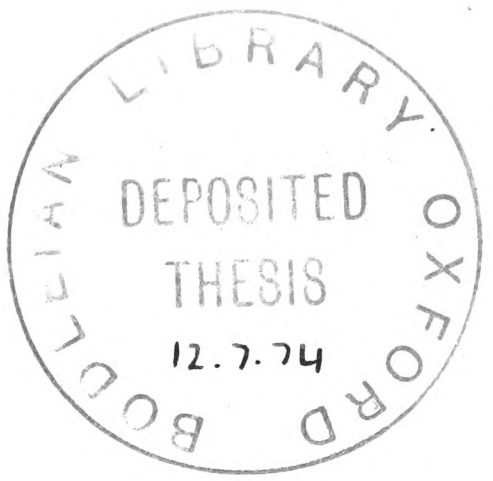
DEVELOPMENT PROBLEMS IN AN EXPORT ECONOMY: A STUDY OF DOMESTIC CAPITALISTS, FOREIGN FIRMS AND GOVERNMENT IN PERU, 1919-1930.

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ABSTRACT

Peru is one of the leading examples of a primary-product export economy which has failed to achieve a high level of economic development. In this study, two alternative explanatory models of such development failure are tested against evidence drawn from Peru's experience in the 1920's (the culminating decade of a cycle of export growth which began in the 1880's and was brought to a close by the world depression of 1930).

The first of the models is drawn from the mainstream of orthodox writing on development. Integration of an economy into international commodity and capital markets is viewed as a positive step towards development, and failure to achieve development is therefore explained by appeal to special obstacles which prevent the working-out of market forces. A variety of such obstacles may be proposed, of which three possibilities are particularly relevant: the absence of a dynamic, responsive elite to initiate and guide a development process; a binding scarcity of capital; and an inability of the local economy to adjust to the technological requirements of development. Because of the existence of such obstacles, the argument runs, the impulse towards growth and modernisation given by integration into the international economic system fails to spread much beyond the export enclaves. Foreign factors of production (particularly capital and technological skills) supplement scarce local factors and thereby increase the strength of the forces working towards development; but in the final analysis development can proceed only as fast as the obstacles are overcome.

The second, opposed, model of development failure suggests that market forces themselves work in such a way as to erode the local economy's capacity for development. Integration into the international economy, it is suggested, leads to economic retrogression rather than development, and may destroy a viable pre-existing capacity to generate development. Foreign capital enters the local economy not to fill gaps in its resource endowment, but because of market imperfections. Local enterprises are destroyed and local factors displaced by the process of investment by international firms. As a growing proportion of capital formation takes place in foreign-controlled, rather than locally-controlled, enterprises, the domestic economy's capacity to mobilise and allocate capital falls, and under-employment of local factors increases. Opening the local economy to international market forces also opens for the domestic elite the option of abandoning an entrepreneurial function, and converting themselves into client allies of foreign interests - a 'comprador' class, without commitment to the development of the broader national economy. The State participates also in this process of decay.

The thesis of this study is that Peru's experience in the 1920's fails to correspond to the first of these two models, but yields some evidence favouring the second. In Chapter 1, four central issues in the debate are identified, and hypotheses derived from them are then tested in the six subsequent chapters. The four areas selected for investigation are the following:

(i) Were there binding factor constraints which ruled out a self-sustaining development process? Attention focusses here particularly

on the question whether there existed a 'savings gap', and whether the native elite may have been incapable of meeting the organisational, technological and psychological requirements of a development model.

(ii) What is the effect upon income levels and development prospects of the process of foreign direct investment in primary-product export sectors? In particular, does foreign direct investment supplement the local economy's supply of scarce factors, or displace native factors of production from efficient employment?

(iii) Does the Government perform satisfactorily as a regulating and bargaining agent, seeking to capture for the host economy the maximum possible gains from export growth in a context of foreign direct investment? The debate here hinges upon the question whether apparent failures of the Government in this role should be attributed to 'softness' or to deliberate policy.

(iv) What is the effect upon native enterprises of a process of denationalisation of leading export sectors? The key question here is whether local capital and entrepreneurs displaced from activity in one sector by the arrival of foreign capital were subsequently reallocated towards productive employment in other sectors of the economy, or instead withdrew from active employment or were allocated into activities whose contribution to development was relatively slight.

Chapter 2 describes the historical background to the Peruvian economy of the 1920's, indicating that the period since the 1880's had

been anything but stagnant. Peru was able, using only local factors of production, to initiate a successful export-led growth process in the late nineteenth century, with important spread effects to other sectors. The country's integration into the international economy, however, quickly opened it to the entry of large international firms, which were welcomed by much of the local capitalist group, and which dominated the economy by the 1920's.

Chapter 3 looks more closely at the capability of the native elite, and establishes that the entry of foreign capital was not dictated by any inability of the local economy to mobilise capital or to apply and develop technology, but occurred rather because of differences between foreign and local firms in the perception of risk and calculation of future earnings; of these, the first appears more important. Development along the lines already begun in the 1890's, the chapter concludes, could have been sustained under the control of domestic firms, given the application of appropriate government policy, and continued expansion of export opportunities abroad.

Chapters 4 and 5 are devoted to a more detailed evaluation of the contribution to Peru's development made by the two leading foreign firms, which between them accounted for over half of the country's total export earnings by 1929. The methodology used is adapted from the recent UNCTAD studies of foreign direct investment in manufacturing, and hinges upon th. comparison between the actual income effects generated by the foreign firms in practice, and the effects which could reasonably have been expected in the case of local control of those sectors in the absence of

foreign capital. In both cases, the conclusion reached is that the net contribution of foreign capital was negligible or negative.

Chapter 6 takes up the issue of government policy formation, asking why, if Peru was deriving so little advantage from the presence of foreign capital, the Government did not regulate the foreign firms more stringently. The enquiry takes the form of a detailed case study of the relations between the Government and the largest foreign firm, the International Petroleum Company. The main conclusion is that the Government was an effective and generally skilled regulator and bargainer within the goals which it set itself; but that those policy goals were certainly not optimal from the standpoint of national development. Rather, the Government tended to embody narrow group interests - particularly the interests of Government itself.

Since the entry of large amounts of foreign capital in the early twentieth century displaced local entrepreneurs and capital from several export sectors, Chapter 7 considers the possibility that these factors of production might have been reallocated towards other sectors of the national economy, initiating dynamic growth there. The conclusion reached is that, on the contrary, the transfer of much of the export economy to foreign control coincided with the end of dynamic development of Peruvian manufacturing and the beginning of a swing towards capital flight, conspicuous consumption, and property speculation as the main activities of the domestic elite. Exports in the 1920's ceased to function as an engine of growth, and only a partial substitute was provided by the huge programme of Government foreign borrowing during the decade. The Peruvian development process

which had begun in the 1880's had come to a full stop by the mid-1920's - five years before the onset of world depression.

The argument is not, however, that this conspicuous development failure should be blamed solely on the operations of international firms. Two other elements in the situation emerge as significant. The first is the failure of the host-country government to assert the national interest (if national interest is defined as a maximum Peruvian share in the gains of export industries) against the international firms - a failure which must be understood not as a manifestation of incompetence, but as a deliberate policy decision.

The second point is that, although the presence of international firms in Peru had negative net effects, it cannot be said with certainty that the country's evolution would have differed fundamentally in the absence of foreign capital. The level of national income at the end of the 1920's would have been somewhat higher, and the national economy would have been better-integrated, but in the absence of effective regulation by government, it is not necessarily true that the native elite would have carried the country into a development process of sufficient magnitude to raise it out of its underdeveloped status. The fact of operating in an open economy, exposed to the influences and opportunities of the international system, might instead have led the Peruvian elite down the path followed in fact by Bolivia, Peru's neighbour, rather than along the road of national capitalist development. The study concludes, thus, on a note of scepticism concerning the long-run viability of export-led growth models in the absence of a strong State genuinely committed to national economic development.

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The early stages of the work for this thesis were supervised by Mr Laurence Whitehead. Most of the project, however, was carried out under the supervision of Mrs Rosemary Thorp, who has given freely of her time and patience. The final result owes a great deal to her encouragement, criticisms, and ideas. The faults and errors which remain are of course entirely my own.

Footnotes and Abbreviations

Throughout, at the first appearance of each work in a footnote, the author's surname and short title of the work are given. Full details of the work will be found in the bibliography at the end of the dissertation. Subsequent references to a work once introduced give only author's surname, or surname and short title in cases where more than one work by the same author have been cited.

In the case of certain periodicals to which frequent references are made, abbreviated titles have been used, as follows:

B.C.I.M. : Boletín del Cuerpo de Ingenieros de Minas.

B.O.M.P. : Boletín Oficial de Minas y Petróleo.

B.O.U.I.E.S. : Bulletin of the Oxford University Institute of Economics and Statistics.

Extracto Estadístico: Extracto Estadístico del Perú, produced by the Dirección Nacional de Estadística.

Leader: The West Coast Leader.

References to sources in the records of the British Foreign Office, held in the Public Records Office, London, are identified by the item number of the document, followed by the group and class codes (FO371) and the piece or volume number. (Example: Despatch dated December 28th, 1930, W.M. Gurney to Foreign Secretary, Item A769 in FO371/15107.) Page numbers, when given, refer to the Foreign Office pagination.

References to sources in the U.S. State Department records held in the National Archives, Washington, as Record Group 59, are identified

by their Decimal File code. (Example: Despatch No. 462 dated February 4th, 1930, Ellis O. Briggs to Secretary of State, D.F. 823.51/471). In some cases microfilm references for the same document are also given, with the microfilm file code (M746) followed by the roll and frame numbers. (Example: M746 Roll 20 Frame 642.)

The following symbols are used throughout for national currencies:

$ U.S. dollar.

£ Pound sterling.

£p Peruvian Libra, originally equivalent to the pound sterling.

S/ Peruvian sol (one-tenth of a Libra).

¢ U.S. cent.

CHAPTER 1

INTRODUCTION: SOME ISSUES

Peru today, despite a century and a half of political independence and five centuries as an export economy, remains an underdeveloped country. It is a classic example of that group of countries which by the mid-twentieth century[1]

> ... had received substantial inflows of capital from abroad and established significant export industries, and yet had failed to develop broadly. Export growth had not initiated in them the general growth predicted by the neoclassical model.

Any attempt to explain this failure, and consequently to cast light upon the causes of underdevelopment, must begin with the historical experience of the underdeveloped countries themselves.[2] In this study, an exploration is undertaken into the experience of Peru during the first thirty years of this century, and particularly into the events of the 1920's. The aim is to test against Peru's past experience some of the explanations which have been offered in the literature for the failure of many export economies to develop. The approach taken focusses upon the questions of capital formation, investment decisions, and entrepreneurship, which are the crucial elements in a capitalist development model. The discussion is in terms of three economic agents

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1. Baldwin, Economic Development and Export Growth: a Study of Northern Rhodesia, p. 6.
2. For a critique of economic growth models which treat underdevelopment simply as a condition of static low-level equilibrium, see Griffin, Underdevelopment in Spanish America, pp. 31-50.

whose influence in these areas was decisive in the Peruvian case: the domestic elite, the international firm, and the host-country government.

The relationship between international trade and capital flows, and the development of individual economies, has been the subject of an enormous literature. The most common conclusion has been that trade and capital flows are positive elements in economic development[1]; but alongside this has often gone a recognition that in practice the integration into the international economy of numerous 'less developed countries' has not been accompanied by the anticipated impetus to their development.[2] As is described below, many writers reconcile this apparent contradiction by appeal to non-economic factors which are held to have obstructed the proper working-out of market forces.[3]

In contrast to this general approach, which identifies obstacles in the internal structure of these countries as the cause of their underdevelopment, there has grown up a body of theory which identifies international market forces themselves as a cause of underdevelopment. Early contributions to this approach were the 'terms of trade' models of some structuralist writers[4], and the Marxist theory of imperialism,

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1. Findlay, Trade and Specialisation, Chapter 6; Meier, International Trade and Development.
2. Cf Meier, pp. 190-191.
3. See, e.g., Myint, 'The Classical Theory of International Trade and the Underdeveloped Countries' in Economic Journal 1958; Nurkse, Patterns of Trade and Development; Caves, ' 'Vent for Surplus' Models of Trade and Growth' in Baldwin, Trade, Growth and the Balance of Payments; Hoselitz, Sociological Aspects of Economic Growth.
4. Prebisch, The Economic Development of Latin America and its Principal Problems. Terms-of-trade models are now out of favour as the result of a series of telling empirical attacks; see, e.g. Haberler, 'Terms of Trade and Economic Development' in Ellis, Economic Development for Latin America.

which holds that colonised countries have been drained of their economic surplus for the benefit of metropolitan economies.[1] A model along similar lines, claiming that the operation of market forces tends to produce a centripetal concentration of economic resources, has been proposed by Myrdal.[2]

In the late 1960's, a group of writers working in Latin America extended this approach. Their basic proposition is summed up by Frank:[3]

> Latin America, far from ... having only recently emerged as an actor on the stage of world events, began its post-conquest life and history as an integral, exploited partner in the world's capitalist development; and this is why it is underdeveloped today.

The essence of the new school, which will here be labelled (in accordance with current usage) the 'dependency model', is its emphasis on the historical origins of underdevelopment. The orthodox tradition of development economics generally assumes that underdevelopment is merely a static set of 'initial conditions', which are progressively overcome by economic development.[4] The dependency model, in contrast, considers

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1. Baran, The Political Economy of Growth, Chapters 5 and 6; Magdoff, The Age of Imperialism.
2. Myrdal, Economic Theory and the Underdeveloped Regions.
3. Frank, Capitalism and Underdevelopment in Latin America, p. 28. Most of Frank's main propositions can be traced directly back to the writing of Baran. The model is summarised in Griffin, Underdevelopment in Spanish America, Chapter 1.
4. See, e.g. Rostow, The Stages of Economic Growth.

the present condition of underdeveloped economies to be the product of dynamic historical processes, and specifically of the nature of the relationship established between the metropolitan economies of the capitalist world and the 'peripheral', or 'dependent', economies. A recent statement of the case points out that[1]

> To classify these societies as 'traditional societies' begs the issue and implies either that the underdeveloped countries have no history or that it is unimportant.

For the historical study of development failure in export economies, the two most relevant approaches are provided by 'enclave models' on the one hand, and 'dependency models' on the other. The remainder of this chapter considers each in more detail, before proceeding to identify the main hypotheses to be tested in this study.

Enclave Models of Underdevelopment

The common denominator of enclave models is their view of underdevelopment as a low-level equilibrium situation, from which one path of escape is opened by integration of the national economy into the world market system.[2] This has two implications which are worth noting at the outset. The first is that the underdeveloped economy, left to its own devices, would be unlikely to enter upon a self-sustaining development process. The second, which follows from the first, is that any benefits obtained from integration into international markets, however much those benefits are circumscribed by indigenous checks to

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1. Griffin, p. 33.
2. For a recent restatement of the low-level equilibrium model see Myrdal, Asian Drama, Vol. 3, Appendix 2, especially pp. 1859-1878.

development, represent real net gains, which can be expected to increase as obstacles are removed. Mikesell has clearly stated this case with reference to foreign direct investment.[1] An export industry, he suggests, is often initially developed by foreign capital because local enterprise is unable to do the job, or is too inefficient to do it well. An economic activity which would otherwise not have existed is thus created. As the development of the industry proceeds, its spread effects should also increase as local factors capture a growing share of the benefits; and ultimately it becomes an integral and vital part of a developing national economy.

The main problem to be dealt with, in this view, is the existence of barriers which limit the integration of the export enclave into the local economy, and hence the extent to which exports are able to act as an 'engine of growth'. The enclave writers have been largely concerned with the identification of obstacles whose removal would speed the integration process, and thereby the transition to self-sustaining development. One line of attack concentrates upon the alleged backwardness and traditionalism of the indigenous society as an explanation for the formation of enclaves; while a second focusses on the question of factor proportions and tax policy.

Possibly the best-known study taking the first of these positions uses the nineteenth-century economic history of Peru as a case study of a country where the traditionalism and rigidity of the host economy led to a failure of export growth to spread beyond enclaves.[2] Levin used

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1. Mikesell, Foreign Investment in the Petroleum and Mineral Industries, Chapter 1.
2. Levin, The Export Economies: their Pattern of Development in Historical Perspective.

this model to explain (and justify) the dominant role of foreign factors of production in the guano industry, claiming that the task could not have been carried out by Peruvians. A critical reading of Levin's work, however, reveals a number of serious flaws.

Levin's intention was to demonstrate that nineteenth-century Peru was a traditional society typical of many others, and that Peruvian 'inability' to develop guano as an export industry illustrates general propositions concerning factor immobility and economic unresponsiveness in underdeveloped countries.[1] The static, unchanging social order, firmly rooted in past history, which lay at the core of Levin's model, proves however to be at variance with the Peru which Levin describes. The initial conditions of the Guano Age were the end-product of decay of the world's greatest precious-metals export economy, followed by prolonged and debilitating wars leading to Peru's independence from Spain.[2] The scarcity and relatively high cost of capital were due not to traditional institutions, but to the destruction and capital flight of the war period.[3] Entrepreneurship, claimed by Levin to have been repressed by traditional culture and alien to the Iberian mind, rapidly flourished in Peru as the rise of the guano trade brought a revival of economic life and uncovered expanding profit opportunities, so that within a couple of decades of the initiation of the trade the Lima-based ruling class

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1. Ibid., pp. 5-6 provides a clear statement of Levin's model.
2. Ibid., pp. 36-37.
3. Ibid., p. 38.

of the country were guano entrepreneurs almost to a man.[1] Indigenous labour, claimed by Levin to have been tightly and irremovably bound to peasant agriculture, had in fact been the mainstay of the mining industry of the preceding three centuries, and was unwilling to enter the guano industry for rather simple and obvious reasons: conditions were appalling, mortality heavy, and wages very low.[2]

If nineteenth-century Peru failed to correspond to models of a traditional society, it is not surprising that the same country in the twentieth century should pose equal problems. The issue is taken up in Chapter 3, which investigates the possibility that the Peruvian elite of the 1900-1930 period may have lacked (in any absolute sense) the characteristics of capitalists and innovators by surveying the record of their performance in export sectors. The impression that entrepreneurship in many underdeveloped societies has been more responsive and dynamic than some theorists have suggested receives support not only from the performance of Peruvian capitalists, but also from the histories of certain other underdeveloped areas. Thoburn, for example, found that in Malaya,[3]

> During the rubber boom in the early years of the century, Malayans had been able to mobilize massive amounts of domestic saving, such that the expansion of the rubber industry did not involve a net inflow of resources and the balance of payments was chronically in surplus. Equally, a large supply of entrepreneurs appears to have been available not only to invest in rubber but also in tin mining and a host of trading activities associated with the export industries.

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1. Ibid., p. 84.
2. Ibid., p. 88.
3. 'Exports and the Malaysian Engineering Industry', in B.O.U.I.E.S. May 1973, p. 110.

Awareness of the weakness of the 'traditional society' case[1] led later 'enclave' writers to concentrate instead on the question of factor proportions. Writing on copper, an industry which has generally been capital-intensive, skill-intensive, and dependent upon relatively sophisticated technology, Baldwin[2] and Reynolds[3] suggested that the technological production function dictated that mineral-export sectors must draw their factor inputs from countries relatively well-endowed with capital, skills, and sophisticated capital-goods industries. The host economy, however responsive, was a prisoner of its factor endowment. Baldwin summarised thus his conclusions concerning Northern Rhodesia:[4]

> ... the engineering constraints on the manner of producing copper, and the early relative factor endowments, were not favourable for initiating a broadly-based, self-sustaining development process. Instead, they were such that Northern Rhodesia became a markedly dualistic economy...

Reynolds, on the basis of similar conclusions, claimed that the host economy's main chance of participating in the gains from export growth was through taxation of the foreign firms, since local firms were incapable of efficiently developing the industry themselves.

As with Levin's work, the Baldwin-Reynolds approach is subject to various criticisms. In the first place, it should be noted that the

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1. See, e.g., the critique in Baldwin, Economic Development and Export Growth, Chapter 1.
2. Ibid.
3. 'Development Problems of an Export Economy', in Essays on the Chilean Economy.
4. Baldwin, p. 214.

applicability of the model is limited to economies whose factor endowment can credibly be portrayed as inappropriate to the needs of the industry concerned, as may be the case with capital-intensive enclaves in labour-abundant economies. It is of little use, however, in cases of labour-intensive low-technology enclaves, such as Peruvian guano and the plantation economies of the Caribbean.

In the second place, the claim that factor proportions are rigidly fixed by the technological production function has been challenged by several writers, who claim that choice of technique is determined by the corporate strategy of international firms, rather than by the impossibility of evolving intermediate technologies.[1]

Finally, it should be noted that the empirical validity of enclave models has come under some fire from subsequent research. Hunt, for example, has found that the Peruvian guano industry (which according to Levin generated very small flows in the local economy) displayed a surprisingly high 'returned value', in the vicinity of 65-70% over the period 1850-1870. He states:[2]

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1. See, e.g., Girvan, 'Multinational Corporations and Dependent Underdevelopment in Mineral-Export Economies' in Social and Economic Studies, December 1970. An alternative formulation of this criticism in terms of more generalised distortions in the international market for technology, is Merhav, Technological Dependence, Monopoly and Economic Growth. See also, Griffin, 'International Trade and the Transmission of Inequality'.
2. Hunt, Growth and Guano in Nineteenth-Century Peru, p. 84.

> Income generated by guano must have created a substantial demand for goods and services produced by the domestic economy.... More direct substantiation for this conclusion comes from the fact that domestic inflation proceeded apace during this period. The lack of demand hypothesized in the enclave model distorts the reality of Peru in the Guano Age.

Dependency Models of Underdevelopment

Writers of the dependency school[1] take a far more pessimistic view of the operation of international market forces. Their critique of the conventional model does not directly attack the comparative-static case for gains from trade, but hinges rather upon what are felt to be the negative dynamic effects flowing from integration of a national economy into the international system with dependent status. The focal point of these models is the mobilisation and investment of savings, labelled 'surplus' in accordance with Baran's usage.[2] The volume of savings actually mobilised in underdeveloped economies, it is suggested, is generally limited by capital-absorptive

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1. In addition to Frank, Baran, and Griffin (see earlier references) the main contributors to the 'dependency' school have been Bodenheimer, 'Imperialism and Dependency: the Roots of Latin American Underdevelopment'; Cardoso, 'Latin American Capitalism' in New Left Review, 1972; Dos Santos, 'The Crisis of Development Theory and the Problem of Dependence in Latin America' in Bernstein, Underdevelopment and Development, and 'El Nuevo Carácter de la Dependencia' in La Crisis del Desarrollismo y la Nueva Dependencia; Furtado, 'Dependencia Externa y Teoría Económica' in Trimestre Económico 1971; Sunkel, 'Capitalismo Transnacional y Desintegración Nacional en la América Latina' in Trimestre Económico 1971, and 'The Pattern of Latin American Dependence' in Urquidi and Thorp, Latin America in the International Economy. An attempt to provide historical perspective is Cardoso and Faletto, Dependencia y Desarrollo en América Latina.
2. Baran, Chapter 2, elaborates his concept of economic surplus. See also Arrate and Geller, 'Economic Surplus and the Budget' in Griffin, Financing Development in Latin America.

capacity,[1] and the supply of capital available domestically can be increased by internal policy measures, without resort to foreign financing. The introduction of foreign capital and enterprise, (which in a short-run static sense may appear more 'efficient' than use of domestic factors) merely reduces the incentive to mobilise and employ domestic factors, since the already-limited absorptive capacity of the economy is further restricted when foreign capital pre-empts profitable opportunities. Baran makes the point explicit in his treatment of primary-product export sectors:[2]

> It is undoubtedly correct that if the natural resources of the under-developed countries were not exploited, there would be no output to provide for the transfers of profit abroad /and such transfers may be thus defended against the claim that they are exploitative/. This is, however, where the firm ground ... ends. For it is by no means to be taken for granted that the now under-developed countries, given an independent development, would not at some point have initiated the utilization of their natural resources on their own and on terms more advantageous than those received from foreign investors.

The outcome of a process of replacement of (or substitution for) domestic factors by foreign factors of production is that the earnings of export sectors accrue to foreign rather than domestic enterprises. The capacity of the domestic economy to generate savings is thereby reduced below the level which would have resulted from domestic development of

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1. Baran emphasizes (pp. 23-24) the wasteful use to which potential surplus is put, rather than capital-absorptive capacity per se; but his approach coincides with that of several recent writers on the latter issue. For a survey see Stevens, Capital Absorptive Capacity in Developing Countries.
2. Baran, p. 186.

the activity; and decisions as to the future allocation of the capital generated in export sectors are made by foreign rather than local firms. Much of this capital in fact leaves the country in the form of repatriated profits; and it is a central proposition of the 'dependency' case that the development contribution of foreign capital is not sufficiently great to outweigh the loss to the local economy imposed by repatriation of profits by foreign firms, and the denationalisation of key sectors.

The opening of dependent economies to foreign capital, and the pattern of development or non-development which has resulted, follow automatically from the integration of an economy into the world capitalist system, in a dependency model. Although there is disagreement over the precise reasons why international (metropolitan) firms are able to displace native firms, dependency writers emphasize the empirical evidence of the superiority of the international firm in any struggle for control, and suggest that native entrepreneurs generally find it more expedient (and profitable) to accede to the entry of foreign capital, and seek for themselves a role as allies and intermediaries rather than as nationalist opponents. This process, however, implies the withdrawal of part of the native elite from a Schumpeterian entrepreneurial role, at the same time as the local capital market is eroded by the transfer of a large part of domestic capital formation into foreign hands and the reduced importance of locally-financed and initiated projects.

The dependency approach puts forward, thus, two central propositions:

firstly, that the indigenous economy would be capable of mobilising the factors necessary for its own development, given the application of appropriate economic policies by government;[1] and secondly, that international market forces in practice produce a displacement of local factors of production from the most profitable sectors, and their replacement by foreign factors - particularly capital and entrepreneurship. The latter process, it is hypothesized, far from inducing a reallocation of scarce domestic resources towards other activities, merely increases the under-utilisation of local potential savings and entrepreneurship, pre-empts the main projects upon which local enterprises might have been constructed, and prevents the evolution of local skills, technology, and entrepreneurial experience.

Models of the State in dependency theory, finally, are as pessimistic as the models of foreign direct investment.[2] The State is considered to be largely the handmaiden of minority vested interests, and correspondingly inclined to exercise its functions of regulating and bargaining from a standpoint quite inappropriate to a policy of national development.

It may be worth emphasizing that the 'dependency' model goes considerably beyond the familiar nationalist case against foreign capital as such. The dependency argument is rather that the international market system operates, in a dynamic sense, against the development of peripheral economies. Foreign firms, if not effectively regulated, will respond rationally to the international structure

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1. For a clear statement of this claim see Hirschman, **'How to Divest in Latin America and Why'**, in Princeton Essays in International Finance No. 76, pp. 5-6.
2. Cf Kaplan, 'Estado, Dependencia Externa y Desarrollo en América Latina' in Dos Santos et al, La Crisis del Desarrollismo y la Nueva Dependencia.

of profit opportunities, and thereby will often act against the interests of host economies. Local firms, however, are also faced (once integrated into the world system) by the same set of market forces, and will also be led by rational calculation into the 'wrong' decisions from the standpoint of national development. It is on this basis that writers such as Frank have been so pessimistic concerning the real possibility of independent capitalist development as an historical option.[1]

Although the 'dependency' model has been widely elaborated, at the theoretical level, historical studies using this approach have been few and not very thoroughly researched; Frank's work on Chile and Brazil provides a case in point. Most of the empirical work done has been concerned with the present-day operations of international firms; it is in this sense that Dos Santos describes the subject of his research as 'the new dependency'.[2] The writing on long-range historical processes, although based upon the plausible conjecture that development failure must have historical roots, has on the whole been confined to generalities. This is surprising, since a number of clear historical hypotheses are put forward in the model. The next section indicates some of these hypotheses.

Main Hypotheses

The two models of development failure sketched above provide a

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1. Frank, pp. xi-xii and 118-119.
2. Dos Santos, 'El Nuevo Carácter de la Dependencia'.

number of sharply-opposed hypotheses which can be tested against historical experience. Four central issues in the debate provide the hypotheses for the study which follows.

i) Does the national economy confront binding factor constraints? Many writers in the enclave tradition have begun from some variant of the 'gap' approach, which suggests that critical bottlenecks in supply of capital, or foreign exchange, or specific skills, must be broken in order for development to proceed. Such models assume very limited flexibility in the local economy, and provide an argument in favour of the use of foreign factors of production, generally introduced through aid or foreign direct investment.[1] Dependency models, on the contrary, emphasize the under-utilisation of domestic resources and tend to deny the existence of binding constraints in the supply of capital or entrepreneurship. The possibility that the supply of land factors may be a critical constraint is not explicitly noted in the dependency literature, but is compatible with its main line of argument. (Such a constraint, it will be seen, has relevance in the Peruvian case). The issue of savings and entrepreneurship is taken up in Chapter 3, which enquires whether the Peruvian capitalist class of the 1920's exhibited the capacity to carry out an independent development process, and what their record had been as development agents in export sectors.

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1. For a well-known statement of the 'gap' approach see Chenery and Strout, 'Foreign Assistance and Economic Development' in American Economic Review, September 1966. Further analysis is provided in Mikesell, The Economics of Foreign Aid, Chapter 3. An early attack on the 'savings gap' concept is Wolf and Sufrin, Capital Formation and Foreign Investment, Chapter 2.

ii) What is the actual contribution of the foreign firm to the development of the host economy? Enclave models suggest that foreign direct investment brings net benefits for the host economy, by supplementing the supply of scarce factors (filling 'gaps'), improving efficiency, and opening possibilities for domestic factors to be reallocated towards the development of other sectors. The argument, in general terms, is that the gains from FDI outweigh the foreign-exchange cost of servicing foreign capital. Dependency models suggest that the proposed 'gaps' do not in fact exist, and that FDI tends to supplement the supply of factors (capital and entrepreneurship) which are already in relatively abundant potential supply, but not fully mobilised (or if mobilised, are already in some degree of excess supply, in relation to absorptive capacity). The net effect of FDI, dependency models suggest, is often negative, once dynamic elements are taken into account. Chapters 4 and 5 carry out quantitative and qualitative analysis of the contribution to Peru's development of the two leading foreign mineral-exporting firms.

iii) Does the government pursue optimal policies? Many writings make the simplifying assumption that government fairly embodies the social welfare of the nation, and devises policy with the aim of maximising that welfare. Dependency writers suggest instead that government serves minority interests, and designs policies primarily to suit those interests. In cases where government fails to promote the national interest in practice, the debate hinges upon the question whether the failure is to be ascribed to incompetence or 'softness' in

the government, or to deliberate policy distortions. Chapter 6 investigates the performance of the Peruvian Government of the 1910's and 1920's in its function as the bargaining and regulating agent confronting the foreign firm, and enquires what were the policy goals pursued by the State.

iv) What happens to domestic entrepreneurs, and their capital, when their enterprises are taken over by foreign firms?[1] In some cases, alliance with the foreign firm in some form of joint venture is the outcome, and it must then be asked whether the implications of such an alliance are positive or negative from the point of view of development. If alliance draws the local entrepreneur into a productive and active partnership with foreign capital, which opens economic opportunities which would otherwise have been inaccessible to the local man, alliance may be a desirable thing. If, on the other hand, the local entrepreneur withdraws from active creative activity, there may be negative results. If it appears that local capitalists were displaced entirely from operation in one sector, it is necessary to see whether they subsequently shifted their activities, to undertake a dynamic role in other sectors. If investigation of the character of the elite shows them to have been responsive to economic opportunities and prepared to shift resources from one sector to another, then such

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1. This issue has attracted debate particularly in discussions of the impact of FDI in manufacturing industry in the less-developed countries. See, e.g., discussion in Markensten, Foreign Investment and Development: Swedish Companies in India, Chapter 9.

a transfer of activity could be predicted to follow upon their displacement, with possibly beneficial effects for overall development. Hence, the patterns of intersectoral resource allocation within the Peruvian economy require investigation. Insofar as an inflow of foreign direct investment represents an increase in the total factor supply, that increase should become manifest in a higher overall level of investment in a variety of sectors. If such increases are not visible, or are less than might be expected, the possibility of leakages may be raised. If increased investment in other sectors does follow heavy foreign direct investment, the character and contribution of this local investment activity must be taken into account in evaluating the role of foreign capital itself. Chapter 7 analyses the evolution of non-export sectors in Peru during the 1920's in order to see whether the growing predominance of foreign capital in export sectors was matched by an increase in the dynamism of locally-controlled sectors serving the local market.

Finally, the choice of the 1920's as the period for study may require brief justification. The decade was the peak of a long cycle of export-led growth in Peru, and is one decade of the twentieth century generally pointed to as a high-water mark in the process of foreign investment in the Peruvian economy. The period is thus particularly suitable for a discussion of the relationship between foreign and domestic entrepreneurial groups, and the structural effects of foreign investment upon the host economy. The decade was also marked by political stability, with no change of government from 1919 to 1930, which provides some guarantee of continuity of policy, and permits close

analysis of long-term policy formation. Lastly, the fact that more than thirty years have passed makes it possible to use the diplomatic papers of Britain and the United States - the two main sources of foreign influence in Peru - to analyse the process of bargaining from the inside.

Sources.

The study draws upon a variety of primary sources. Peruvian official publications provide most of the statistical material used; in particular the foreign-trade statistics and the annual statistics of the mining industry. The former, although subject to severe criticism at the beginning of the century for their incomplete coverage and poor valuation techniques, had improved greatly by the 1920's and are used here with a fair degree of confidence. The official mining statistics, on which Chapters 4 and 5 rest, are excellent, presenting the results of a thorough annual questionnaire in disaggregated form. Statistics of manufacturing, on the other hand, were irregular and very patchy, serving only to provide orders of magnitude, as Chapter 7 notes. Agricultural statistics were quite unreliable in the 1920's, and have been ignored.

The analysis of the negotiating performance of the Peruvian Government is based on a survey of the diplomatic archives of both Britain and the U.S.A., with most of the key points cross-checked between the two.

The basic source for the description of the economy's overall structur and evolution in the 1920's is the English-language weekly, The West Coast Leader, which provided regular . coverage of events in the Peruvian business community and occasionally commissioned special economic articles, including several by members of the commercial staff of the U.S. Embassy. The Leader also reprinted articles on Peru originally published abroad, in sources such as the Wall Street Journal.

In addition to these main primary sources, material culled from a wide range of secondary sources provides evidence to support the general picture drawn below of the Peruvian economy in the 1920's.

CHAPTER 2

The Peruvian Economy in the 1920's

The Peruvian economy has always been, since Independence in the 1820's, an export economy, whose cycles of growth and stagnation have coincided with shifts in the international markets for Peruvian products, mostly primary commodities. The country's republican history can conveniently be divided, for analysis, into three broad cyclical periods, corresponding to the movements of export earnings shown in Figure II.1. The three cycles may be summarised as follows:

1. The Guano Age, 1830-1882: Peru's recovery from the destruction and economic collapse associated with the Independence Wars was hastened and followed by an export boom based on guano fertiliser, which was dug off the islands along the coast and shipped to European farmers. The guano age reached its peak in the late 1860's and early 1870's; but the mid-1870's brought financial collapse, declining markets for guano, and exhaustion of the richest reserves. The cycle was brought to a close by the defeat of Peru by Chile and loss of the country's reserves of nitrate (the successor to guano) in the War of the Pacific, 1879-1882.[1]

2. The Second Post-Independence Cycle, 1883-1932: Recovery from the destruction and collapse associated with the war was followed by

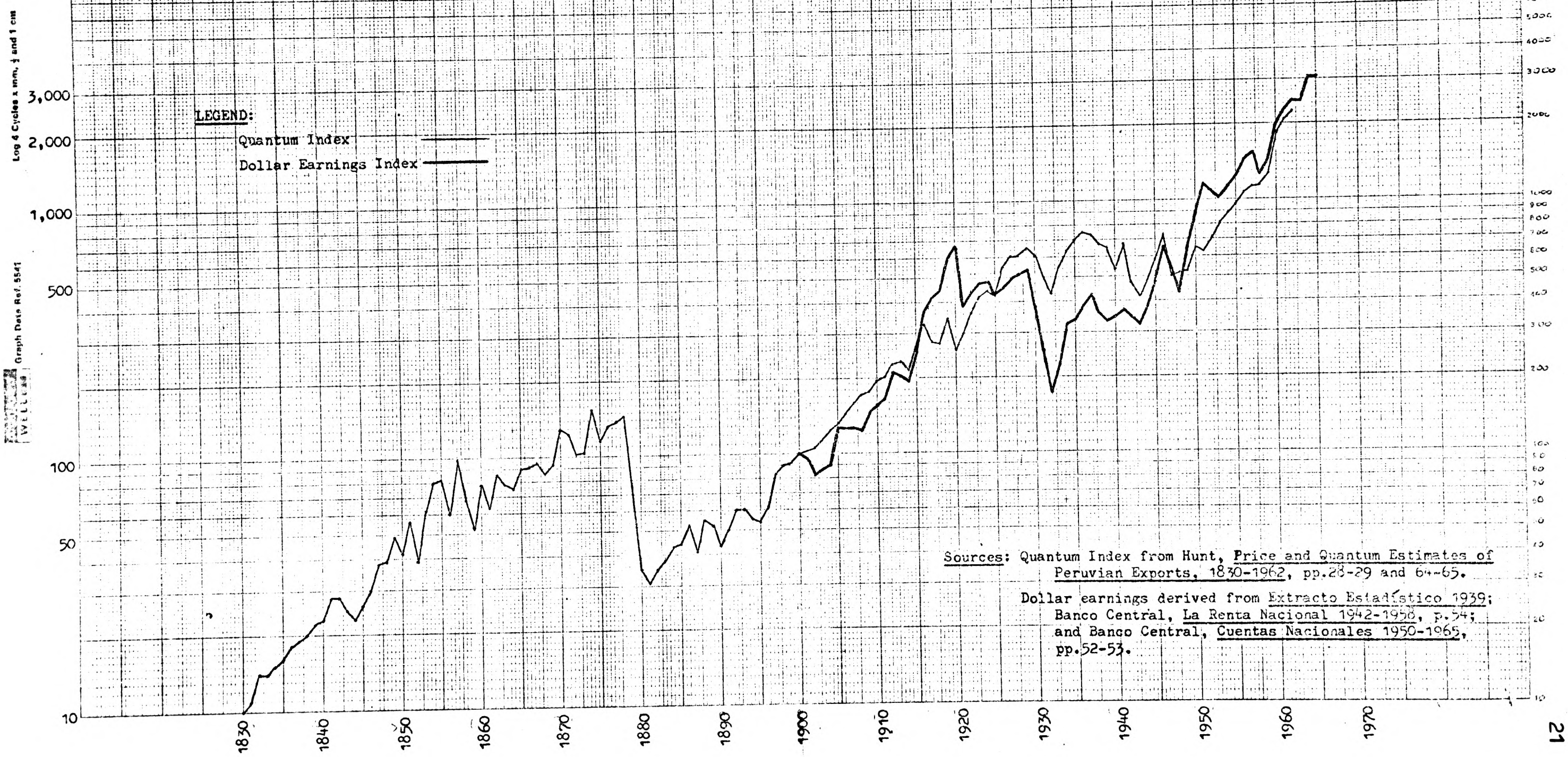
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1. A number of histories of the Guano Age are available. See, e.g., Hunt, Growth and Guano in Nineteenth-Century Peru; Levin, The Export Economies; Maiguashca, 'A Reinterpretation of the Guano Age'; Matthew, 'The Imperialism of Free Trade: Peru 1820-1870', in Economic History Review, December 1968; and Bonilla, 'L'Histoire Économique et Sociale du Pérou au 19e Siècle'.

FIGURE II.1

Exports 1830 to 1965: Indexes of Volume and Dollar Value

1900 = 100



Sources: Quantum Index from Hunt, Price and Quantum Estimates of Peruvian Exports, 1830-1962, pp.28-29 and 64-65.

Dollar earnings derived from Extracto Estadístico 1939; Banco Central, La Renta Nacional 1942-1956, p.54; and Banco Central, Cuentas Nacionales 1950-1965, pp.52-53.

the rapid growth of a diversified group of export products, with earnings reaching a peak in the wartime boom years 1916-1920. The cycle ended with financial and economic collapse imposed by the Great Depression, and with Peru again at war, this time with Colombia, but on only a very minor scale.[1]

3. The recent period, 1933 on: Recovery from the Depression was followed by high export earnings in the Second World War and Korean War, and steady export growth based on copper and fishmeal since then.

The existence of cycles such as these, of course, is a problem faced by any export economy. Looking at the quantum and dollar-earnings indexes over the period from 1830 to the mid-1960's, one finds that exports took thirty years after the 1879-81 disaster to recover to their 1878 level; and nearly twenty years to recover after the 1929-32 collapse. In the course of each of these recoveries, a rapid rate of increase was established which carried over beyond the level of the preceding peak. From 1830 to 1860 the index shows an average annual growth of nearly 7%. From 1890 to 1929, the average was again 7%. From 1942 to 1965, the average was nearly 10%. Averaging over the peaks and slumps, however, from 1830 to 1965 the overall annual growth of exports was only 4% (still a fairly respectable figure); and if (judging from Figure II.1) one pessimistically supposes that the steep growth since 1950 represents, as in previous cycles, a swing above the long-run growth trend, that trend comes down to 3.5%. Total

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1. The war between Peru and Colombia over the Amazon territory of Leticia was halted before it had developed beyond minor skirmishing. Colombia won.

population over the same period grew at an average of about 1.5% (slightly lower in the nineteenth century, and accelerating slowly from 1920 on)[1], indicating an overall upward trend in exports per capita of some 2% p.a. over 120 years. This, however, is certainly above the rise in total income per capita, since exports have always been the most dynamic sector of the economy.[2]

A model of export-led growth should presumably focus on the effects upon the national economy of the periods of sustained rapid export growth, such as that from 1890 through to 1929, since it is in such periods that one might expect the foundations of self-sustaining development to be laid. If no sign whatever could be found of exports having exercised a dynamising role in relation to other economic sectors, it might be necessary to fall back upon the type of explanation which focusses on internal rigidity in the national economy. This, however, is not the case in Peru for the 1890-1929 period. The picture which emerges is rather one of an economy served by able entrepreneurs and with a considerable capacity to mobilise resources for development, which nevertheless by the end of the 1920's was stagnant and exhibiting signs of latent collapse. As later chapters will indicate, these signs included an incipient balance-of-payments crisis caused not so much by the import needs of a developing economy as by heavy outflows on capital account; a stagnation in

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1. Peru, Censo Nacional de Población y Ocupación de 1940, Vol. 1, pp. cx-cxiii; and Banco Central de Reserva, Cuentas Nacionales 1950-1965, Table 1, p. 11.
2. An illustration is the period 1950-1960, during which exports per head grew 78% while GNP per capita rose only 31%. (Cuentas Nacionales 1950-1965, Table 1.)

the rate of growth of manufacturing industry; a deterioration of the local capital market; and the disappearance of much of the entrepreneurial drive which had earlier been characteristic of Peruvian businessmen. At first sight, Peru in the 1910's and 1920's seems to conform to the second part of Frank's statement that[1]

> During depressions and wars, industrial and economic development in the Latin American satellites did indeed spurt ahead - only to be again cut off or rechannelled into underdevelopment by the subsequent recuperation and expansion of the metropolis or by the restoration of its active integration with the satellites.

How such a pattern could have come about is the central question to be confronted by any study of Peru in this period. As a first step, the remainder of this chapter will fill in the general background to the events of the 1920's. First the general evolution of the economy from 1880 to 1930 will be surveyed, with emphasis on the changing composition of exports and the growing role of foreign direct investment. Then follows a closer analysis of the two main sources of dynamism in the economy: the export sectors and the Government, both of which are studied in conjunction with the changing state of the balance of payments (as revealed by the exchange rate). Finally, some comments on the political background to the period are added.

The Economy, 1880-1930.

Peru emerged from the War of the Pacific with its economic structure seriously damaged. Some of this damage was directly the result

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1. Frank, Capitalism and Underdevelopment, p. 28.

of the war: the occupying Chilean forces destroyed several of the large-scale modern sugar mills built during the 1860's and 1870's, all the installations of the nascent petroleum industry, and sections of the country's railway network.[1] Chile also annexed Peru's southern provinces, containing the main reserves of nitrates and much of the remaining guano. Much damage, however, also derived from the financial collapse which had begun in 1876 and brought the bankruptcy of many sugar growers (heavily dependent on credit), all but one of the banks (which were caught overextended, with large loans outstanding to sugar and other sectors)[2], and the public treasury.

The war was not, however, without its stimulating effects on future development. Certain of the leading entrepreneurs of the following twenty years derived their capital from the war[3]; and the ruin of numerous small operators in the sugar industry provided the opportunity for a new group of entrepreneurs to concentrate large landholdings under their control during the 1880's and 1890's, enabling them to derive significant economies of scale in the organisation of the leading export industry.[4]

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1. According to Costa y Laurent, 'The Railways of Peru' in West Coast Leader (hereafter referred to as Leader), January 11th, 1927, pp. 8-9, the Chileans destroyed 197 kilometres of line and annexed territory containing 256 kilometres, out of a total rail system of 2,017 kilometres. The country's main railways (the Central and the Southern) remained intact.
2. Garland, La Industria Azucarera en el Perú (1550-1895), p. 13.
3. Gio Batta Isola, for example, an immigrant Italian coal merchant, produced cannon balls for the Peruvian armed forces, and went on to become a leading figure in the textile industry and banking (Chaplin, The Peruvian Industrial Labour Force, p. 236).
4. Leading members of this group were the Gildemeisters and Larcos in La Libertad; the Pardos and Aspíllagas in Lambayeque; and the Swayne family in Cañete. Augusto B. Leguía shrewdly married a Swayne, in 1892. For discussion of the process of consolidation of the industry, see Klaren, La Formación de las Haciendas Azucareras y los Orígenes del Apra, Chapter 2.

The postwar recovery accelerated into a development boom in the 1890's, directed by a sizeable group of Peruvian entrepreneurs active in a wide variety of fields. Banks and insurance companies sprang up; manufacturing industry blossomed in Lima, with considerable import substitution; the foundations of a new copper-mining industry were laid in the Sierra; and electricity and tramways companies initiated a rapid growth of the utilities sector.[1] Much of the capital for this development was supplied by the sugar and silver-mining industries, which were connected with the other sectors by interlocking directorates.[2] An interesting feature of this period of national development was that it was, of necessity, self-sustained. As a later commentator pointed out,[3]

> The existence /of the large defaulted foreign debt from the 1870's/ perhaps had been beneficial, in that it completely eliminated the possibility of incurring any new foreign indebtedness during the years of reconstruction when Peru was forced to rely on its unassisted efforts.

A similar note was struck by a Wall Street Journal article of 1922, which cited Peru's success in the absence of foreign loans to support the contention that the country was credit-worthy:[4]

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1. The strength of the domestic Peruvian economic elite at this time is indicated by the fact that Lima was the only capital city in Latin America where the utilities sector - gas, electricity, water, trams - was wholly owned by local capital, with no British participation. (One small exception, the moribund Lima Railways Co, leased its sole line to Peruvian operators.)
2. Among the sugar planters, the Pardos were leading textile manufacturers; the Gildemeisters and Aspíllagas were involved in mining and banking ventures; and Leguía was a major figure in the insurance world. Mining names - Mújica, Gallo, Piaggio and the like - were also common on Lima directorates.
3. McQueen, Peruvian Public Finance, p. 16.
4. Reprinted in Leader, February 1st, 1922, p. 4.

> Curtailment of Peruvian credit since 1890 has not been altogether detrimental to that country. Foreign debt is diminutive. Currency is fully protected by a large gold reserve. Exports have quadrupled since 1913. Balance of trade has been uniformly favourable....

The phase of internally sustained, national development lasted, in general terms, up to the end of the wartime boom, in 1920.[1]

From the turn of the century, however, this pattern began to be overlaid by a new feature: the entry into Peru of large amounts of US capital in the form of direct investment in productive sectors.[2] The Peruvian-owned copper industry of Cerro de Pasco was bought up in 1901; the main oilfield was taken over from a British firm by Standard Oil in 1913; and the US merchant house W.R. Grace and Co. initiated in 1905 a progressive takeover of the largest manufacturing sector, cotton textiles.[3] At the turn of the century perhaps 5% of Peru's exports were produced by foreign firms; by 1930, the proportion

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1. The developments described above are summarised, but not discussed at any length, in Mariátegui, Seven Interpretive Essays, pp. 12-16.
2. British and US capital were already largely dominant in the import-export business, but had seldom ventured beyond this into actual production. The first such investment by British capital was in the Peruvian Cotton Manufacturing Company, in 1890; and by US capital, the takeover by W.R. Grace and Co of the Cartavio sugar plantation, in 1882. The latter case was the result of foreclosure on a mortgage, and remained an isolated example until the twentieth century.
3. For a detailed study of this process of US penetration of the Peruvian economy, see Bollinger, 'The Rise of US Influence in the Peruvian Economy, 1869-1921'.

had risen to over 50%.[1] Similarly the large-manufacturing sector, established by local capital, became increasingly the preserve of foreign capital; foreign control of the cotton-textile industry rose from 25% of installed capacity in 1904 to 83% by 1933.[2] In addition to direct foreign investment in productive activities, the 1920's witnessed a massive increase in Peru's foreign debt, from £p2.5 million in 1919 to £p23.6 million by 1929. This huge inflow of foreign funds during the mid-late 1920's served, among other things, to offset the slackening of the growth of export earnings after the boom associated with the 1914-1918 war in Europe (see Figure II.1).

Rough estimates of the value of British and US direct investment in the Peruvian economy during the first thirty years of the twentieth century appear in Table II.1. It can be seen that the total amount of US capital invested in Peru rose steeply from 1900, and that British capital (growing very slowly after 1905) was decisively outpaced during the First World War. The common view that the 1920's were the decade in which the United States displaced British predominance[3] does not correspond to actual events.[4]

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1. At the turn of the century foreign capital (in the sense of international firms) controlled two of the large sugar estates (Cartavio and Santa Bárbara) and an oil company which was not yet a significant exporter. By 1930 foreign capital dominated the copper, silver, vanadium and oil export sectors, with over 50% of total export earnings, and held three large sugar plantations (San Jacinto, Cartavio and Paramonga). In addition, foreign participation in the processing (ginning) stage of the cotton industry had increased considerably.
2. In 1904 the only foreign-owned textile mill was the Vitarte factory of the Peruvian Cotton Manufacturing Company (British). 'Capacity' is here measured by the number of looms in operation.
3. See, e.g. Carey, Peru and the United States, p. 212, and Yepes del Castillo, Perú: Un Siglo de Desarrollo Capitalista, p. 283.
4. This point is strongly made by Bollinger, pp. 16-22, on the basis of foreign trade statistics.

TABLE II.1

Level of Direct Investment in Peru by U.S. and British Firms, 1900-1929

Millions of U.S. Dollars

Year	U.S. Direct Investment	British Direct Investment	Total U.S. and British Direct Investment
1900	3	27	30
1905	15	51	66
1910	30	54	84
1914	38	58	96
1919	111	50	161
1924	145	52	197
1929	162	66	228

Sources: U.S. investment from Lewis, America's Stake in International Investments.

British Investment from South American Journal, September 21st, 1935, p. 273; Rippy, British Investment in Latin America 1822-1949; and Stock Exchange Official Intelligence, various issues.

Notes: The above figures need to be treated with caution. The U.S. figures, from Lewis, purport to represent the net assets of U.S. firms active in Peru (i.e. the net assets of their Peruvian operations, insofar as this could be obtained). The British figures, on the other hand, represent the issued capital stock (stocks and debentures) of British firms active in Peru, drawn mostly from the London Stock Exchange reports. In the figures given above, the South American Journal compilations have been modified by showing the market value of the stocks and debentures of the Peruvian Corporation (the largest British firm in Peru) rather than their face value; other British firms retain their face value. This rather crude adjustment is necessary to allow for the fact that the nominal capital of the Corporation greatly exceeded the real value of the firm's assets in Peru, and bore no relation to the actual sums of British capital at stake. The Corporation's capitalisation was carried out by the conversion of defaulted bonds of the Peruvian foreign debt from pre-1879 into shares in a company owning Peru's railways and controlling the country's guano exports, by an agreement in 1890 (the 'Grace Contract'). In the early twentieth century the Peruvian Corporation accounted for about 90% of nominal British investment in Peru. Revaluation of other British firms to give a closer approximation to their net assets or net worth than is provided by the face value of issued capital has not been attempted here, and would be unlikely to alter greatly the trend shown above, or the relation between US and British capital.

In addition, it is significant that U.S. capital at that time was moving into productive export sectors, with a secondary movement into banking and manufacturing. British capital was most strongly entrenched in the services sector (railways and commerce) and in half-a-dozen manufacturing enterprises, and the British role in actual production for export did not increase significantly during the period considered.[1] The arrival of U.S. capital on a large scale had a correspondingly greater impact on the productive structure of the Peruvian export economy.

Not all export sectors were equally affected by this influx of U.S. capital. The petroleum and metal-mining industries were the ones which became truly dominated by foreign firms, while only minor inroads were made into agricultural activities. (In part this is explicable in terms of the fact that it was in mineral production that international corporations based in the USA were most active in the early twentieth century.) The importance of this pattern of allocation of foreign capital is brought out by Table II.2, showing the shares of various products in Peru's total export earnings. In contrast to the relatively monoproduct structure of the Guano Age, the 1880-1930 export cycle was one of diversified exports, with constant shifts and changes as first one, then another product came to the fore.

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1. Only one British company, Lobitos Oilfields, remained active as an export producer throughout the period 1901-1930. Another British oil company, London and Pacific Petroleum, was sold off to Standard Oil of New Jersey in 1914 and its British owners, the Keswick family, transferred their interests to British Petroleum. The Liverpool-based British Sugar Company, an important sugar producer at the turn of the century, was sold off to Peruvian interests in 1921, and a number of other sugar plantations were also sold off by British capital at that time (see Chapter 3). In mining, British capitalists were active in rather desultory fashion at Sayapullo (the Sayapullo Syndicate) and Santa Lucia (Lampa Mining Company) but never rose above the rank of small-medium scale producers. Only in cotton were there significant British inroads, mainly by the merchant firm Duncan Fox and Co, who established a number of large ginning plants, and obtained several cotton-producing estates by foreclosures in 1921.

TABLE II.2

Percentage Shares of Some Major Export Products, 1900-1930

Year	Sugar	Cotton	Rubber	Wool	Petroleum	Copper
1900	32	7	n.a.	7	-	14
1901	24	9	n.a.	6	-	22
1902	33	8	10	6	-	8
1903	27	8	11	11	1	7
1904	25	7	16	8	-	9
1905	32	7	16	8	-	10
1906	25	8	17	9	-	14
1907	14	8	17	7	1	31
1908	19	15	11	5	2	22
1909	18	19	17	6	2	19
1910	20	14	18	7	2	13
1911	20	14	8	5	5	22
1912	15	11	14	4	8	25
1913	15	16	9	6	10	22
1914	30	16	5	6	10	19
1915	26	11	5	5	10	29
1916	24	10	4	6	8	36
1917	22	15	3	9	6	34
1918	21	19	2	14	7	29
1919	31	25	2	6	9	18
1920	42	30	1	2	5	12
1921	29	22	-	2	17	21
1922	24	25	1	3	22	18
1923	27	22	1	3	18	17
1924	21	22	1	4	23	14
1925	11	32	1	4	24	18
1926	17	22	1	3	28	16
1927	16	23	1	3	27	18
1928	13	21	-	4	28	20
1929	12	18	-	4	30	23
1930	11	18	-	3	30	19

Source: Calculated from Extracto Estadístico 1939, p. 247 and pp. 238-239.

Note: The sharp drop in copper's share in 1902 corresponds to the closure of most of the mines at Cerro de Pasco by the U.S. mining syndicate which bought up much of the area in 1901. (See Chapter 3.)

During the first twenty years of the twentieth century the 'agricultural' products sugar, cotton, rubber and wool made up consistently 50-60% of total exports by value. Within this group sugar was generally the leading product, briefly displaced by rubber in 1907 and cotton in 1913. The most important underlying trend was the steady rise of cotton from 7% of total exports in 1900 to about a quarter of total exports in the early 1920's. By the mid-1920's cotton had permanently outpaced sugar.

All four of these products, however, went one by one into decline. Rubber exports from the Amazon region slowly petered out from 1914 on, under the impact of resource exhaustion and Asian competition. Wool exports fell off from 1918, and their percentage share during the 1920's did not rise above 4%. World sugar prices failed to recover from the crash of 1920-1921, and the industry remained in decline throughout the 1920's, a decline which led ultimately to bitter confrontation between the growers and the Government. Finally cotton, following a brief export boom in 1922-24, saw its earnings shrink away. From around 60% of total export earnings in 1920, these four products had fallen to 30% by 1929-1930.

The other side of the coin was the rise of mineral exports to a position of dominance. Copper and petroleum began the century with not much more than 10% of export earnings between them; rose for a few good years during the 1914-1918 war to nearly 40%, and after a slight falling-back in 1919-1920, went on to a combined total of 53% of exports by 1929. Another mineral product, silver, although not shown in Table II.2, displayed a pattern rather similar

to that of copper: a drop at the beginning of the century (when, however, silver was still a larger share of exports than copper) and a rise in the 1920's.

The implications of these shifts in export composition are obvious enough, particularly as they relate to the distribution of the incomes derived from exports. During the great upswing of export growth before the 1914-1918 war, and in the postwar boom of 1918-1919, most of the increase in export income went to Peruvian enterprises, while foreign enterprises participated as junior partners in the export growth process. By the 1920's, however, all the incremental export income was accruing to foreign firms, while the export income going to Peruvian firms shrank, not only relatively, but also absolutely. The combined earnings of sugar, cotton, rubber and wool (the main Peruvian-controlled sectors) evolved as follows, largely reflecting external market forces:[1]

Year	Earnings £000	Index 1914 = 100
1914	24,430	100
1919	83,200	341
1924	54,900	225
1929	38,828	159
1934	27,080	111

The results of the pattern revealed were twofold. In the first place, in the 1920's Peruvian capitalists involved in export sectors were

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1. For an early analysis of Peru's problems using similar figures see Dennis, 'What Overthrew Leguía: the Responsibility of American Bankers for Peruvian Evils' in The New Republic, September 17th, 1930. The figures in the text are from Extracto Estadístico 1934-1935, p. 136, converted to dollars at par for 1914 and 1919, and at current exchange thereafter. (The Peruvian statistics used par rates until 1923).

riding on a downward escalator while foreign firms were on a upward escalator. The possibility of Peruvians' switching across to the expanding sectors was limited primarily by the barrier to entry constituted by foreign control of the scarce land factors on which the sectors were based - an issue which is discussed at length later.

In the second place, the nature of the mechanism through which exports might act as an 'engine of growth' underwent a change corresponding to this switch in the structure and distribution of export earnings. Whereas in the 1890's and 1900's Peruvian capitalists in export sectors had had at their disposal a growing economic surplus from which they had made resources available to other sectors, especially finance and manufacturing, now this surplus was shrinking. Accordingly, economic development depended decreasingly upon the willingness of Peruvian capitalists to shift resources from sector to sector, and was increasingly a function of the size and nature of the spread effects reaching the host economy from the activities of major foreign firms.

The Economic Context of the 1920's: (1) The Exchange Situation

Because of the great importance of exports and imports in determining the movement of the economy, most of the major events of the 1920's were bound up with the condition of the Peruvian balance of payments. Official statistics on the balance of payments itself were not begun until 1938[1], but since throughout the 1920's Peru

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1. Prior to 1938, only one serious attempt was made to estimate the balance of payments: a survey of the first six months of 1922, by the US official hired in that year to reform the Peruvian Customs. His figures are presented in Chapter 7.

operated with a floating exchange rate[1], the movements of this provide a good indication of, the condition of the balance of payments. Table II.3 gives the annual average exchange of the Libra on the dollar, and Figure II.2 shows the quarterly movement of the rate, from 1915 to 1930. Just as the long-run economic history of Peru is best analysed in relation to the export-earnings series, so the short-run history of the 1920's can conveniently be presented in the form of a commentary on Figure II.2. Alongside the exchange rate should be considered the movement of the wholesale price index, shown by Figure II.3.

The detailed economic history of the 1920's falls naturally into three periods, delineated by the movements of the exchange rate. The periods are:

(a) 1917-1921: the great export boom, accompanied by heavy domestic inflation and political unrest, and terminated by a collapse of world prices in 1920-21.

(b) 1922-25: the years of the cotton boom, which brought a recovery of exchange and an upswing of the economy, but terminated in renewed recession in 1925-26.

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1. Peru until 1932 was nominally on the gold standard. However, during the period of upward pressure against the gold points from 1917-1920 an embargo on exports of monetary gold from the United States produced a general appreciation of Latin American currencies; and throughout the 1920's, during which period there was general downward pressure on the currency, the export of gold from Peru was prohibited by law, making the gold standard inoperative in effect. (See 'Peruvian Exchange During the War', US Bureau of Foreign and Domestic Commerce, Latin American Circular No. 63, reprinted in Leader, July 3rd, 1920, pp. 5 ff; and also a Wall Street Journal article on Latin American failure to understand gold-standard theory, reprinted in Leader, September 10th, 1921, p. 7.)

TABLE II.3

Annual Average Exchange Rate: U.S. Dollars per Libra

Year	Rate
1915	4.23
1916	4.81
1917	4.99
1918	5.28
1919	4.92
1920	4.59
1921	3.61
1922	3.85
1923	4.11
1924	4.05
1925	4.00
1926	3.72
1927	3.73
1928	3.97
1929	4.00
1930	3.53

Source: Extracto Estadístico 1934-1935, pp. 38-39, sight rates in New York.

FIGURE II.2: Exchange Rate of the Libra on the Dollar, Quarterly, 1915-1930

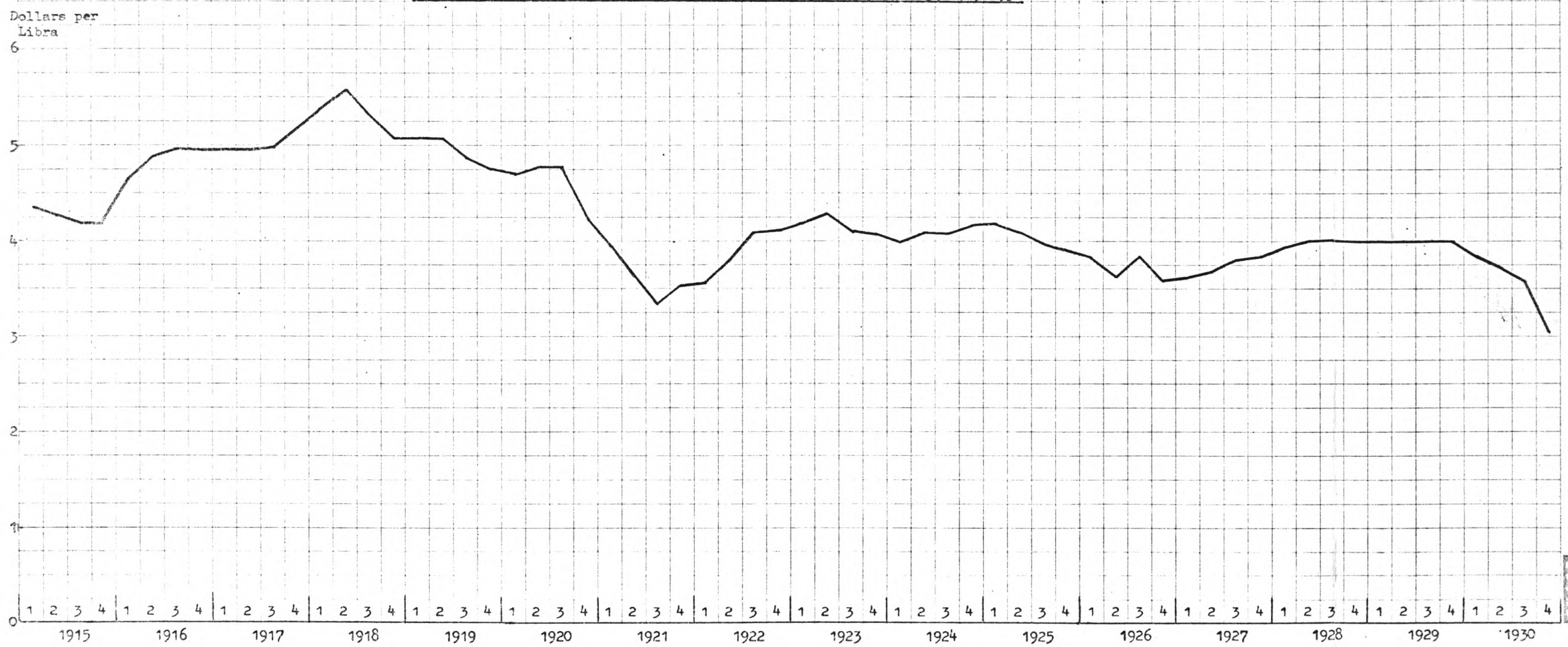
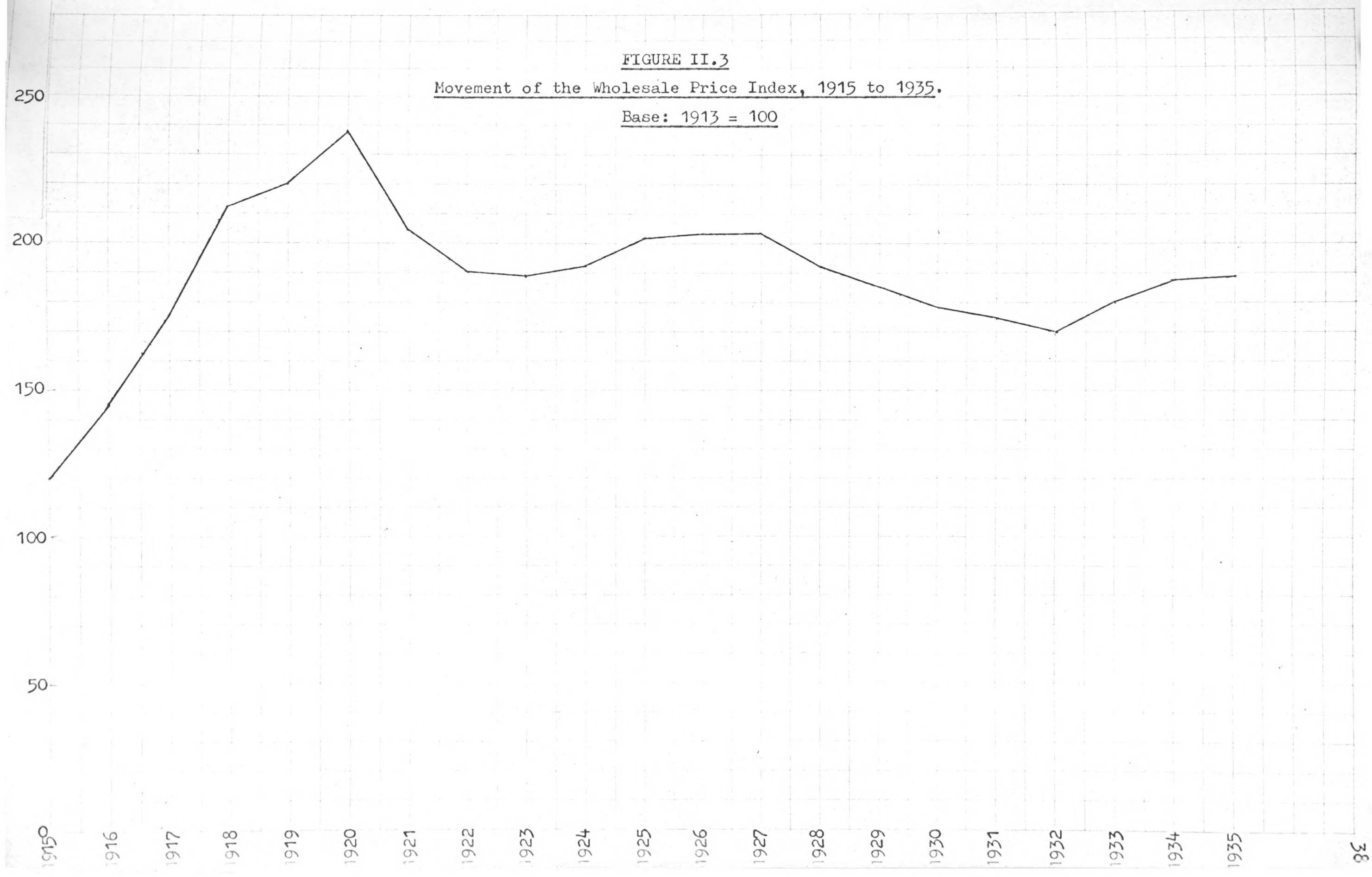


FIGURE II.3

Movement of the Wholesale Price Index, 1915 to 1935.

Base: 1913 = 100



(c) 1926-1930: the years of huge foreign loans, during which the Government attempted to refloat the economy and maintain exchange by heavy borrowing and public-works expenditure. The exhaustion of Peru's credit in 1929 was quickly followed by the definitive collapse of exchange and a massive balance of payments crisis in 1930-31, due both to the full onset of the world depression, and to the already-evident weakness of the Peruvian balance of payments.

During the years 1917-1920 Peru enjoyed an unprecedented boom of export earnings, which carried foreign-exchange income well above the level required to pay for imports. Heavy imports of gold came to a halt with the US gold embargo in September 1917, and the Libra proceeded to float upward, reaching a 14% premium by February 1918 and 17% by June. In 1918, with record export earnings, a restricted supply of imports due to the war, and no gold available for import, the only forces acting to check the appreciation of the Libra were the unwillingness of Peruvian exporters to exchange their earnings at a disadvantageous rate[1], and the increase in the supply of Peruvian currency. From September 1918 until mid-1919 the Peruvian Government pegged the rate at $5.04 by printing notes, backed by gold deposited in New York and London.[2] In mid-1919, despite continued

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1. A growing proportion of export earnings were held abroad, or kept in foreign currency, during the peak years of the boom. Foreign deposits of Peruvian banks rose from £p627,000 in November 1917 to £p1.5 million by June 1918. ('Peruvian Exchange During the War'.) In additions to deposits with the Peruvian Banks, exporters also ran up large balances with banks in Britain and the U.S.A.
2. McQueen, Peruvian Public Finance, pp. 93-113 gives an excellent summary history of the Peruvian currency to 1924. See also Alzamora, El Billete de Banco en el Perú. On the 1918 measures see McQueen, pp. 102-104.

high export earnings, the demand for foreign exchange rose sharply, and the rate settled back to a little under par until the collapse of export markets in September 1920 produced a rapid depreciation.

The export boom and currency appreciation had two important results, which dominated the economic scene in Peru during 1919 and 1920. In the first place, the heavy demand for the Libra in the exchange markets led the Government (encouraged by alarmed exporters) to undertake a rapid expansion of the money supply, in particular via a £p3 million note issue legislated in August-September 1918.[1] This fuelled a major consumption boom, especially in Lima. In the second place, this boost to domestic demand brought heavy pressure to bear on supply, and particularly on the supply of foodstuffs. Prices shot up in 1918 and 1919, causing general unrest among wage and salary earners which culminated in a general strike in Lima in May 1919,[2] and contributed to the defeat of the Civilistas in the elections of June 1919.

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1. The wisdom of this measure was hotly debated at the time. The figures for total emitted money and money in public use were as follows: (£p millions)

Year	Emitted Money	In Public Use	% increase in emitted money
1916	2.3	1.1	
1917	2.7	1.9	17.4
1918	5.1	3.3	88.8
1919	6.9	4.2	35.2
1920	7.8	5.4	13.0
1921	7.8	4.7	0.0

(Source: Extracto Estadístico 1934-1935, p. 32).
The actual rate of increase of the money supply was probably rather lower than these figures indicate, because of the incomplete coverage of the earlier years (gold coin and circulating sterling was impossible to measure accurately.)

2. Reports on the strike and the rioting which accompanied it are in Leader, May 31st and June 7th, 1919.

The end of the war boom in late 1920 came as a considerable shock in Peru; this was the first such general recession for forty years (the last occasion had been the late 1870's), and put an abrupt halt to many of the expectations of a golden age of developmer for the Peruvian economy. The Government was particularly embarrassed, having adjusted its level of spending to a level appropriate t the high-revenue boom years; 1921 and 1922 witnessed heavy deficits and much talk of retrenchment, culminating in a new Budget Law in 1922.[1]

In 1921, however, the US cotton crop was hit by a plague of boll weevil, which persisted until 1925, and the renewed boom of world cotton prices which followed carried exchange upward again and brought a brief period of prosperity to the coastal economy. The boom petered out in 1925, as recovery of the US cotton areas coincided with disastrous floods along the coast of Peru which caused heavy losses in the cotton and sugar crops for that year. As cotton earnings dropped, and those of sugar and wool remained low, the exchange rate sagged downward again, to the great alarm not only of a Government which was becoming increasingly indebted already to foreign bankers, but also of the entire Peruvian elite, for reasons which are discussed in Chapter 7. The Reserve Bank operated as a heavy buyer of Libras in an attempt to hold up the rate, and in July 1926 the Government formed a dollar exchange

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1. McQueen, Peruvian Public Finance.

pool with some of the main US firms active in Peru. The $4 million thus raised, in addition to a $16 million loan floated in New York in August 1926, succeeded in pushing the exchange rate up from $3.75, its July level, to 3.88 by October 1926; but even the injection of this $20 million did not suffice, and in October the Government temporarily withdrew official support, exchange collapsed to 3.50, and hopes of achieving stabilisation at 4.00 were abandoned for the moment.[1]

1927 brought a brief improvement of cotton, wool and sugar earnings, accompanied by the heaviest Government borrowing of the decade. A total of $66.5 million in loans was raised in New York during the year, resulting in a net increase in Peru's foreign debt of $36 million. Exchange recovered again to 4.00, and was held at this level through 1928 with the reserves remaining from the 1927 loans, and by a further $24 million net increase in the foreign debt, most of it incurred in the second half of the year. In 1929 foreign credit dried up, reflecting the diversion of interest among US investors away from fixed-interest securities towards more speculative investment, and growing unease among US Government and bankers regarding Peru's credit-worthiness. Attempts to float further loans in the USA dominated the attention of the Government throughout 1929, and produced a great deal of friction between the Peruvian and US Governments. Exchange was held, with growing desperation, at 4.00, but

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1. For the history of the exchange crisis of 1926 see Leader, June 22nd, 1926, p. 4; July 13th, 1926, p.3; August 17th, 1926, p. 3; also McQueen, 'Causes of the Exchange Slump in Peru' in Leader, November 30th, 1926, p. 19.

TABLE II.4

Movement of the Funded Foreign Debt, 1919-1930

Year	Funded Foreign Debt at Year-end		Net increase during year	
	Dollar debt US $ million	Sterling debt £ million	Dollar debt US $ million	Sterling debt £ million
1919	-	1.0[b]	-	-
1920	-	1.0[b]	-	-
1921	-	0.9[b]	-	-0.1
1922	2.4	2.7	2.4	1.8
1923	2.1	3.4	-0.3	0.7
1924	8.8	3.3	6.7	-0.1
1925	13.5	3.2	4.7	-0.1
1926	30.5	3.1	17.0	-0.1
1927	66.4[a]	3.0	35.9	-0.1
1928	90.7	4.9	24.3	1.9
1929	89.7	3.6	-1.0	-1.3
1930	88.5	3.5	-1.2	-0.1

a. Excluding $29 million of bonds in process of retirement.
b. At June 30th.

Sources: 1919-21 Extracto Estadístico 1923, p. 145.
1922-1930 from Kemmerer, Report on the Public Credit of Peru.

Note: In addition to the funded debt shown above, there were substantial additions to non-funded foreign debt in 1929.

by the end of 1929 reserves were exhausted,[1] and an attempt to legally stabilise the currency at 4.00 in February 1930 was quickly followed by collapse.[2]

A number of important points about the economy emerge from the foregoing outline. In the first place, it is clear that the key determinant of the exchange rate was the amount of foreign exchange accruing to Peruvian factors, whether export producers

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1. The Reserve Bank began 1929 with reserves of $3.4 million available to support the currency, but by December the reserves had fallen to minus $76,000. An additional $6 million was received from Chile in payment for the Treaty by which Peru finally surrendered the disputed territory of Arica; without this $6 million, exchange could not have been held. (See Despatch No. 401, dated November 20th, 1929, US Ambassador Mayer to Secretary of State, D.F. 823.51/443). Further short-term credits at the rate of $750,000 monthly were provided by Seligmans, the bankers involved in the floatation of the 1927-1928 loans, until December 1929, but a growing dispute between Leguía and the bankers over public finance and exchange policy led to an open breach in early 1930. (See documents on the dispute in D.F. 823.51, M746 Rolls 20 and 21; especially Memorandum dated November 8th, 1929, Stinson to Munro, D.F. 823.51/436, M746 Roll 20 Frame 642; Memorandum dated December 11th, 1929, Stinson to Munro, D.F. 823.51/444; and Despatch No. 462 dated February 4th, 1930, Ellis O. Briggs to Secretary of State, D.F. 823.51/471.)

2. In early 1930 the currency was officially devalued to 4.00, the de facto rate, from its former par of 4.86. The £p1 million worth of gold thus freed from the currency-backing reserve was immediately exported to New York in March 1930, and heavy deflationary pressures were put on the economy. The outcome was a crisis of business confidence and the bankruptcy of Peru's main bank, the Banco del Peru y Londres, in mid-1930. (Despatch No. 503 dated April 8th, 1930, Mayer to Secretary of State, D.F. 823.51/482.)

or Government. The foreign-owned mineral sectors, oil and copper, enjoyed steady growth of earnings through the decade, but this did not suffice to protect the exchange rate. It was generally recognised at the time that this merely reflected the fact that relatively less of the exchange earnings of these products returned to Peru than was the case with the Peruvian-controlled sectors; or, stated the other way around, that these sectors generated a relatively heavy outflow of funds in the balance of payments.[1]

In the second place, the strength and persistence of the pressure on the exchange rate was remarkable, especially if it is considered that imports were not rising at any very dramatic rate during the period. There was widespread talk at the time of speculation against the currency; but never any sign of speculators taking their profits by returning to the Libra. The significance of this point is explored further in Chapter 7.

In the third place, the Government's heavy foreign borrowing has here been presented as having been motivated by a desire to support the exchange rate as much as by a desire to finance expanded Government activities in the domestic economy. This interpretation, which is supported by various contemporary accounts,[2] differs from the

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1. As Matthew E. Hanna, the US Embassy Counsellor, pointed out in 1928, 'The economic and business situation ... is dependent for its prosperity (in contrast to the prosperity of foreign corporations engaged in extractive enterprise here) upon the positions of sugar and cotton'. (Despatch No. 43-G, dated August 7th, 1928, Hanna to Secretary of State, D.F. 823.51/415.) The British Commercial Attache took a similar view: 'The Government has now been forced to admit that in effect their figures on export earnings do not represent the actual situation, the reason being that amongst the exports 50 to 60% are crude oil and copper ore, which are exported by foreign companies, practically none of the proceeds remaining in Peru'. (Despatch dated December 1929, W.M. Gurney to Foreign Secretary, Item A533 in FO371/14252, p. 399.)
2. See especially the State Department references cited above (Note 1, p. 44); also McQueen, 'Causes of the Exchange Slump'.

standard version which treats Leguía's foreign borrowing as having been dictated by the requirements of Government finance rather than by exchange policy. The next section looks in more detail at the allocation of the increased Government expenditure made possible by these loans.

The Economic Context of the 1920's: (2) The Government Sector

The 1920's were a period in which the economic role of Government in Peru increased very greatly. From £p6.6 million in 1919, Government expenditure rose to £p25.7 million in 1928, before falling off as foreign loans dried up.[1] This rapid expansion of spending provided the Leguía regime with much of its political strength, both because of its ability to support a large political clientele group, and because payment of the salaries of the armed forces was regular. Much of the money went into large-scale public works projects whose development contributions were potentially considerable. The key to financing all this was foreign borrowing.[2] In 1919, the year in which Leguía came to power for the second time, 5% of total Government expenditure was financed by 'credit operations'; by 1926 the proportion had risen to 43%, and in the two-year period 1927-1928 it was 56%. In 1929 the proportion was back to 5%, as the Leguía regime's foreign credit came to an end.[3] Until late 1929 Leguía was

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1. Extracto Estadístico 1934-1935, Table 196, p. 279.
2. No detailed discussion of the history of foreign loans in the 1920's is undertaken in this study. Full surveys already exist in Yrigoyen, M., 'Bosquejo Sobre Empréstitos Contemporáneos del Perú', in Revista Universitaria de San Marcos, 1928; Suárez, and Tovar, Deúda Pública Externa, 1920-1966 pp. 47-67; Kemmerer et al., Report on the Public Credit of Peru; and Wynne, State Insolvency and Foreign Bondholders Vol. 2, pp. 109-195.
3. Extracto Estadístico 1934-1935, pp. 278-279. 1927 and 1928 have been taken together because the floating of £50 million of National Loan bonds, which took place in December 1927 and is included in income for 1927, corresponded to expenditure incurred in 1928.

able to resort to a variety of emergency measures to keep the Government solvent, but then drastic cuts in expenditure - particularly public-works expenditures, and spending in the (politically less-vital) provinces away from Lima - were unavoidable. Spending in 1930 was 24% below that for 1929, and the regime was overthrown by a coup initiated in Arequipa (in the far south) in August 1930.

The rapid expansion of the government sector in the mid-1920's provided, for a few years, a growing autonomous source of demand within the local economy, and to some extent substituted for the declining importance of economic impulses generated by the locally-owned export sectors. This could never, however, be more than a temporary expedient so long as the process depended upon Peru's foreign credit. Although domestic sources of revenue were not neglected (Government income from this source was increased by over 100% during the Oncenio), Leguía preferred in general to avoid increasing the tax burden so long as foreign finance could be found. When foreign loans stopped, they did so abruptly and completely, and the sharp fall in government spending which this forced (in an era before deficit financing was politically acceptable) set off a downward multiplier through the rest of the economy.

Nevertheless, financing the government sector by foreign loans can be a viable policy so long as the proceeds of loans are productively utilised. Certainly Leguía and his supporters made much of the fact that his administration spent unprecedented sums on public works,

TABLE II.5

Leguía's Public Works Spending: Various Estimates

1. Garland Duponte

Thousands of Libras

Year	Irrigation	Railways	Sanitation	Roads	Ports and Other	TOTAL
1919	-	138	-	27	154	319
1920	125	429	72	33	219	878
1921	141	332	192	49	279	993
1922	122	454	180	68	289	1,113
1923	88	240	340	74	514	1,256
1924	181	310	523	61	433	1,508
1925	378	526	782	251	518	2,455
1926	877	577	543	283	581	2,861
1927	921	883	697	689	497	3,687
1928	727	744	639	1,017	1,676	4,803
1929	609	780	493	963	1,563	4,408
1930	n.a.	n.a.	n.a.	n.a.	n.a.	1,200[a]
TOTAL	4,169	5,413	4,461	3,515	6,723	25,481

a. Estimated.

Source: Garland Duponte, Lo Que el Oncenio Hizó por el Perú Bajo el Mando del Presidente Leguía, p. 9.

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2. Capuñay

Thousands of Libras

Category	Expenditure 1919-1930
Roads	10,760
Railways	8,790
Irrigation	4,390
Sanitation	3,670
Port works	2,470
Public buildings	870
Avenues	720
Plazas and Parks	240
TOTAL	31,910

Source: Capuñay, Leguía: Vida y Obra del Constructor del Gran Perú, p. 197. Capuñay lists also a further £p5.3 million of public spending on education, defence, and land distribution, which has been excluded from the above table.

TABLE II.5 (CONTINUED)

3. Labarthe's Figures

Thousands of Libras

Category		Expenditure
Railways		4,900
Roads		4,152
Irrigation:	Imperial	922
	Olmos	3,453
	Esperanza	612
	Chira	60
	Total	5,047
Sanitation and Urban Improvement:		
	Lima and area	1,114
	Puno	24
	Arequipa	213
	Cuzco	167
	Iquitos	81
	Ayacucho	64
	Total	1,663
Callao port works		2,800[b]
Palace of Justice and Plaza de la República		545
TOTAL		19,107

b. Full cost of the works, including 1931-32.

Source: Labarthe, La Política de Obras Públicas del Gobierno de Leguía, passim.

TABLE II.5 (CONTINUED)

4. 1930 Album Figures

Thousands of Libras

Category	Expenditure to June 30th, 1930
Drinking-water systems in 21 towns[c]	1,444
Paving in Lima	1,000
Electric-light systems in 50 towns: Government share of cost	77
Subsidies to private/municipal electrical construction	24
Public buildings	500
Avenues, Plazas, Parks	633
Ports and promenades	2,219[d]
Monuments and statues	45
Various public works	13
Outlays by Ministerio de Fomento to June 1930	3,788
Irrigation: Imperial	n.a.
Olmos	1,985
Esperanza	219
Sechura repairs	7
Railways and Roads	n.a.

c. Including Trujillo which was not paid for by Government.
d. Including budget of 2,000 for Callao port works, not spent as of June 1930.

Source: Jochamowitz et al, Album Obsequiado al Sr A.B. Leguía, pp. 13-63.

ostensibly designed to lay the infrastructure for future development of Peru. Table II.5 presents four sets of estimates of the actual public-works outlays of Leguía. Three of these show total estimates for all expenditures under this heading. The degree of disagreement among the various authors is considerable, with estimates ranging from £p19.3 million (the very hostile writer Labarthe) to £p32 million (from the extravagently pro-Leguía Capuñay). Capuñay's figure, which includes an imputed value for forced labour used in road-building,[1] and apparently also includes some administrative expenditure, can be dismissed as too high. If the information confidentially supplied by the Government to its creditors is correct, the Garland Duponte figures are also inflated:[2]

> For a debt increase of $106 million between December 31st, 1919 and June 30th, 1929, [Leguía] can point to about $66 million spent on new public works. All expenditure for these, whether from revenues or loans, are included in this approximate total .... Owing to graft and inefficiency the amounts spent have average more than twice the fair cost of the works.

The report by Peru's New York creditors on which the above comments were based, and which followed a careful study of the Government's public works performance, was considerably more explicit:[3]

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1. This item alone accounts for £p6 million. See Labarthe, La Política de Obras Públicas del Gobierno de Leguía, p. 36.
2. Dennis, 'What Overthrew Leguia'.
3. Despatch No. 325, dated July 30th, 1929, F.L. Mayer to Secretary of State, D.F. 823.51/433. This despatch reports on a study conducted in 1929 by a group of U.S. Government officials working with Seligmans, the New York bankers, to produce an opinion on Peru's credit rating. Dennis was a member of this team, and toured many of the main public-works sites. It is possible that the Peruvian Government supplied this mission with under-estimates of expenditures in an attempt to reduce the impression of waste and inefficiency.

> The bankers confidentially reported that the President had said to them that his extra-budgetary public works contracts were essential to the maintenance of his political power in the country. Since most Government positions are only modestly paid, it is the custom to overlook irregularity on the part of officials appointed from the ranks of deserving supporters. Since there are not enough positions to go around, there has grown up an army of contractors, recruited almost entirely from the ranks of Leguía partisans. These men subsist upon Government construction contracts which they customarily farm out in small parcels to minor members of the party, who in turn farm then out a second or third time before the actual construction of a given section of highway, railroad, or irrigation begins. As a result, the graft in public works has grown to represent a formidable proportion of the cost to Peru. The bankers stated that a generous estimate of the Government's return on the general extra-budgetary public works contracts (exclusive of the Callao docks) was less than fifty cents on the dollar.

In addition to this depressing picture, it is clear that a large part even of the effective investment resulted in only rather doubtful development gains. By far the greater part of the expenditure on urban works was concentrated in Lima, providing the infrastructure for real-estate speculation in the early 1920's, while work in other towns proceeded at a leisurely pace. Enormous sums were spent from 1925 to 1930 on the gigantic irrigation project at Olmos, of which only a small section was ever completed, while most of the investment was written off - notably a £p300,000 uncompleted road to Udima, and £p314,500 worth of dam foundations at Carhuaquero. £p170,000 more was spent on fraudulent 'expropriations' of land owned by political favourites. The main beneficiaries of Olmos were in Lima: Juan Leguía and his friends, and the merchant house of Ayulo and Co, which sold the machinery to the Government. Ayulo repossessed large quantities of little-used machinery in

1931, on which the firm made a large profit.[1]

Throughout Peru, the roads constructed under Leguía conformed to no pre-planned system, but were left to the discretion of local contractors. The misuse of 'conscripción vial' for the personal benefit of local elites seems to have been a widespread phenomenon in the Sierra. And the railway extensions which were built during the 1920's, of which very few were actually finished, were in several cases later written off; the 80 kilometres of the line to Pucallpa from Tambo del Sol on the Cerro de Pasco Railway, built at a cost of £p650,000, were of such poor standard as to be unusable by anything more than converted automobiles, and were eventually torn up and the line converted to a road.[2] A similar fate befell the 24 completed kilometres of the Huancavelica-Castrovirreyna line, which had cost in the vicinity of £p300,000.

The rapid rise in Government spending during the late 1920's, thus, was important not so much as an exercise in productive investment (although some gains in social overhead capital were clearly made) as because of the important role of this injection of spending power into the economy, an injection which was crucial in maintaining the level of economic activity during the second half of the decade.

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1. Labarthe, pp. 44-69 gives a thorough description and critique of the Olmos project, in which Labarthe himself had been employed for some time. See also an earlier, and harsher, attack by Labarthe: 'El Más Grande Escándalo de Ingeniería en Suramérica' in El Comercio (Lima) September 5th, 1930, p. 11.
2. For the later debate with the Government over the fate of this line, see Ministerio de Fomento, Memoria, 1931-36, pp. 567 ff.

The Government would seem to have been motivated by two requirements: heavy foreign borrowing to support the exchange rate, and heavy domestic expenditure to support the Government. Infrastructural investment, it might be suspected, was viewed as a useful cover for these two goals, rather than as a goal in itself, despite the loud rhetoric at which Leguía excelled.

Summary

This chapter has sketched in the background against which Peru's development experience in the 1920's was set. Already, several salient aspects of that experience have become apparent. In aggregate terms, the growth of total export earnings during the decade conceals the effects of the shifting composition of exports, as the earnings of Peruvian-controlled sectors fell and those of foreign-controlled sectors rose. There were recurrent exchange crises, indicating an underlying disequilibrium in the balance of payments, and relief from these crises was obtained only temporarily from time to time - initially as a result of the cotton recovery of 1922-24, and later as a result of the ability of the Government to borrow massively on the New York money market. By the second half of the decade the economy's sources of economic dynamism were limited to the Government and the foreign exporting firms. The Government sector was characterised by waste, corruption, and long-run instability as a result of heavy dependence upon foreign credit. The foreign firms active in production for export were repatriating high profits, and generating only limited spread effects (these issues are taken up in Chapters 4 and 5).

Nevertheless, the 1920's were in some ways a glittering period for the fortunate, Lima-resident elite group. Contemporary foreign observers laid heavy emphasis on the prosperity of this elite (evident in their luxury-consumption habits, extravagent town houses, and frequent trips abroad) and upon the favourable climate in which foreign firms operated. Behind the glitter of the new Lima and the harmonious relations between foreign and domestic capitalists, however, lurked the ever-present, and increasing, element of crisis. Writing in 1926, the British Consul captured (unconsciously) the underlying contradiction:[1]

> It is almost incredible to those who knew the country before 1920 what progress has been achieved in the past few years under a stable government and a uniform political administration dedicated to a definite plan of national rehabilitation. With the rights of property guaranteed, and respect for those rights enforced, public confidence has been restored, and the nation as a whole has rallied to the support of the government in the realisation of its constructive programme ...

Yet, on the next page,

> Exchange is demoralised, credit curtailed, and it is certain that if it were not for the large loans that the government has recently succeeded in making for the prosecution of public works, there would now exist a general paralysis of industry.

Postscript: The Politics of the 1920's.

In most standard historical treatments of twentieth-century Peru the period 1919-1930 is considered to have been sharply distinct from the periods both preceding and following. The distinction is based

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1. Trant, Report on the Commercial, Economic, and Financial Conditions in Peru, pp. 6-7.

on political factors.[1] These years were given an apparent cohesiveness by the fact that a single President - Augusto B. Leguía - held power throughout (this, the longest unbroken presidential term in the republican history of Peru, is usually referred to as the Oncenio). The appearance of unity was strengthened by the fact that the change of government in 1919 involved sharp factional dispute, the entry of various 'middle-class' groups into a more prominent role in politics, and the collapse of the Civilista Party which had dominated the government since the turn of the century. Under Leguía the governmental apparatus was strengthened and centralised, the opposition was exiled, and party politics virtually came to an end. These points have dominated Peruvian commentaries on the Leguía government,[2] both for and against; and those commentaries, in turn, have contributed to the general impression that the Oncenio was a distinct period. However, in any but a narrow political sense, such distinctions are unreal and misleading. To isolate the Oncenio analytically from the twenty years

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1. See, e.g., the treatments of the Oncenio in Basadre, Historia de la República, Vol. 9, especially Chapter 180; Pike, The Modern History of Peru; Marett, Peru; and Bourricaud, Power and Society in Contemporary Peru.
2. Peruvian commentaries on Leguía tend to fall into two general groups, each concentrating upon particular transformations alleged to have been wrought by his government. The opposition (usually those exiled or repressed during the Oncenio) accuse Leguía of having 'destroyed' the constitutional order and overturned democratic principles. The central theme of this school forms the title of Solis' book, La Caída del Gobierno Constitucional en el Perú. V.A. Belaunde, in his Memorias, takes a similar line. The other group consists of those who defend Leguía as a modernising dictator, representative of the rising national bourgeoisie. The most forthright statement of this position is Capuñay's Leguía: Vida y Obra del Constructor del Gran Perú. A recent study on the same lines is Karno, 'Augusto B. Leguía: the Oligarchy and the Modernisation of Peru'.

which preceded it is a serious error, particularly when one is writing on economic rather than political history.[1]

During the thirty years from 1900 to 1930 there were only five years (1900-1903 and 1913-1914) when the presidency of Peru was not occupied by either José Pardo or Augusto B. Leguía, both of them prominent entrepreneurs from the 1890's, leading figures in the sugar industry, keen horse-racing men, members of Lima's upper-class club life, and major figures in the new generation of Civilista politicians of the turn of the century. The political split between these two which began with Leguía's exile in 1912 and culminated in his overthrow of Pardo in 1919 dominates the pages of history books,[2] but had no visible effect on economic policy-making. Nor did Leguía, himself a member of the elite, make any attack on its economic position to parallel his loud political rhetoric:[3]

> The displacement of the civilistas during this reign of their hated enemy was merely political. Leguía did not attack the privileges of the great leading families; and many of them benefited directly or indirectly from material progress - for example, from the urbanizaciones. Furthermore, one should not forget that Leguía was a hacendado and cotton exporter like many of his enemies, and had family ties with some of them.

The image of Leguía as a thrusting out-group moderniser, leading new social forces to the conquest of power in Peru and brandishing a new

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1. Yepes (p. 287) hopefully pronounces, on the basis of rather scanty evidence, that 'with Leguía began a new epoch in the history of Peru'. This claim would appear to have been motivated more by a desire to round off neatly and definitively the 'Century of Capitalist Development, 1820-1920', than by analysis. Cf the review of Yepes by R. Thorp in Latin American Review of Books, 1973.
2. A particularly striking case of the sensationalisation of factional disputes is Karno's study.
3. Basadre, Chile, Perú y Bolivia Independientes, p. 637.

ideology of the 'Patria Nueva', has thus little to do with the reality of the 1920's, and has produced great confusion in the analysis of the Peruvian economic elite.[1] In this study, Leguía is treated as a typical Peruvian businessman and politician, no more and no less. As one of his critics once suggested,[2] Leguía's Oncenio was distinguished from the Pardo regime of 1915-1919 not so much by any difference of principles as by the new opportunities opened for government extravagence and corruption by the flood of foreign

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1. One example is Pike, whose analysis begins from the presumption of a clear distinction between the 'aristocracy', on the one hand, and the 'middle, urban, business-minded sectors' on the other. Faced with the evident identity of views and interests of the two groups (if indeed they were two), he falls back on the idea of a middle-class sellout: 'What actually occurred was that part of the middle sector, rather than acting as a countervailing power to the traditional aristocracy, joined with it in supporting Leguía' /my emphasis/. Pike thereby solves the contradiction by abandoning the thesis that Leguía was anti-aristocrat, since he was supported by the aristocracy. (Pike, pp. 217-218). None of the writers in this school succeeds in separating Leguía from the Peruvian elite, although several fall back hopefully on the claim that he was a provincial nobody. As Marett put it, 'The middle-class upstart Leguía was not popular with the aristocratic conservatives who ... formed the backbone of the Civilista Party' (Marett, p. 131). In a country where social mobility upward into the elite has always been a fact of life this is a dangerous argument; Leguía's personal disagreements with other Civilistas required no class hostility to keep them going, and many of the 'aristocratic conservatives' themselves had origins a good deal more humble than Leguía. Manuel Candamo, for example, the aristocrats' aristocrat, President from 1901-3, and a business partner of Pardo and Leguía in the Rímac Life Assurance Company, was the son of a Chilean trader who had made a fortune in the coolie traffic. (Karno, p. 67).

2. Mayer, El Oncenio de Leguía.

lending undertaken in the 1920's by US bankers.[1]

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1. The corruption associated with the Leguía regime is legendary. One estimate was that the President and his family illegally enriched themselves to the tune of about £p2.5 million during eleven years in power. (See discussion of the accusations against Leguía in 1930, in Despatch dated December 28th, 1930, W.M. Gurney to Foreign Secretary, Item A769 in FO371/15107; and Despatch dated January 16th, 1931, Gurney to Foreign Secretary, Item A1039 in FO371/15107). Details of bribes totalling $520,000 paid to Juan Leguía by U.S. bankers, using the State Department as an intermediary, are in Cable dated March 21st, 1927, Seligmans and Co. to Samuel Maginnis (their representative in Lima), transmitted in State Department code, D.F. 823.51Se4/5, M746 Roll 21 Frame 130. Details of £p100,000 in bribes paid to President Leguía by the Sun Life Assurance Co. are in FO371/14252, pp. 187 ff. The President, however, died intestate (see letter dated April 12th, 1935 from Blease and Sons to Frederick Huth and Co., creditors of Leguía, in Frederick Huth papers in the Guildhall, London, Ms 10706/Box 2 /File 8).

CHAPTER 3

The Capacity of the Peruvian National Elite

As Chapter 1 indicated, the capacity and willingness of domestic elites in underdeveloped countries to undertake development tasks has been a matter of some disagreement, particularly in regard to Latin America.[1] The stereotype of the passive, non-innovative, pre-capitalist ruling class has been sufficiently pervasive to induce the author of a recent study, which demonstrated the very adequate entrepreneurial performance of old-established Brazilian families in the nineteenth-century coffee boom, to wonder whether the landowners of Sao Paulo might have been unique in Latin America.[2] This chapter will outline the historical performance of the Peruvian elite in various export sectors during the early part of the twentieth century, and will suggest that economic responsiveness, innovative capacity, and ability to mobilise investment resources, were all present. At the outset it may be worth noting that the role of immigrant figures in Peruvian development during this period, while considerable, was mostly limited to the urban economy of Lima. The capitalists considered in this chapter were overwhelmingly native-born Peruvians. The immigrant section of the elite makes its appearance in Chapter 7, where the urban economy is studied in detail.

Although the question of the birthplace of entrepreneurs is important in the controversy over the possible origins of 'entrepreneurial'

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1. For a discussion of the two main schools of throught, see Kriesky, 'Entrepreneurs in Latin America and the Role of Cultural and Situational Processes' in International Social Science Journal, 1963.
2. Dean, The Industrialisation of Sao Paulo, 1880-1945 p. 38.

traits, it is not central when the matter at issue is the ability or non-ability of the domestic economy to mobilise the factors necessary for self-sustaining development. In the latter context what is important is the distinction between a development process conducted by capitalists resident within, and closely tied to, the local economy; and a process conducted by international firms whose base of decision-making and locus of capital accumulation are located abroad.[1]

It has already been indicated that the Peruvian elite prior to the 1920's was not without a tradition of dynamism and creativity, and that the 'spirit of capitalism' (whether for profit or adventuring motives) had made its appearance in the 1890's, a decade in which local capital moved into the establishment of large manufacturing firms, native banks and insurance companies,[2] an active Stock Exchange for the mobilisation and channelling of local capital,[3] and the only public-utilities (electricity and tramways) complex in Latin America to be entirely local-run.[4] No commentator of the 1890's had lamented the absence of the capitalist virtues among his countrymen; debate had

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1. For a clear distinction between immigrant entrepreneurs and international firms in the context of the nineteenth-century mining industry see Purser, Metal Mining in Peru, Past and Present, p. 88.
2. Illuminating insights into the entrepreneurial basis of the 1890's experience are provided by the lists of boards of directors of the leading local financial institutions of the period, printed in Yepes, pp. 175-180. Among the noteworthy names, of course, appears that of Leguía, earlier member of a dynamic class, who in the 1920's was so bitterly criticising the 'aparthy and inertia' of his people.
3. The Bolsa Comercial de Lima was set up by José Payán of the Banco del Perú y Londres, in 1896. On its later development see the discussion below, in Chapter 7.
4. For a full history of the early days of public utilities in Lima, see 'Lima in the Dawn of Electricity', Special Industrial Supplement to the Leader, May 24th, 1927.

hinged on the question of which economic sectors should be promoted next, rather than on the question whether the capitalists existed to carry out the work.[1]

By the 1920's, however, contemporary comment on the Peruvian elite was predominantly unfavourable. The US Commercial Secretary in 1922 described them as 'very conservative in their ideas and ... usually unwilling to take the risks incident to new industrial enterprise'.[2] Leguía himself was hardly more flattering, as the British Minister noted in 1927:[3]

> President Leguía is a great believer in regeneration from outside; he has several times in his speeches made reference to the apathy and inertia of his own people, and in pursuance of his ideas he has contracted for the services of /foreign/ experts or special commissioners to study, report on, or direct various branches of industry or economic work.

The final word on the matter, for many later Peruvians, came from José Carlos Mariátegui in 1928[4]:

> The moral, political, and psychological elements of capitalism apparently have not found a favourable climate here. The capitalist, or rather the criollo landowner, believes in income before production. The love of adventure, the drive to create, and the organising ability that characterise the authentic capitalist are almost unknown in Peru.

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1. For the very important turn-of-the-century debate among Peruvian economists over the issue of protection for manufacturing versus 'desarrollo hacia afuera', seeBarreda y Osma, Los Derechos de Aduana y las Industrias Nacionales; Garland, Las Industrias en el Perú and El Fisco y las Industrias Nacionales; and Gubbins, Lo Que Se Vé y Lo Que No Se Vé and Más Luz!
2. W.E. Dunn, in Leader, March 21st, 1923, p. 13.
3. Lord H. Hervey, 'Annual Report for 1926'; Item A2497 in FO371/12019.
4. Mariátegui, Seven Interpretive Essays, p. 21.

That such a change could have come about within the space of a single generation immediately casts doubt upon the possibility that the failings of Peruvians in the 1920's were to be attributed to deep-seated psychological or cultural factors, and suggests the need to look rather at the circumstances with which they were confronted. This chapter will trace the performance of Peruvian capitalists in four export sectors during the first thirty years of the century, in order to demonstrate the irrelevance to the Peruvian case of theories which attribute slow development and the entry of foreign capital to the incapacity and weakness of the domestic capitalist class. The first two case studies presented cover sugar and cotton, the two leading export activities which remained in local hands, to show that where Peruvians remained in control they were responsive and creative entrepreneurs when opportunity offered. The second two studies deal with copper and oil, the two sectors which passed into foreign control, in order to test the hypothesis that the entry of foreign capital can be explained by the inability of local factors to develop those activities.

Cotton

The full history of Peruvian cotton remains to be written, partly because of the characteristics which distinguish it from the other major export sectors of the 1920's. Cotton has been a smallholders' and sharecroppers' crop, with few if any economies of scale in cultivation, and consequently it has not, in Peru, given rise to plantations as large

and obvious as those of sugar.[1] Furthermore, being geographically dispersed along the coast, it created a string of processing plants of moderate size - gins and cottonseed oil mills - in contrast to the giant centralised factories of sugar.[2]

As was shown in Chapter 2, cotton was the fastest-growing export product of the period 1900 to 1920. Although the sector had enjoyed a brief boom at the time of the US Civil War in the 1860's[3], its growth thereafter was slow until the end of the century[4]. The takeoff of cotton came in the first decade of the twentieth century, stimulated by the steep rise in demand from the newly-established Lima cotton mills, plus high prices offered in Britain for both cotton and oilcake for cattle feed. From around 6 million tons in 1899, exports were up to 21 million tons in 1909, a dramatic expansion which brought the value of cotton exports up to parity with sugar. The figures in Table III.1 suggest a strong supply response by Peruvian agriculture to the rise in British cotton prices during the period 1900-1905 (the main response appears with a lag of roughly four years, as

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1. Ruth, 'The Cotton and Sugar Industries of Mexico and Peru', p. 51. An intensive, region-by-region survey of the role of smallholders in Peruvian cotton is Sociedad Nacional Agraria, Como se Produce el Algodón en el Perú, a study prepared to counter attacks on the SNA as a large landowners' club.
2. The development of the processing side of the industry is not pursued here. The development of cotton ginning and cottonseed-oil milling followed a pattern similar to that of other sectors: initiated by Peruvian capitalists, the sector was subsequently partly denationalised as the foreign merchant houses (particularly Duncan Fox) diversified into processing. Until 1930 at least, however, Peruvian capital was dominant. See Ruth , p. 52; Martin, p. 172; Dunn, pp. 352-362 and 460; and 'From Cottonseed to Lard: a Peruvian Industry' in Leader, September 9th, 1927, Supplement, p. 1.
3. Ruth, p. 46. The boom continued until 1874, when the southern USA recovered as a major producer.
4. Ruth, p. 46 indicates that Peru was unable to compete in the main market, Britain, because freight rates to Liverpool from Egypt and India were below those from Peru. The Peruvian response was a widespread swing out of cotton into rice.

TABLE III.1

British Cotton Prices and Peruvian Cotton Exports, 1890-1930

Year	British Average Price for Upland/ American Middling cotton, pence per lb.	Liverpool price of Tanguis, pence per lb.	Peruvian Cotton Exports 000 Tons	Peruvian Cotton Exports £ millions
1890-4 av	4.66		7.3[a]	0.3[a]
1895-9 av	3.79		5.7[b]	0.2[c]
1900-04 av	5.55		7.4	0.3
1905-09 av	5.92		13.7	0.7
1910-14 av	6.98		19.2	1.2
1915	5.87		21.1	1.3
1916	9.00		21.2	1.7
1917	16.55		17.4	2.9
1918	22.30		21.5	3.8
1919	19.65		37.1	6.6
1920	23.14		34.8	9.0
1921	9.40		36.4	3.8
1922	12.10		40.0	5.0
1923	15.25		43.4	6.8
1924	16.26		40.2	7.0
1925	12.64		41.7	7.5
1926	9.40		50.2	5.9
1927	9.54	25.39	57.1	6.8
1928	10.92	24.88	46.5	5.9
1929	10.26	21.15	45.5	6.8
1930	7.49	13.78	54.6	5.9
1931	5.90	9.67	46.9	5.2

a. Average of 1890 and 1891 only.
b. Average of 1896-99 only.
c. Average of 1897-99 only.

Sources: British average prices from Mitchell, B.R., Abstract of British Historical Statistics, p. 491.

Liverpool Tanguis prices from Grunwald and Musgrove, Natural Resources in Latin American Development, p.439.

Peruvian export figures from Extracto Estadistico 1934-1935, pp. 135-6.

Note that the total export figures given above include cottonseed, oil and cake, in contrast to the figures in Table III.2 below, which are for cotton only.

Peruvians became convinced that the higher prices would hold, and moved land out of other crops). In Ica, Hammel reports[1]:

> By 1905 cotton was beginning to replace grapes as a cash crop and the first vineyards were torn out to make room for cotton fields .... Cotton was preferred to grapes because it was not subject to the high taxes on alcohol ..., it required only a tenth of the field labour per unit area, and the grower could obtain ready financing on a high percentage of his expected crop. Obviously, these are advantages only to commercial growers, so that the replacement of grapes by cotton began among and was for a long time confined to wealthy agriculturists.

The pattern of resource transfer into cotton proceeded to the point where technological limitations were encountered, in terms of the varieties of cotton grown. Peru is one of a small group of countries climatically adapted to the production of long-staple cotton (in the 1920's, Egypt was the only other large producer in this class). Long-staple cotton enjoyed (and enjoys) a considerable premium over short-staple varieties, because of its suitability for mixing with wool; it also was increasingly used in the manufacture of automobile tyres, as the automobile boom took hold in the USA.[2]

Until about 1910, the only long-staple cotton grown in Peru was a variety known as Aspero, which was ecologically limited to the northern valleys. Most of the cotton grown in the valleys of the centre

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1. Hammel, Wealth, Authority and Prestige in the Ica Valley, quoted by Ruth, p. 47.
2. Cotton was later replaced by nylon as the cord material in tyres. In the 1920's, however, it was unchallenged for this use. See report from Daily News Record, New York, reprinted in Leader, March 15th, 1922, p. 8. For comments on the premium enjoyed by long-staple cotton - often as much as double the base price in world markets (American middling), see Grunwald and Musgrove, Natural Resources in Latin American Development pp. 431 and 439.

(including the Cañete and Ica areas) was short-staple Egyptian cotton, which commanded lower prices and so gave lower returns. Until the early 1920's, these valleys of the Centre were large producers of sugar, particularly the valleys around Lima and the Cañete area. The displacement of sugar by cotton proceeded to only a limited degree, because profits remained higher in the former commodity. A study in 1916 by the British Sugar Company (a major Cañete producer) indicated that the transfer of the company's land to cotton would not be economically worthwhile.[1] The introduction of a long-staple cotton adapted to the conditions of Central Peru, however, abruptly changed the picture.

The development and introduction of Tanguis cotton in Peru is a case study in successful and dynamic agricultural innovation, and represented a technological triumph for Peruvian entrepreneurs. The original research and development effort, conducted by Fermin Tanguis, a Pisco cotton grower,[2] was inspired by the desire to evolve a variety which would be resistant to wilt. This disease had been inflicting severe damage on the Peruvian crop during the early years of the century, and was a contributory factor in the failure of long-staple cotton to become established in the Centre. Tanguis began his experiments in 1908, and in 1912 obtained a new cotton, wilt-resistant, high-quality, and long-staple. For the following three years Tanguis was

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1. R. Miller, personal communication.
2. Tanguis, a Puerto Rican by birth, came to Peru in 1872. For his biography see Basadre, Historia de la República, Vol. 8, pp. 3861-3863.

engaged in breeding further stock from the original plant; and in 1915 he made the new seed available for sale to other cotton growers.[1] In 1919, at the height of the export boom, Tanguis cotton made its appearance as an export crop[2]; in that year it was 12% of cotton exports by weight. By 1921 this proportion had increased to 35%, and by 1923 to 50%. Because of the higher prices it commanded, the share of Tanguis cotton in total cotton earnings was higher than its volume share (the reversal of this in the 1928 figures is suspect). The figures on cotton exports from 1920 to 1928 appear in Table III.2.

Tanguis cotton, thus, rose to 80% of cotton exports within a decade of its commercial introduction to Peru. This fact alone suggests a lively awareness of economic advantage among growers, particularly when it is considered that a substantial part of the cotton crop came from small peasant planters. A second round of the same process in the North came with the introduction of Pima (a super-long staple cotton, also developed locally) in 1924-25.

In the early 1920's, with sugar prices depressed and with profitability in cotton boosted by the new variety and the US boll weevil

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1. Peru, Cradle of South America September 1924, p. 92; Barlow, Cotton in South America, p. 120.
2. The introduction of Tanguis coincided with a drive by Peruvian growers to gain a better position in the US market. From 11,000 bales in 1916-1917, Peru's cotton exports to the USA rose to nearly 20,000 in 1917-1918, 25,000 in 1918-1919, and 63,000 in 1919-1920. 'The war interfered with the movement of Egyptian cotton and this gave Peruvian Mitafifi an opportunity to enter our market; an opportunity which her producers did not hesitate to grasp to the full extent of their producing ability'. (C.E. Toller, in Leader, March 5th, 1921, p. 14).

TABLE III.2

Peruvian Cotton Exports, by Variety; FOB Value and Weight.

Year	Tanguis		Pima		Other	
	Tons	£p000	Tons	£p000	Tons	£p000
1920	9,537	3,180	-	-	25,238	7,925
1922	14,642	1,772	-	-	25,297	2,616
1924	26,928	4,438	-	-	13,290	2,020
1926	38,972	3,665	1,483	138	9,145	737
1928	38,195	4,661	3,551	549	4,731	582

Percentages Based on the Above Figures.

Year	Tanguis %		Pima %		Other %	
	Volume	Value	Volume	Value	Volume	Value
1920	27	29	-	-	73	71
1922	37	40	-	-	63	60
1924	67	69	-	-	33	31
1926	79	81	3	3	18	16
1928	82	80	8	9	10	11

Sources: Figures on volume and value extracted from Estadistica del Comercio Especial, 1920 pp. 259-60; 1922 pp. 247-248; 1924, pp. 316-317; 1926, pp. 367-368; 1928, pp. 385-386.

Note that the 1920 Customs valuations of cotton exports may be unrealistically high, due to the problems of determining average prices for the year.

plague referred to above,[1] the process of transfer of resources into cotton from other crops again picked up momentum. Reporting from Pisco in 1924, Rounsevell stated:[2]

> The price and profitability of the cotton crop has in recent years relegated pisco, the drink, into a place of very minor importance in Pisco, the port. Vineyards have, year by year, been uprooted; stills destroyed and wine presses abandoned. Old vineyards have been planted to cotton, stills have been replaced by oil mills and the wine press has been succeeded by the cotton press .... This year of record profits is likely to see the last of the big vineyards in Ica and the other valleys contributory to Pisco, uprooted.

By 1926, a study of Cañete (formerly a major sugar area) reported that cotton accounted for 90% of all cultivated land in the province.[3]

The boom was shortlived. By 1925 world prices were on the way down, and disastrous floods wiped out much of the Peruvian crop in January-February 1925.[4]

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1. 1922, exceptionally was a year of severe supply shortage in world cotton markets. Peru's earnings were boosted not only by the failure of the US cotton crop, but also by a drop in the competing Egyptian long-staple crop, which in 1922 was of poor quality, and reduced roughly 13% below the 1921 level by a British-imposed policy of restriction on Egyptian production. (Leader, March 15th, 1922, p. 8). During 1921 world stocks of cotton ran down, and the shortage was felt in 1922, when prices rose steeply. An immediate worldwide supply response, including Peru, took world production up to 25 million bales, a record level, in 1925; far above current consumption. As stocks accumulated prices fell again through the later 1920's. By 1930 world stocks had reached 17 million bales, or 70% of annual output. For analysis of the movement of stocks and prices during the 1920's see Nogaro, Les Prix Agricoles Mondiaux et la Crise pp. 104 ff.
2. Nelson Rounsevell in Leader, January 8th, 1924, p. 1.
3. Hinds, Informe Sobre la Producción de Algodón en el Valle de Cañete, p. 4.
4. By 1927 it was reported that cotton earnings were failing to meet production costs (Miles Poindexter, Despatch No. 742G to US Secretary of State, May 12th, 1927, D.F. 823.51/401.) There are, however, grounds for doubt as to the accuracy with which producers reported their true costs to the Government.

In those three years, however, Peruvian landowners who went into cotton reaped profits comparable to those which had accrued during the wartime years. With production costs totalling perhaps 30 soles (£p3) per bale of Tanguis, growers were receiving 80 soles (£p8) per bale from Lima buyers at the end of the 1923 season.[1]

Cotton thus produced, for a brief span in the 1920's, a group of rich agriculturists, and raised hopes of a return of the high years of prosperity, 1917-1920. In cotton, creative entrepreneurship was profitable, and the Peruvians engaged in the sector showed themselves to be as dynamically creative, in the Schumpeterian sense, as any country could ask of its capitalist class.

Sugar

The characterisation of sugar in the 1920's as a Peruvian-owned sector does not go unchallenged in Peru. Indeed, it is one of the most durable myths of Peruvian economic history that the sugar industry was initiated and controlled by foreign capital. Ruth states[2]:

> Foreign capital, entrepreneurship, and management were dominant, especially in the Chicama valley.... The dominating catalyst during [the nineteenth century] appears to be the foreign entrepreneur, organising the native factors of production and importing any deficiency.

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1. Leader, January 8th, 1924, p. 1. See also Leader, July 1st, 1924, p. 23.
2. Ruth, pp. 85-86. See also Sutton, 'Land Economics and Reclamation in Peru', in Leader, January 14th, 1930, p. 8.

The image of an industry dominated by foreign firms has been popular among Peruvian writers in part at least because foreign firms make an easier target for criticism than domestic firms, and because the features of the sugar industry which have been the subjects of criticism - connections in the international economy, monopolistic behaviour, displacement of local mercantile groups by plantations' own import networks, and so on - are of a type which often tends, if only subconsciously, to be identified with foreign capital.

Such an image of the sugar industry, however, distorts the reality. Part of the difficulty is that commentators have tended to class as 'foreign' both international firms and immigrants. Once the distinction is made, it can be seen that foreign firms were consistently a small minority of the sugar owners. Only in two of Peru's sugar-producing areas - the Chicama Valley and Cañete - were major plantations foreign owned: the Cartavio plantation of W.R. Grace (supplemented by Grace's purchase of the Hacienda Paramonga in Pativilca in 1927) and the Santa Bárbara estate of the British Sugar Company (controlled by W.M. and Jno Lockett of Liverpool). The latter estate was sold off to local capitalists in 1920.[1]

Meanwhile in La Libertad, in addition to Grace, there were four

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1. The Santa Bárbara estate, consisting of five haciendas, was built up in the nineteenth century by a Scots immigrant, Henry Swayne. After his death, in order to meet debts to Locketts, the estate was sold to the newly-formed British Sugar Company in 1900, with Augusto B. Leguía (Swayne's son-in-law) as manager. The company was formed by Locketts and the Swayne heirs, and it was the desire of the Swaynes to liquidate their holdings which led to the sale in 1920. The Sociedad Agrícola de Santa Bárbara which took over the estate had capital of £p500,000, apparently equivalent to the purchase price. (Leader, July 10th, 1920, p. 2). The leading figures in the new company were Pedro G. Beltrán, the Barnechea family, and Oscar Ramos Cabieses, (Leader, August 11th, 1925, p. 4), all names familiar in the history of Peruvian agriculture.

Peruvian or immigrant families operating: the Larcos (immigrants from Italy in the 1860's); the Gildemeisters (immigrants from Germany in the 1850's); the Chopiteas, and the Gonzalez-Orbegosos. Further north in Lambayeque the names were virtually all Peruvian: Pardo, Izaga, Aspíllaga, and a number of smaller operators. In the 1920's the De la Piedra family (immigrants from neighbouring Ecuador) were the only non-native participants there. In the valleys around Lima the dominant figures were Lima capitalists who had invested in convenient agricultural enterprises: the Prado family (San Agustín hacienda and Buen Pastor mill); Eulogio Fernandini the mine-owner (hacienda and mill Pro); the Jacobys (Carapongo); the Devescovis (Chacra Cerro); Gio Batto Isola (Vista Alegre). Other major firms were the Sociedad Agrícola San Nicolás (in Pativilca, owned by the Barreda family and the Banco Perú y Londres group); the Sociedad Agrícola Tambo Real (at Chimbote, owned by a Peruvian syndicate in association with the British merchants Barber, Vargas and Co); the Pampa Blanca and Chucurapi estates in the Tambo Valley near Arequipa (Lira and Romaña families respectively) and Santa Bárbara, after its purchase by local interests. From time to time sugar estates were bought or sold by foreign firms[1], but it is quite incorrect to describe

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1. W.R. Grace and Co purchased the sugar estate and mill Infantas near Lima in 1917, but re-sold it in 1920 for $1,750,000 to a Peruvian group connected with the Banco Italiano. The sale price (£p360,000 at $4.86 = £p1) gave Grace a £p98,000 clear capital gain in three years; the purchase price had been £p261,000. (Leader, July 10th, 1920, p. 1, and August 27th, 1921, Supplement, p. 1.) Milne and Co, who had bought up the Puente Piedra estate near Lima in 1911, also sold in 1920, to a Peruvian group headed by the mine-owner Manuel Mújica y Carassa, and the Banco Popular. (Leader, July 10th, 1920, p. 2). Tambo Real plantation near Chimbote, formerly owned by the French Dreyfus family, was acquired by foreclosure in 1916 by Barber, Vargas and Co and the Anglo-South American Bank, who resold it shortly afterwards to a local firm headed by Rollin Thorne (a Peruvian). (Leader, August 7th, 1920, Supplement).

the industry as foreign controlled.

This being the case, it is interesting to note that the sugar industry had a long record of investment, innovation, and concentration of holdings, stretching back to the 1870's.[1] Peru was a highly efficient producer by world standards, with exceptionally high yields resulting from ecological conditions, and constant improvements in milling technology, especially during the 1910's. The 1920 collapse of sugar prices, as can be seen in Table III.3, put an end to thirty years of steadily improving prices and growing output, and throughout the 1920's the sugar sector was in decline.[2] The response of the sugar owners to this decline was twofold. In areas where the growing of cotton was an ecologically-viable alternative, there took place a massive and general shift out of sugar, which resulted in a dramatic geographical concentration of the country's sugar industry in three regions: Lambayeque, La Libertad, and Tambo (in the far South). Cañete and several of the valleys around Lima virtually ceased to produce sugar.[3]

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1. On early investment history see Garland, La Industria Azucarera. On the state of the industry by the 1920's see Rosenfeld, La Industria Azucarera del Perú, a highly complimentary report by a US expert brought to Peru in 1925.
2. Surprisingly, descriptions of the economic crisis in La Libertad at that time fail to take this into account, preferring to blame the difficulties of local commerce solely on monopolistic distortions caused by large capital. See, e.g., Klaren, La Formación de las Haciendas Azucareras y los Orígenes del Apra, Chapter 5.
3. The evidence of a swing out of sugar around Lima is clear in the long series of closures of the Lima mills. 1925-26 saw the closure of Chacra Cerro, Pro, Chuquitanta, and Carapongo; the remainder of the 1920's saw a steady reduction of the area under cane and the volume of output; and the continued depression of the industry in the 1930's, combined with growing competition in the Lima market from W.R. Grace's plantations further north, killed off the remainder of the Lima mills during the 1930's. Naranjal, the last survivor, was closed in 1938. (Union de Productores de Azúcar, El Azúcar Peruana, p. 19). From about 30,000 tons in the mid-1920's, Lima sugar output was down to 20,000 tons by 1930, representing the demand of the Lima market. (SNA, Memorias).

TABLE III.3

Sugar: World Prices and Peruvian Exports, 1900-1930

Year	Raw sugar prices		Peruvian sugar exports	
	New York (¢ per lb)	London (d per cwt)	000 metric tons	£p millions
1900-04 av	2.36	121.8	121	1.2
1905-09 av	2.61	131.9	126	1.3
1910-14 av	2.75	145.8	143	1.4
1915	3.59	230.5	177	3.0
1916	4.78	261.0	220	4.0
1917	5.22	323.3	239	4.1
1918	5.49	295.3	212	4.2
1919	6.65	364.3	198	8.3
1920	11.35	n.a.	272	12.5
1921	3.36	219.5	250	5.0
1922	3.00	183.5	240	4.8
1923	5.28	309.0	271	6.9
1924	4.17	261.0	282	5.4
1925	2.56	153.0	266	2.6
1926	2.56	147.0	208	4.6
1927	2.95	165.0	331	4.6
1928	2.43	139.5	300	3.6
1929	1.99	108.5	306	3.4
1930	1.47	79.0	363	2.6

Sources: Prices from FAO, The World Sugar Economy in Figures, Table 21, p. 127.

Peruvian exports from Extracto Estadístico 1939, pp. 246-247.

The second response, in areas whose comparative advantage continued to be in the production of sugar, was a series of measures of retrenchment and concentration, combined with the initiation of a renewed research and development effort to produce higher-yielding (lower unit cost) cane varieties. The swing towards research and development was epitomised by the establishment, in 1926, of an agricultural experimental station controlled by the Sociedad Nacional Agraria and headed by Gerardo Klinge, the leading Peruvian agronomist of the period.[1]

The decline of the sugar industry's prosperity in the 1920's had a number of clearly-visible effects on that section of the national elite which was involved in the industry. On the whole, sugar remained a profit-making activity[2], but the profits were not large, and the short-run outlook was gloomy. This represented an abrupt reversal of the picture which had prevailed until 1920, and which had induced a number of Peruvian capitalists with expectations based upon the performance of the preceding thirty years to invest massively in sugar

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1. The station was established on the La Molina estate near Lima, and subsequently developed into the national agricultural university. For details of its establishment and early history see Sociedad Nacional Agraria Memoria for the years 1925 and 1926.
2. 'The Economic Future of Peruvian Sugar' in Leader, September 22nd, 1925, p. 21.

- a process which had reversed an earlier trend towards gradual denationalisation of the industry.[1] Between the end of the 1914-1918 war and the onset of the recession of 1920, Peruvians poured capital totalling some £p2 million ($10 million) into sugar estates and mills[2] - a sum which bears comparison with the $12 million estimate of costs on which Cerro took its decision to construct the Oroya smelter. This enormous investment was made, of course, with imperfect (and in this case completely incorrect) foresight, and proved a great disappointment to those involved. Wherever possible, entrepreneurs who had transferred huge resources into sugar in 1919-1920 were by 1922-1923 engaged in shifting their land out of sugar into cotton, rice or other food crops, and urbanisation projects. Those located in areas suited only to sugar, or where sugar remained more profitable than alternative crops (La Libertad and Lambayeque, mostly) did not have this option open to them, and remained in the industry. In most cases their profits enabled them to survive; but few had surplus resources of any magnitude to spare for use as venture capital in other sectors. To the falling-away of investible surplus in the industry must be added (and partly attributed) the

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1. Leader, July 10th, 1920, pp. 1-2. The investment was financed by a 'great reserve of surplus Peruvian capital' generated by war conditions. (Ibid).
2. Full details on the sums invested at this time are not available. The following scattered cases indicate that £p2 million is a reasonable, and perhaps conservative, estimate. Santa Bárbara (see above) was bought for £p500,000; and Infantas for £p360,000. The Sociedad Agrícola Tambo Real, which took over the estate in 1918, had fully-paid equity of £p390,000 plus £p100,000 of issued bonds by 1920 (Bolsa Memoria 1920, Anexo 1), and in 1920 ordered £p300,000 worth of milling machinery in England (Leader, August 7th, 1920, Supplement), apparently paid for out of the above capital. The Sociedad Agrícola Puente Piedra, formed in 1920, had issued capital of £p150,000 (Perú en su Centenario, pp. 93-94). The Sociedad Agrícola Paramonga, with quoted capital of £p400,000 in 1917 had doubled this to £p800,000 by 1920 (Halsey, p. 343; and Bolsa Memoria 1920, Anexo 1.) Victor Larco in 1919 installed £p250,000-plus worth of new machinery at Hacienda Roma, financing the purchase by means of a loan from the Banco del Perú y Londres (Klaren, p. 34, fn). Expansion and improvements on other estates during the period would easily have accounted for a further £p500,000.

declining political influence of sugar. The leading figures of the Civilista party - Pardo, Aspíllaga, the pre-1912 Leguía[1] - had been sugar entrepreneurs, as had various lesser political figures such as Durand. Leguía's overthrow of the Civilista Party in 1919, and the political purges which followed, sent the Pardos, Aspíllagas and Durands into exile, and removed the sugar industry from the inner councils of government. Enrique de la Piedra, a Leguiista figure and Minister of Finance in 1919, who bought the Pomalca estate in 1920 and might have become a new spokesman for the industry, was gradually eased out of the government circle during the decade and by 1930 was one of the opposition leaders, masterminding an assassination attempt on Leguía.

The political weakness of the sugar planters was reflected in their inability to win favourable treatment from the government. The great strikes in the Chicama Valley in 1921 initially received governmental support, and were repressed, using the army, only after long hesitation.[2] Repeated demands during the 1920's for lower sugar taxes were ignored by Leguía; and the government's determination to defend the exchange rate against depreciation deprived the industry of relief from that quarter. A project promoted by the sugar planters (together with various other agricultural interests) for an agricultural bank to furnish working capital came to fruition in a small way in 1927 when the Crédito Agrícola was established; but conflicts of interest between Peruvian and U.S. bankers emasculated the scheme, which received only half-hearted support

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1. Leguía's main landholdings were in Cañete, and in accordance with the general trend there, he was a cotton rather than sugar grower by the 1920's.
2. Klaren, pp. 68-72.

from Leguía.[1]

All in all, the 1920's were an unhappy time for sugar. Only one planter (Larco) actually went bankrupt[2], but the rest were engaged in digging-in rather than branching out into other sectors. In several cases this involved the removal of some part of their capital from Peru, especially in the case of the exiled Lambayeque planters. Although Larco received £p500,000 disposable cash from his sale of Roma, and the owners of Paramonga recovered £p600,000 of their £p800,000 investment by selling out to Grace in 1926[3], there is no sign of this money having moved into new large-scale enterprises elsewhere in the economy, and a considerable proportion probably found its way overseas (the Paramonga purchase price may indeed have been paid abroad in dollars).

Whereas cotton and mining figures were frequently to be found among the directors of non-export enterprises in Lima during the 1920's, sugar entrepreneurs were playing a declining role, in keeping with the decline of their economic base. A comparison of the leading names in finance and manufacturing in the 1890's with those of the 1920's reveals a sharp contraction of the relative importance

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1. For a summary history of the Crédito Agrícola see Gerbi, pp. 341-346.
2. In 1927, after having fallen steadily deeper into debt over a period of several years, Larco sold Roma to the Gildemeisters for £p1.3 million, of which £p700,000-800,000 went to pay off his debts to the Banco del Perú y Londres. (Leader, September 20th, 1927, p. 1). The possibility of a Gildemeister takeover had been under discussion since the closure of the Roma mill in 1922, which left Larco dependent upon the Casagrande mill. In early 1924 a provisional sale agreement was reached, under whic the Gildemeisters were to pay Larco £p1.8 million for the property. (Leader, April 1st, 1924, p. 9). This deal, however, fell through.
3. Leader, September 21st, 1926, Supplement, p. 1. The Sociedad Agrícola de Paramonga was established in 1898 to take over the estate from the Canaval family. From £p100,000 the capital had risen to £p400,000 by 1916, and was again raised to £p800,000 in 1919-1920. (Perú en su Centenario, pp. 66-69; Halsey, p. 343; Basadre, Historia, p. 3187).

and influence of the sugar men; and in a number of cases investments held outside the sugar sector by sugar planters were liquidated, major examples being the sale of the Gildemeister and Orbegoso mining properties to Northern Peru.

The absence of a dynamic, progressive spirit among sugar planters in the 1920's comes thus as no surprise, when the economic circumstances faced by the industry are considered. Capital was tied up in land and machinery, and could be transferred en masse into other, more attractive occupations only in areas where a swing into cotton, rice or urban real estate was possible. Investible surplus was low, and a number of the leading entrepreneurs were isolated from Peruvian investment opportunities by political problems, or faced (like De la Piedra) severe uncertainty about their future security in Peru. These were, nevertheless, men whose credentials as development agents had been amply established during the prceding decades. To categorise them otherwise than as active, intelligent and economically responsive capitalists is to deny forty years of history.

It is clear, in summary, that Peruvian capitalists in sugar and cotton were not afflicted by psychological or cultural barriers which prevented their operation as rational entrepreneurs; nor were they unable to mobilise capital and skills when suitable profit opportunities offered; nor did they operate their enterprises at a technological level significantly below that attained elsewhere in the world. Close study of the wool industry of southern Peru yields similar conclusions as to responsiveness and readiness to innovate.[1]

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1. I have written up the results of the wool study elsewhere, as 'Modernisation and Change in the Wool Industry of Southern Peru, 1919-1935', forthcoming.

Having considered the performance of Peruvian entrepreneurs in those export sectors in which they remained predominant, the question naturally arises of whether similar features were present in those export sectors where foreign capital was or became the dominant force. It might have been the case that Peruvians were willing and able to participate actively in agricultural export sectors, yet were deterred from undertaking the development of mineral exports by some set of special problems - technological difficulty, risk, marketing problems, or questions of factor endowment. The analysis which follows of the events in mining regions which preceded the entry of the two leading metal-mining foreign firms, Cerro de Pasco Copper Corporation and Northern Peru Mining and Smelting, permits a definite conclusion to be reached that Peruvians were as capable and entrepreneurial in mineral as in agricultural export activities.

Copper-Silver Mining

Foreign capital entered the metal-mining sector in the shape of the Cerro de Pasco Mining Company (later Cerro de Pasco Copper Corporation, referred to hereafter as Cerro), in 1901. Cerro was established to develop a large group of mines at Cerro de Pasco purchased from Peruvian owners. The copper-mining industry was by that time well-established in the Cerro de Pasco and Morococha regions (see map in Figure V1), as a direct successor of the former silver-mining industry which had been destroyed by falling prices

during the 1890's.[1] The year 1897 marked the dividing line between the dominance of silver, the traditional product, and that of copper. In that year Peru demonetised silver, the market for which in consequence contracted sharply, and interest turned to copper, the key metal in the rapid growth of the world electrical industry in the 1890's. In both Peru and Chile[2] local capital was quickly attracted into the new product. At Morococha, where copper mining had been pioneered by the Pflucker family, the copper boom was in progress by the mid-1890's, led by a local-born entrepreneur, Lizandro A. Proaño, and served by the large smelter of the Backus and Johnston Mining Company at Casapalca. At Cerro de Pasco, where the costs of transport out from the mines were a serious problem,[3] smelters were built locally to produce copper matte. From 1898 to 1900 more than ten smelters were built with a combined daily output capacity of 31 tons.[4] Exports from the area in 1900 were 5,138 tons of matte and 11,944 tons of high-grade copper ore.[5] The leading figures in the smelting boom - Andres Rizo

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1. These two regions, and the silver mines of Casapalca, had a long history of previous operation. See the historical material in Purser, Metal Mining in Peru, Past and Present.
2. On the early history of Chilean copper see Reynolds, Chapter 1.
3. The need for a railway out from Cerro de Pasco was dramatically emphasized by the swing from the low-bulk high-value commodity, silver, to the high-bulk commodity copper. The problem was compounded by the fact that the processing of copper was by smelting, which in turn required the hauling of large tonnages of coal from mines in the surrounding region. An early attempt at railway construction, the Ferrocarril Mineral de Cerro de Pasco, of which 30 km were built in the 1870's, had been destroyed by the Chileans in 1879 (Costa y Laurent, 'The Railways of Peru' in Leader, January 11th, 1927, pp. 8-9). The transport issue was discussed in Jorge Basadre, 'Aspecto Industrial del Cerro de Pasco' in Boletín de la Sociedad Nacional de Minería, 1899. Data on freight rates from Cerro de Pasco to Oroya was also given in 'United States Mining Syndicate in Peru', in US Monthly Consular Reports, March 1902, pp. 422-23. According to this source, the cost of sending out a ton of ore or matte by llama in 1901 was 70-80 soles, compared with an estimated railway freight rate of 24 soles.
4. A list of these smelters and their owners appears in Velarde and Denegri, 'Informe de la Comisión del Cerro de Pasco', in B.C.I.M. No. 16, 1904, p. 21.
5. 'United States Mining Syndicate in Peru', p. 422.

Patrón, the Gallo family, M. Malpartidq, G. Ruiz Diaz, Eulogio Fernandini - were all Peruvian entrepreneurs with experience in the mining industry and connections in Lima. The mines were owned by a mixture of former silver miners, and newly-arrived speculators from Lima. The future of the industry looked bright in the long run, and the basic work of proving the existence of commercial copper reserves, and developing the necessary technology for high-altitude smelting[1], had been carried out under Peruvian auspices. As the twentieth century opened, three requirements remained to be met for the Cerro de Pasco copper industry to become an export sector of front-rank importance. One was a drainage tunnel to permit workings to be carried below the water table; a local company was set up to dig this in 1900, and the tunnel was completed in 1908.[2] The second was a railway to carry out copper at a reasonable cost; this project washanging fire because of the reluctance of the Peruvian Corporation to commit any further capital in Peru. The third was the injection of heavy capital investment to raise the industry to large scale; this would have become available progressively through the succeeding decade as the leading mine-owners - especially Fernandini - built up their holdings.

In September 1901, however, a group of US capitalists headed by James Haggin were able to buy up, within the space of a few weeks, 80% of the mineralised zone at Cerro de Pasco.[3] Subsequently the new company extended its Cerro de Pasco holdings further, and moved into

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1. Gerbi, El Perú en Marcha, p. 257, attributes to an immigrant Italian engineer, Chiapponi, the development of a furnace which would operate satisfactorily at 14,000 feet.
2. The Empresa Socavonera de Rumihallana was formed by a group of leading capitalists headed by Isaac Alzamora (then Vice President of Peru), José Payán, and the Aspíllaga family. A forthcoming study by C. McArver of the University of North Carolina covers its history.
3. Report on the Trade and General Condition of Peru in 1901 (British Diplomatic and Consular Reports, Annual Series No. 2807), p. 12. For a description of the origins of the US syndicate and its early expansion see Bollinger, pp. 151-202.

Morococha also. The mines were then closed down for five years while massive infrastructure investment was carried out: a railway was built to Oroya in 1904, and a large smelter at Tinyahuarco began production in 1906. The tunnel company, having completed the drainage project, was bought out in 1908 for $3 million in Cerro shares. The arrival of US capital, a bonanza for the mine-owners, was quickly fatal for the Peruvian-owned smelters, whose supplies of ore were cut off by the purchase and closure of mines, and who appear to have suffered from discrimination in access to the new railway. The only smelter to survive was that of Fernandini at Huaraucaca, which remained economically viable because of Fernandini's ownership of a large group of mines. This smelter finally closed in 1923, when Fernandini obtained an advantageous contract to supply the Cerro smelter.

At Morococha the situation was rather different, and the course of events correspondingly differed also. The region was much closer to the Central Railway, which meant that the costs of using animal transport were much lower. Consequently it was economically feasible to send unprocessed, selected ores out to the railway, and thence down to lower altitudes for large-scale smelting at Casapalca. In 1902, the last year of llama transport, Proaño reportedly sent out 40,000 tons of copper ore.[1] Furthermore, the Morococha mine-owners were successful where the Cerro de Pasco ones had not been, in persuading the Government to build a railway to the mines over the pass at Ticlio, in 1902. Proaño, with no drainage

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1. Pacheco, Cabezas Dirigentes del Alto Comercio del Perú pp. 174-176, in an article apparently prepared by Proaño himself, gives this figure as for 1905, but specifically states that the tonnage was carried by animal. Since the Ticlio branch was put through in 1902, I have assumed that the figure refers to that year.

problem at his mines and with railway transport to hand, proceeded with major investments which, proceeding parallel with the larger programme of Cerro, were rather overshadowed, but whose importance should not be overlooked. To escape from dependence on the Backus and Johnston smelter at Casapalca he built his own, with Peruvian equipment[1], at Tamboraque further down the Central Railway. Tamboraque cost £p150,000 (over $700,000) to build, and opened in 1904.[2] With capacity nearly equal to Casapalca, this new smelter diverted Proaño's ores away from Backus and Johnston, who had few copper mines of their own. The viability of the Casapalca operation was thus under threat.

Proaño now found himself under heavy pressure from the foreign firms. Cerro, having consolidated its hold on the Cerro de Pasco area, moved in on Morococha, buying up a number of mines.[3] Simultaneously Backus and Johnston were also buying mines, and pressuring

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1. The furnaces and ancillary equipment were built by the Piedra Liza foundry in Lima (Pacheco, p.49). An interview with the owner of the foundry, Robert Reid, concerning the merits of Peruvian against imported capital goods is in Peru Today, November 1909, pp. 25-28.
2. Proaño, Lizandro A. Proaño y la Sociedad Minera Alapampa, p. 31. For a description of the Tamboraque plant in 1908 see Herrera, 'Estado Actual de la Minería en Huarochirí' in B.C.I.M. No. 72, pp. 38-40. Some information on Proaño's activities at Morococha in his pre-Alapampa period is in Jochamowitz, 'La Industria Minera en Morococha en 1907', in B.C.I.M. No.65.
3. Among these were the San Miguel and San Francisco mines of Proaño. The circumstances of the sale of these are shrouded in mystery; a later survey talked of 'forced sale'. (Pacheco, p. 172).

Proaño to supply ore to Casapalca again.[1] Since Proaño was not interested in selling out, and his presence blocked the attainment of foreign control of Morococha, the only major struggle between a Peruvian entrepreneur and a foreign firm in the first thirty years of the century took shape. In 1911, in a remarkable managerial error, Proaño pledged temporary control of his mines and smelter to a group of creditors in Lima, in order to pay off debts incurred in his investment programme. Backus and Johnston immediately bought control of the debt, and used their consequent control of the mines to destroy Proaño's enterprise. The Tamboraque smelter was closed down, and in a swift series of maneouvres Backus and Johnston seized control of the board of Proaño's company, despite Proaño's control of a majority of the capital.[2] Proaño was never able to mobilise either the Government or the police in his favour, and was obliged to fight the case through the courts. The final decision, in his favour, was given in 1923.[3] During the intervening ten years, although he drew dividends on his capital,[4] Proaño was denied access to his mines and control over policy. The Tamboraque

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1. Backus and Johnston were also momentarily threatened by a short-lived British smelting venture, the Peruvian Smelting and Refining Company at Río Blanco; this company went bankrupt under very dubious circumstances, the local manager passing over to Backus and Johnston with various assets of the firm. The Río Blanco equipment was moved to Casapalca after liquidation of the British company.
2. The details are given in Proaño, Sociedad Minera Alapampa Limitada: la Titulada Memoria; and Lizandro A. Proaño y la Sociedad Minera Alapampa.
3. Pacheco, p. 172.
4. Proaño's dividend income, even under the extremely disadvantageous terms imposed by Backus and Johnston, appears to have averaged around £p100,000 annually during the wartime boom. See Sociedad Minera Alapampa: la Titulada Memoria, pp. 13-14.

smelter, closed for a decade, was obsolete when he recovered control, and the Alapampa mines had been stripped of their richest veins by Backus and Johnston.[1] During the First World War negotiations between the latter firm and Cerro were under way, which resulted in the take-over of Backus and Johnston in 1919. Cerro entered the 1920's, thus, with properties spread across three main areas of the Central Sierra (Cerro de Pasco, Morococha, and Casapalca), and with two major smelters, at Tinyahuarco and Casapalca. Operations were centralised in 1922 with the opening of a new smelter at Oroya and the closing-down of the Casapalca and Tinyahuarco plants.

This brief sketch of the early history of copper in the Centre is important not only because it disposes of one of the myths about the industry, that it was started from scratch by US capital, but also because from this follows the point that US capital coexisted from the outset with a capable and dynamic group of domestic mining entrepreneurs. Although Cerro moved firmly to take control of the commanding height of the copper industry - large-scale smelting - it remained (necessarily) content with only partial control at the level of mining properties. The sheer number and diversity of mineral deposits in the Central Sierra imposed on the mining industry there, even after the arrival of a large-scale unifying enterprise, a complexity far greater than anything encountered by, for example, copper companies in Chile. By mutual consent with a majority of the local mining capitalists who remained, Cerro became the main market for the ores of independent miners. The result was that copper (and silver/lead/zinc) mining in the Centre became by the 1920's a

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1. Backus and Johnston used their control of the board to impose an ore-purchasing contract and mine leasing agreement, under which they received 83% of the earnings from Alapampa ore. (Ibid).

huge integrated enterprise involving both foreign and domestic entrepreneurs who shared the returns from the export industry. In only one case was it impossible to convince a local capitalist of the advantages of allying himself with foreign capital[1], and in that case, the destruction of Proaño was made possible by the tacit acquiescence of the other mining capitalists and the Government. Proaño, after an initial bitter anti-foreign reaction[2], leased his Morococha mines to Cerro[3], thereby finally consolidating the system. Cerro in the 1920's was a popular firm among Peruvian mining entrepreneurs: an organiser of large-scale profitable export activity, in which local capitalists could obtain a share without any of the risks and problems involved in smelting and marketing on their own behalf.

The implications of the process discussed above for an understanding of the evolution of the domestic entrepreneurial elite are obviously considerable. On the one hand, sale to or alliance with foreign capital was evidently an acceptable business strategy, provided that satisfactory terms were offered. On the other hand, this strategy, once followed, implied that the mining capitalists of the Centre ceased to operate as entrepreneurs in the Schumpeterian sense in that sector. The development of Peruvian smelting technology was stopped in its tracks with the closure

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1. In 1920 Cerro offered to buy up all Proaño's interests for £p400,000 cash, a sum identical to that just accepted by Ricardo Bentín for his Aguas Calientes mine at Casapalca. Proaño flatly refused; the offer, if accepted, would have amounted to an out-of-court settlement of his dispute with Backus and Johnston (=Cerro). (Leader, March 25th, 1920).
2. Pacheco, p. 178.
3. Ministerio de Hacienda, Memoria 1929, p.lxxiii.

of Tamboraque and the gradual decadence of Huauraucaca[1] after the first decade of the century. Similarly, the development of native large-scale mine technology was limited, as Peruvian ownership became restricted to deposits of medium and small scale. (All deposits were offered, as a matter of course, for sale to Cerro, and the more significant ones were accepted[2]).

The pattern established by Cerro at the beginning of the century spread to the rest of Peru with the arrival in the country of two further US companies, following the First World War. In 1904 two Peruvian mining engineers had thus described the effects of Cerro's arrival:[3]

> The effect of the operations of the American syndicate has been ... to develop the spirit of speculation in Cerro de Pasco, a spirit which has manifested itself in the wave of claim-staking, not only on all free land remaining near the known copper and silver zone, but on all available land in the other coal and metal centres of Pasco province, and even on large tracts of sterile terrain.

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1. Fernandini's smelter never advanced from the production of copper matte to production of copper bars (the last processing stage before refining) as a result of a contract under which Huaraucaca matte was sold to the Cerro smelter at Tinyahuarco for re-smelting. With the opening of Oroya, Cerro reached an arrangement with Fernandini under which the silver-rich ores of his mines at Colquijirca were supplied directly to Oroya for smelting with Cerro ores; Huaraucaca then closed down. Even in its last days this was a notable plant, the most complex assemblage of metallurgical processing in Peru until Oroya, equipped to produce silver and bismuth in addition to copper matte. (See photographs and description in Perú en su Centenario, pp. 121-129.)
2. During the 1920's Cerro's major purchases included the Aguas Calientes silver mine at Casapalca (from Ricardo Bentín, for £p400,000); the San Blas salt mine (from the Government); the Antamina copper deposit in Ancash; the San Cristobal mine at Yauli (José O. Hernandez); and the Yauricocha copper deposit (from a US-Peruvian syndicate, for $300,000). Even Fernandini, the most successful independent mine-owner, was reported in 1920 to be considering the sale of his Colquijirca mines to Cerro for $3 million. (Leader, January 15th, 1920, p. 2).
3. Velarde and Denegri, p. 35.

In 1916 the Anaconda Company, already active in Chile, began investigating copper deposits in southern Peru, and took options on properties at Tintaya and Cerro Verde. The Cerro Verde option was exercised in 1920, and the owner, Carlos Lohmann (a local mine-owner) received £200,000 cash for his title.[1] Local reaction to the Cerro Verde option was prompt:[2]

> Latterly numerous claims have been staked in the hills extending between Quequena and Cerro Verde, principally in the locality called Cerro Negro. These claims, it appears, have not been made with the idea of exploitation on a greater or lesser scale, but simply with the expectation of possibly interesting foreign capitalists.

More important, however, were the events in the north which followed the entry of the American Smelting and Refining Company into Peru in 1921. In April of that year an option was taken on the copper mines of Quiruvilca, and a local subsidiary of ASARCO was set up in Lima: Northern Peru Mining and Smelting Company, headed by a Lima lawyer, Alfredo Alvarez Calderon.

Like the Cerro de Pasco mines in 1901, Quiruvilca had a considerable history of development prior to foreign takeover. The area had been a silver producer in the nineteenth century[3]; and as at Cerro, attention had swung away from silver at the turn of the century. In 1905 the value of the adjoining copper ores at Quiruvilca was proven

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1. Leader, February 19th, 1920, p. 1. (A later Leader article, March 25th, 1920, p. 15, gave a figure of £40,000. The discrepancy was not explained). For a description of the Cerro Verde case see Bollinger, pp. 222-223. The deposit was never brought into production, and was expropriated from Anaconda in 1970.
2. B.C.I.M. No. 93, quoted in Leader, May 17th, 1919, p. 10.
3. Leader, May 28th, 1921, p. 1 notes the operation of amalgamation plants at Quiruvilca during the 1870's. Purser, p. 97, reports the installation of a Patera leaching plant in 1897.

and development began. From 1910 the company was controlled by the Gildemeister family, prominent La Libertad sugar planters. The company did well during the First World War.[1] By 1920 over £p44,000 had been raised for investment through stock and bond issues[2], a smelter had been constructed using coal from the nearby Huayday field[3], and a cart road was under construction from the railhead of the Gildemeisters' private line up the Chicama Valley.[4] However, the postwar decline in copper prices was reducing margins, and transport problems imposed severe limitations on development. With only mule transport out to the railhead at Quirihuac, only hand-picked ores carrying 30-40% copper were sent out during the war period; even with this handicap, 1.7 million pounds of copper were exported annually.[5]

As the best ores ran out, however, transport investment was obviously about to be required on a rather large scale, in road, or rail, or some other form of access. As sugar-based operators, the Gildemeisters were retrenching in 1921, and were prepared to take a good price for Quiruvilca. In 1923 Northern Peru exercised its option. The owners of the Sociedad Minera Quiruvilca received $740,000 (£p180,000), equal to seven years' profits even at the peak wartime rate. Adjacent claims held by Señora Becherel de Gildemeister were bought for $116,000

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1. Leader, March 25th, 1924, p. 24.
2. Leader, May 28th, 1921, p. 2.
3. Leader, December 18th, 1919, p. 9, and October 30th, 1920, p. 12.
4. Leader, May 28th, 1921, p. 2.
5. Leader, May 28th, 1921, p. 1, and March 25th, 1924, pp. 1 and 24. Cerro exports at that time were 60 million lb annually.

(£p28,000), and the nearby properties of the Sociedad Minera Almirante fetched $225,000 (£p55,000).[1] Northern Peru thus laid out $1.1 million on properties at Quiruvilca, in addition to purchases of coal claims at Callacuyan, probably from the Gildemeisters. This was a good price, considering that the proven reserves at that time were only one million tons of 12% copper ore, sufficient to match Cerro output for only five years.[2]

Having taken over Quiruvilca, Northern Peru faced the need for considerable investment in infrastructure. The transport problem was solved using a technique which arrived in South American mining in the early 1920's: the aerial cableway[3]; and a large smelter was constructed at Shorey, near the mines.[4] Large-scale copper production (about 12 million pounds annually) lasted for five years, from 1927 to 1931, before the smelter was closed down in the depression.

The need for capital and the five-year gestation period for Quiruvilca encouraged Northern Peru to take an interest in other mining properties in the La Libertad region: the silver mines of Salpo (also known as Millhuachaqui), between Quiruvilca and Quirihuac.

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1. Leader, March 25th, 1924, p. 1. The Almirante mine was owned by Victorio and Carlo Somaruga of Trujillo, owners also of a Trujillo tannery.
2. Cerro in 1920 had 20 years' reserves in sight (Myron B. Walker, 'Mining at Cerro de Pasco' in Leader, April 29th, 1920, p. 8).
3. The complete line from Quiruvilca to the roadhead at Samne cost Northern Peru $450,000 (£p110,000) to build; it served the mines at Quiruvilca and Salpo, the Shorey smelter, the Motil timber hacienda, and the Samne concentrator. (A.H. Hammond, 'Aerial Tramway Solves Difficult Transportation Problems for Northern Peru Mining and Smelting Co' in Leader, October 12th, 1926, pp. 22-24.)
4. The smelter was bought second-hand in Chile, and installation was completed during 1927. Production began in March 1927. (B.O.M.P. No. 26, p. 8.)

Here a vein of silver ore ran under the town, with pockets containing as much as 600 ounces of silver per ton, plus several ounces of gold.[1] Two problems were hindering development: transport costs down to Salaverry were high, and the ore was a difficult sulphide which required expensive milling processes. Most of the small operators in the area lacked the resources for major investment in such plant, and limited themselves to small exports of hand-picked ore. The major family in the area were the Gonzalez-Orbegosos, an old-established La Libertad sugar family.

In 1921 Northern Peru took twenty-year leases on three of the main mine properties at Salpo; the contracts provided for profit-sharing with the owners, and payment of royalties on output.[2] Northern Peru installed a mill at Samne, with a 12 kilometre cableway to the mines, and a road from Samne to the railhead. The mine-owners who had leased out their properties could be well content; the necessary infrastructure investment was being put in for them, and they were receiving a satisfactory rent in addition.

It might appear, thus, that at Salpo Northern Peru was undertaking a creative task which local capital was incapable, or unwilling, to undertake. Such a conclusion would, however, be too hasty, for Northern Peru was not the only successful operator in the area. In 1917 a young Peruvian mining engineer, Hector Boza, recently returned from training in the USA, discovered a pocket of high-grade ore in the Salpo vein,

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1. Nelson Rounsevell, 'Salpo' in Leader, September 9th, 1923, p. 2. 1.7% silver is an extremely high grade.
2. Leader, September 18th, 1923, p. 2.

and staked a claim called 'La Guardia'. He turned to his family, an old-established Trujillo line, for working capital, and the mine was taken over by a new family firm, Boza Aizcorbe Hermanos, with Hector as manager. Exports of selected silver ore began in 1919. In 1924 the history of the enterprise was summarised as follows:[1]

> The La Guardia mine has been perhaps the most spectacular bonanza unearthed in Peru in recent years. Since the beginning of operations it is estimated that between four and five million dollars in high grade ores have been taken out by the owners ... and shipped to New York without the investment of any foreign capital and without resorting to borrowing or hypothecation to finance the various operations.... Among all the mining ventures which in the last decade have been undertaken with small ... capital, 'La Guardia' is the one right and shining success illuminating a dark field of failure, and demonstrating to the world that profitable mining in the Andes without large initial capital investment is possible.

After allowing for current operating costs, the Bozas cleared between two and three million dollars (£p500,000 - 750,000) in profits during those five years - up to $600,000 annually. A good part of this money was put into investment. A concentrator was built at Challhuacocha with a 25 mile road to the railhead. A two-mile aerial cableway and a five-mile narrow-gauge railway connected the mill to the mine. Most of this infrastructure was operating by 1922 - before the Northern Peru installations, which were based on almost identical calculations (probably, indeed, were merely an imitation of the Bozas' system) were begun. The Bozas' cableway, with a vertical rise of 3,600 feet, was running in late 1923, when the Northern Peru line to Samne was still only half-built. The machinery and technology in the mill (crusher, ball mills,

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1. Nelson Rounsevell in Leader, March 11th, 1924, p. 14. For further background on the Boza enterprise, see Pacheco, pp. 82-94.

oil floatation and wet concentration) were copied identically in Northern Peru's Samne mill. Expansion of the mill from a daily capacity of 20 tons of ore up to 80 tons was underway in early 1924.[1] The Bozas were by this time the most innovative of Peruvian mine owners, and among the wealthiest.

In February 1924 they gave Northern Peru a twenty-year lease on La Guardia. The US company paid $1 million cash down, and 30% of the mill returns over the period of the lease. The Bozas' railway, cableway, mill and road were closed, and La Guardia was merged with the rest of Northern Peru's Salpo operation. The Bozas retired to live comfortably in Lima; apart from some small-scale acquisition of mining property in the Central Sierra, they were not again heard of as entrepreneurs during the 1920's. The history of Northern Peru throughout the 1920's, like that of Cerro, includes a continuous stream of offers of sale or lease made by the owners of mines and deposits in the north. In 1924 the company was granted options on the Ganoza family's gold mines at Pataz[2], and on the Antamina copper deposit controlled by Agustín Arias[3]. In 1925 a consortium of mine-owners in the old silver centre of Hualgayoc offered Northern Peru an

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1. Ibid.
2. Leader, November 25th, 1924, p. 1; and October 26th, 1926, p. 4. On the Pataz area's possibilities in the 1920's see Plews, Gordon, 'The Pataz Gold Deposits' in Leader, November 29th, 1921, pp. 1 and 13. Northern Peru paid the Ganozas $200,000 for their properties at Pataz, installed a new mill and precipitation plant, and began large-scale operations in 1926. Pataz reached peak production during the 1930's. (B.O.M.P. No. 8, p. 60; and No. 26, p. 8).
3. Leader, May 6th, 1924, p. 28; November 25th, 1924, p. 1. The Antamina option was dropped in 1925 (Leader, May 26th, 1925, p. 5, and June 23rd, 1925, p. 36). Arias subsequently succeeded in selling the deposit off to Cerro.

option, which was initially accepted but then abandoned.[1] At the same time, Northern Peru leased the silver/zinc mines at Chilete, owned by the Gildemeisters and Fermín Málaga Santolalla - the former Quiruvilca owners.[2]

The two giant U.S. firms, Cerro and Northern Peru, dominated metal mining in Peru during the 1920's. Cerro at that time was Peru's second-largest individual exporter, after IPC. Cerro's exports during the eleven years 1920-1930 totalled £p54 million ($212 million), only slightly less than 20% of total export earnings during the period. Northern Peru's exports during the same period came to somewhere in the vicinity of £p9 million, over 3% of total export earnings. Both foreign firms had established themselves in Peru by buying out existing locally-owned enterprises, but both had then moved into production on a scale never attained by any single Peruvian enterprise. The latter point should not be overstressed, since Peruvian mining enterprises which could well have developed to a far larger scale were bought out or suppressed relatively early in their life. Thus, although the historical record reveals no actual Peruvian firm comparable with Cerro, the possibilities for locally-controlled development were considerable. The levels of scale and efficiency which might have been attained by Peruvian copper and silver mining firms in the twentieth century, had they not been subject to foreign takeover

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1. Leader, August 4th, 1925, Supplement, p. 1.
2. Leader, October 26th, 1926, p. 4. In 1928, after investing £p100,000 in development work, Northern Peru purchased the deposit for £p62,500 (B.O.M.P. No. 32, p. 7.) It was brought into full production in the early 1950's.

bids, are indicated by the record of the tin industry in neighbouring Bolivia, where foreign capital failed to make significant inroads and local firms reached their maturity.[1] Certain major drawbacks of the Bolivian model are considered later.

Petroleum

The producing oilfields of the 1920's were in the hands of three companies. International Petroleum Company (IPC) was a Canadian-based subsidiary of Standard Oil of New Jersey, and was the largest of the companies, with control of the Negritos oilfield (also known as La Brea-Pariñas) and the country's biggest refinery at Talara. Lobitos Oilfields Ltd. was a British firm owned mostly by the merchant houses Balfour Williamson and Co. and Milne and Co. (the latter a Lima-based British firm). Empresa Petrolera e Industrial Faustino G. Piaggio S.A. was the smallest of the companies, owned by an immigrant Italian who had come to Peru in the 1860's. It was also the oldest-established of the three, having worked the Zorritos field and refinery continuously since the early 1880's. In contrast to the case of copper, oil in Peru was not an industry which had suffered a process of denationalisation, with local enterprises being supplanted by foreign firms. Only the one successful Peruvian firm had ever existed, and foreigners had been deeply involved in the development of the industry throughout its history. To provide

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1. Simon Patiño, a Bolivian of Indian blood, and a man in many ways similar to Proaño in Peru around the turn of the century, operated Bolivia's most successful tin-mining enterprise, and by the 1930's had branched out internationally to become the towering figure of the world tin industry. See Klein, 'The Creation of the Patiño Tin Empire' in Inter-American Economic Affairs, 1964.

the background to the 1920's, it is worth enquiring how the industry came to be foreign-dominated, and whether this was a necessary prerequisite for its development.

The early history of oil in Peru before the war of the Pacific reveals a number of pioneering enterprises, combining local and foreign interests but generally dominated by US engineers.[1] The first well was sunk on the Zorritos field in 1863, by a Scot employed by a local syndicate. US drilling crews from Pennsylvania were brought in in 1865 and sank four successful wells, but the enterprise failed financially. Prentice, a Pennsylvania oil entrepreneur, began prospecting on his own account in 1867 and in 1876 established a refinery at Zorritos to process the crude from successful wells drilled in that year. Another American, Henry Smith, began drilling at Zorritos in 1870, and in 1875 or 1878 (sources differ) entered partnership with Faustino G. Piaggio, a Callao merchant, in order to obtain working capital. Meanwhile on the Negritos field further south, Henry Meiggs[2] had been prospecting and drilling; in 1873 he established a refinery at Callao. On Meiggs' death in 1874 his enterprise (in which some £150,000 had been invested) was taken over by J.B. Mullor and Co of Lima, who built port works at Talara.

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1. The basic sources for the early history of Peruvian oil, on which the above summary is based, are the following: Moreno, Petroleum in Peru from an Industrial Point of View; Marsters, 'Informe Preliminar Sobre la Zona Petrolífera del Norte del Perú' in B.C.I.M. No. 50, 1907; Kay, 'Peruvian Petroleum' in West Coast Leader, February 19th, 1924, pp. 1-2; and Jochamowitz, 'El Problema Petrolifera del Perú', in B.C.I.M. No. 125, 1939, pp. 19 ff.
2. The US engineer who built the Central Railway. On Meiggs' Peruvian career see Stewart, Henry Meiggs, Yankee Pizarro.

The first wells were sunk and the first two experimental refineries built in Peru, thus, during the height of the guano era, at a time when virtually all the available capital and entrepreneurs in the country were totally preoccupied with guano and with the beginnings of the nitrates boom in the far south. From the point of view of Peruvians, the oilfields of the northern desert held little interest, since the only market was the kerosene trade[1] - hardly significant when compared to the great boom products of the day. Nor had oil yet become a major international commodity. The early foreign developers in Peru were men who had been infected with the spirit of the Pennsylvania oil rush of the 1860's; but until the end of the century Peruvian oil was a very speculative business.

The first phase of the industry was brought to an abrupt halt in 1879, when the Chilean navy destroyed the oilfield installations. By 1883, however, Piaggio had begun the rehabilitation of the Zorritos field, having foreclosed on Smith's estate immediately upon the latter's death. In 1884 the 'Establecimiento Industrial de Petróleo de Zorritos' was set up by Piaggio to construct port works and a refinery, and import modern drilling equipment. In the conditions of the 1880's the kerosene market was becoming more lucrative than in the guano days; by 1886 Piaggio was supplying 300,000 gallons of an estimated national consumption of 1,000,000 gallons annually.[2] Interest in the oilfields, however,

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1. In addition to supplying domestic kerosene for Lima and Callao, Meiggs and Prentice began exporting at a modest level. 1877 exports of kerosene were worth 15,900 soles from Callao (Meiggs) and 16,900 soles from Zorritos (Prentice). (Ministerio de Hacienda, Estadística del Comercio Exterior 1877, Vol. 1.) Most of these exports were to Chile.
2. Jochamowitz, p. 24.

remained confined to a very narrow group of Peruvians, and most national resources were being absorbed by the postwar economic recovery of Lima and the sugar industry. Apart from Piaggio, the only Peruvian with a major interest in oil was Genaro Helguero, the owner of the Hacienda La Brea-Parińas beneath which lay the Negritos oilfield, whose main concern was to capitalise his asset through sale. Having obtained (by manouevres of dubious legality) a virtual tax exemption for the property, coupled with a consolidation of surface and subsoil rights, Helguero sold it in 1888 to an international oil speculator, Herbert Tweddle,[1] for £18,000. Tweddle promptly formed a company in Britain, the 'London and Pacific Petroleum Company', in which he sold his interest in 1890, at a large profit. For the following fifteen years Piaggio and the London and Pacific Company were the only firms controlling proven and producing oilfields. London and Pacific did not bring Negritos into full production until the turn of the century (development was delayed by managerial disputes in London), but thereafter rapidly outpaced the output of Zorritos.[2]

In the 1890's a number of attempts to find a third commercial field met with resounding failure. Most of the enterprises were by

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1. Tweddle's earlier ventures had included an unsuccessful attempt to obtain from the Russian Government a Rockefeller-style pipeline monopoly on the Baku oilfields, in 1875. (Moreno, p. 42).
2. Zorritos had the great advantage that its oil was readily accessible at a shallow depth beneath the beach, making drilling costs very low. The geological structure, however, was small-scale and fragmented, and the growth possibilities of the field correspondingly limited.

now either Peruvian or Peruvian-foreign joint ventures.[1] In 1900 however it was Alexander Milne, of Milne and Co, who struck oil at Lobitos, and in 1901 he formed a company in London to finance development. Production began in 1904-5, and in 1908 the firm was reorganised, becoming the Lobitos Oilfield Co, Ltd.[2] The only other successful entrant into the industry was the Lagunitas Oil Co, with four square miles of claims near Talara.[3]

Until the early twentieth century, oil remained a product of much less significance to the Peruvian economy than sugar, cotton, or silver. /Its only use was as domestic kerosene, and exports were very small./ The takeoff of the industry in the years 1900-1910 was encouraged by the emergence of a large Peruvian market for fuel oil, as the Central Railway and the Peruvian Steamship Company switched from coal to oil. International demand was also booming, and exports from Peru on a large scale began about 1908. These developments brought rapid prosperity to the industry, and aroused increasing interest among Peruvian entrepreneurs. Peruvians tried, and failed, to find new oilfields in 1904 (J. Taiman, at Quebrada Siches); 1905-7 (Taiman again, at La Breita); 1910

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1. Two attempts were made by a Peruvian, Francisco Miranda, to develop a small field at Quebrada Heath, but both failed because of finance problems. Both were joint ventures dependent on foreign financing: Heath Petroleum Company (British) in 1891, and Cie Francaise du Pétrol de l'Amérique du Sud (French) in 1897-8. The latter company spent 3.5 million francs on refinery construction before running out of working capital. Other attempts of the decade of the 1890's were the Mancora Peru Petroleum Syndicate (Peruvian-British, 1891); the Peruvian Petroleum Syndicate (1894); E.L. Doheny (US) in 1895; and Federico Blume (Peruvian) in 1900. (See list in Kay, op. cit.)
2. Rippy, British Investments in Latin America, p. 131.
3. The capital for the Lagunitas company came from Chile (B.C.I.M. No. 81, p. 26). The company operated in close accord with London and Pacific, and was registered in London.

(Elías Montefiore at Cabo Blanco); 1912 (at La Garita); 1913 (a 'Peruvian syndicate', at Lechusal); and 1913-14 (Bocapan Oilfields Ltd, a Lima syndicate, at Boca Pan) - all in the northwest. Various parallel new foreign attempts met an equal lack of success.[1]

The Peruvian oil industry thus became foreign-dominated for two reasons: firstly, because foreign oil speculators developed an interest in Peru twenty years before the country became a significant exporter, and bought control of the largest oilfield very cheaply at that time; and secondly because the natural resource base of the industry was geographically limited within a few relatively small areas, so that Peruvians wishing to enter the industry from the 1890's on were prevented from doing so by their inability to locate oil. The sole remaining large field in the north, at Lobitos, was staked out by British interests - whether by superior energies, or by pure chance, remains unclear. Thereafter, the fact that no new fields remained to be found constituted an effective barrier to entry, and assured the oligopolistic position of the three main successful firms. The key to this situation was the London and Pacific company's control over the entire 640 square miles of the Negritos oilfield - a huge (by Peruvian standards) resource base which could equally well have supplied a number of smaller firms. From 1910 on a bitter dispute developed over the company's title to this area.[2]

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1. See list in Kay, for these attempts; also Jochamowitz, p. 79 for Montefiore, and B.C.I.M. No. 83, p. 50 for Bocapan. At this time also there were attempts by Peruvians and foreigners to develop the small oilfield north of Lake Titicaca, in Puno.
2. The history of this dispute is covered in Chapter 6.

When Standard Oil of New Jersey[1] arrived in Peru to buy up oilfields, thus, the obvious candidates were British firms. In 1913 Standard bought up London and Pacific, and Lagunitas followed in 1914. The two enterprises were consolidated under the control of the IPC, a Canadian subsidiary of Jersey Standard, and the West Coast Fuel Company (the sole oil-distributing network on the Pacific coast, and the key to the Chilean market) was taken over at the same time. Negritos now became an integral part of the worldwide activities and strategy of Standard Oil; and since world oil markets were subject to growing oligopolistic control and the IPC offered an easy means of access to those markets, the other major exporting firm in Peru (Lobitos Oilfields) entered a working alliance with the Standard interests, selling all Lobitos oil through the IPC. Piaggio, the Peruvian firm, had by this time almost ceased to operate as an exporter, since domestic demand was sufficient to absorb all the output from Zorritos and local prices were good.

With the exception of an interlude of leadership by Piaggio in the 1880's and 1890's, the leading role in Peruvian oil was held by foreigners throughout the industry's history. By 1910 oil was inaccessible to Peruvians because of the barrier to entry posed by foreign control over the oilfields of Negritos and Lobitos; and Peruvian interest was discouraged from 1910 on by a government prohibition on the

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1. The 1911 breakup of the Standard Oil Trust by the US Supreme Court left Jersey Standard with control of the Canadian subsidiary, Imperial Oil, with a refinery in Vancouver on the Pacific coast. This refinery had formerly been supplied from Standard's California fields, which were now, however, in the hands of Standard of California, a separate company. As an intra-firm source of supply for Vancouver, an oilfield on the Pacific coast of Peru was an obvious solution, and from at least 1912 on Imperial Oil was interested in obtaining a foothold in Peru. See Lewis, The International Petroleum Company Versus Peru, p. 14.

staking of new claims in the north until further notice.[1] During the period 1908-1930 when Peru rose to the rank of an important petroleum exporter, therefore, the questions of availability of domestic factors, or of technological limitations on Peruvian enterprises, were not raised, since entry was sufficiently difficult and risky to deter most local interest. Had there been no foreign firms, however, it is quite implausible to suggest that Peruvians would not in due course have undertaken the development of the industry, once the extent of world demand for oil became evident.[2]

Conclusion

The most important conclusion to be drawn from this chapter is that no argument can be made for the view that the backwardness, incapacity, or unresponsiveness of the native elite imposed a binding constraint upon internally-generated economic growth in Peru. Peruvian capitalists demonstrated a high level of ability in export sectors - ability which came to the fore in periods when export markets opened attractive opportunities, but which tended to disappear from sight in more difficult periods. This applies not only to those export sectors in which Peruvians retained control, but also to sectors

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1. The reasons for this moratorium on new claims are not at all clear. It appears to have resulted from government concern at the possibility of an uncontrolled rush of Peruvians trying to stake claims in contested areas. Jochamowitz (p. 79) ascribes the measure to 'la necesidad de efectuar el plano catastral de esas regiones, pues la multiplicidad de los denuncios había creado controversías que sólo podrán resolverse con dicho plano'. The main beneficiaries, obviously, were the established firms, who were freed of the threat of new competition and given the opportunity to continue with their own prospecting of the north at a leisurely pace.
2. The detailed history of the industry during the 1920's, which further confirms the patterns sketched here, is covered in Chapter 6.

which were bought up by foreign capital. Following from this is another major conclusion: that the entry of foreign capital into the oil, copper and vanadium[1] sectors cannot be explained in terms of Peruvian inability to undertake the development of those industries. Correspondingly, the selling of natural-resource assets to foreign firms, and the general performance of the Peruvian elite in the 1910's and 1920's, are to be understood in terms of the rational responses of members of that elite to the economic situation with which they were confronted.

The question why Peruvian owners of natural resources should have sold out to foreign capital, if they could have undertaken development of the assets themselves, resolves into the question of the capitalised present value which local and foreign firms placed upon those assets. The foreign firm, evidently, was prepared to pay above the Peruvians' reserve price in cases such as the Cerro de Pasco mines. This might have been because the foreign firm expected to earn a higher level of income from the assets than did the local firm; or might have

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1. Vanadium offers a further case study of alliance between local and foreign capitalists. Fernandini, already established as a copper producer, discovered the world's largest vanadium deposit at Mina Ragra (near Cerro de Pasco) in 1905, and immediately succeeded in selling it to a new US firm, the American Vanadium Company of Pittsburgh, for £10,000 cash plus a 10% shareholding (worth £70,000 at face value). Without lifting a finger in the development of the mine, the raising of capital, or the organisation of marketing, Fernandini thereby obtained a stake in one of the most profitable mining ventures of all time, since vanadium was a strategic metal during the First World War. The company paid annual dividends of £32 per £10 share throughout the decade 1909-1919, and then sold out to the Vanadium Corporation of America, in which Fernandini continued as a director. (See Bollinger, pp. 214 ff; Leader, October 4th, 1919, p. 3 and May 13th, 1924, p. 29; and Basadre, Historia, pp. 3493 ff.)

reflected the use of a lower discount rate by the foreign firm in its calculations.[1] As will be seen in Chapter 5, the first of these two possible explanations seems rather weak, at least in the Cerro de Pasco case, suggesting that the issue of discounting for risk may have been the crucial element in the local owners' decision to sell. The large international firm may apply a lower rate of discount than does the smaller local firm either because of imperfections in the international capital market which enable the former to borrow at cheaper rates; or because the risks involved in the development of the enterprise, although objectively the same between the foreign and local firms, can be more readily borne by the former. This would occur because of the fact that the international firm tends to have a more diversified portfolio, in which the individual project under consideration is proportionally more marginal. The international firm is able to spread its risks across its entire portfolio, which amounts to the provision of a degree of insurance against risk in the individual project.[2] The local firm, for which the single mining enterprise would represent a far greater proportion of its portfolio (indeed, might bulk so large that failure in this one project would ruin the firm entirely), must apply a higher risk premium, and this could well suffice to explain a divergence between local and foreign firms in their evaluation of the capital value of assets.

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1. Cf discussion in Kindleberger, American Business Abroad, pp. 24-25.
2. The risk-spreading properties of a large organisation have been the subject of comment in the literature on public-sector investment decisions. See, e.g., Samuelson, 'Comment' in American Economic Review 1964, pp. 95-96; Arrow, 'Insurance, Risk, and Resource Allocation' in his Essays in the Theory of Risk-Bearing; Arrow and Lind, 'Uncertainty and the Evaluation of Public Investment Decisions' in American Economic Review 1970; and Little and Mirrlees, Manual of Industrial Project Analysis, Vol.2, p.201.

Mariátegui, pondering the success of foreign firms in entering Peru and displacing domestic capital from various export activities, concurred with various other commentators of the time in 'placing the primary responsibility on local capitalism for its absenteeism and its lack of vision and energy'[1], and he claimed that[2]:

> Capitalism is not just a technique; it is also a spirit. This spirit, which reaches its height in the Anglo-Saxon countries, is weak, incipient, and rudimentary in Peru.

This chapter has produced ample evidence to refute such an explanation for the success of foreign capital in penetrating the Peruvian economy. Insofar as the 'spirit of capitalism' (if such a distinctive 'spirit' exists) involves the enterprising creation of profitable undertakings, it was by no means as weak in Peru as Mariátegui implied. Dean, in his study of successful São Paulo entrepreneurs in the late nineteenth century, reached parallel conclusions there:[3]

> Why were the Paulista planters so enterprising? Is it possible to maintain that there was in São Paulo, in the last quarter of the nineteenth century, a concentration of entrepreneurial ability more intense, or a capitalist mentality more highly developed, than in other parts of Brazil or Latin America? ... In summary, the entrepreneurial success of the Paulista planters as a class may be attributed not to innate or to cultural endowments but to the operation of a profitable market....

The question of what effect the presence of foreign capital had upon the country's development, remains to be answered. The two chapters which follow take up the question of whether the entry of the two leading foreign firms of the 1920's brought significant advantages for the Peruvian economy as a whole.

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1. Mariátegui, p. 20, fn.
2. Ibid., p. 21, fn.
3. Dean, pp.38 and 43.

CHAPTER 4

Foreign Capital and the Petroleum Industry: an Evaluation of the International Petroleum Company

Of Peru's various export products, oil was the most obvious candidate for the description 'enclave', on simple geographical grounds. The country's producing oilfields of the 1920's were located in the far northwest, 600 miles from Lima. They occupied a desert zone of the coast, and were surrounded on all sides by desert, without effective road or rail communication with the (relatively lightly) populated valleys to the southeast.[1] Communication and transport of goods between the fields and the outside world was almost entirely by sea, through a series of ports owned and operated by the oil companies: Talara (IPC); Lobitos and Cabo Blanco (Lobitos Oilfields); and Zorritos (Piaggio). Most equipment for the industry was imported directly through these ports, and export production left directly by tanker for North America. Since the fields were located on the coast, there was no overland transport of goods through populated areas (which might have produced some local spread effects); and since the area was desert, there was no question of establishing local agriculture to supply food directly to the oil towns.

The figures presented in Table IV.1 indicate the dominant position of the IPC, with 85% of exports during the period 1920-1929 and 80% of

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1. The small Zorritos field, the furthest north, was a partial exception to this pattern of isolation, being located less than twenty miles south of the town of Tumbes and its small zone of irrigated agriculture.

TABLE IV.1

Statistics of the Petroleum Industry, 1916-1934, by Company

Year	Output of Crude Petroleum: 000 tons	Percentage shares of: IPC	Lobitos	Piaggio	Exports of Petroleum Products: US $ million	Percentage share of: IPC	Lobitos	Piaggio
1916	346	71	26	3	6.8	93	7	0.1
1917	347	70	27	3	5.8	85	15	0.1
1918	334	71	26	3	6.9	82	18	0.1
1919	349	70	27	3	11.3	85	15	-
1920	373	71	27	3	7.0	87	13	-
1921	489	76	21	2	14.3	92	8	0.4
1922	701	82	16	1	22.0	90	10	0.1
1923	752	81	17	2	18.3	86	14	0.4
1924	1,046	82	17	1	24.4	87	13	0.2
1925	1,220	81	19	1	22.5	81	19	0.1
1926	1,427	80	19	1	27.6	84	16	0.1
1927	1,341	77	22	1	37.9	86	14	-
1928	1,592	79	20	1	45.0	88	12	-
1929	1,777	81	19	0.5	51.6	86	14	-
1930	1,656	78	21	1	24.8	80	20	-
1931	1,340	76	23	1	14.8	80	20	-
1932	1,313	77	22	1	16.5	80	20	0.03
1933	1,762	84	15	1	17.8	87	13	0.03
1934	2,162	87	13	0.3	27.9	88	12	-

Sources: Output from Hohagen, 'La Industria Minera en el Perú 1937' in B.C.I.M. No. 122.

Export data from Extracto Estadístico 1934-1935, Tables 76 and 78; and Estadística del Comercio Especial, various years.

Notes: Percentages may not add exactly due to rounding.

Exports are broken down on the basis of the port through which exports left. All exports from Talara are considered to be IPC exports; all Lobitos and Cabo Blanco exports are credited to Lobitos Oilfields; and all Zorritos exports are classed as Piaggio. Exports from other Peruvian ports (not significant, and mostly consisting of re-exports from Callao of products shipped in from the North or from abroad) have been credited to the IPC.

crude output.[1] During the 25-year period from 1909 (the first year in which oil exports exceeded £p100,000) to 1934, Peru's petroleum exports aggregated US $424 million out of total exports of $2,053 million. In the decade 1920-1929, oil accounted for $271 million of total exports of $1,065 million - or around 25%. The potential importance of an export sector of this magnitude for Peru's development was obviously enormous. The investigation which follows takes up the questions of how far that potential was realised, and what contribution was made to the industry, and to Peru, by the leading foreign firm, IPC.

Methodology for the Analysis

1) Equations. In order to translate the general issues discussed in Chapter 1 into quantitative terms, this section sets out some equations to be used for the analysis. The methodology is then applied to the case of the IPC. In the chapter following, a similar model is applied to the case of Cerro de Pasco Copper Corporation.

The most straightforward measure of the economic contribution of a particular enterprise (and one much used by defenders of international corporations) is physical productivity. In many cases it appears that the advantages possessed by international firms are such as to make them more productive in a given activity than locally-based national

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1. The higher percentage share of exports than of output is accounted for by two factors: the higher unit value of IPC exports as compared with Lobitos, because of value added in the Talara refinery; and the fact that a certain amount of the crude produced by Lobitos was sold to the Talara refinery and subsequently appeared in the IPC's export figures.

alternatives.[1] In a world economy where overall allocative efficiency was the ruling criterion for economic decision-making, and where problems of distribution did not arise, the more productive enterprise would be preferred to the less productive.[2] In the absence of effective redistributive mechanisms, however, the attainment of Pareto efficiency internationally does not necessarily maximise the welfare of individual countries. National welfare maximisation, in the real world, is a second-best problem, and the normal solution adopted is for individual countries to seek to maximise their national income even though this implies that world Pareto efficiency may not be attained.

In this case, a firm's contribution to total output (i.e. to the host country's domestic product) is less significant than its contribution to national income, and it no longer follows that the more productive enterprise is preferable. A foreign firm which repatriates most of the income generated by its activities must be considered inferior to a local firm which makes a greater contribution to national income, even if the latter enterprise is less physically productive.

The enclave writers were not interested in such comparisons, but they did evolve a set of quantitative measures of the income contribution of a firm, which are relevant to the discussion. In order to

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1. This is not always or necessarily true. A variety of motives may lead foreign firms in mineral-export sectors to restrict their output below maximum capacity, and below the output which local firms could achieve. In Peru in the 1920's, IPC deliberately held back the development of its oilfield at certain times; while in the south of the country the Salinas borax deposits were held entirely idle by Borax Consolidated, an international trust formed to restrict world supply and thus support international prices.
2. For a defence of the international corporation on the grounds that it contributes powerfully to world allocative efficiency see the writings of C.P. Kindleberger.

discuss and elaborate upon these measures, the following symbols will be used, all referring to the activities of a particular firm[1] being studied:

B Returned Value (as defined below).

C Dividends, interest, etc., paid to local capitalists.

D Dividends, interest, etc., paid to foreign capitalists overseas.

G All payments by the firm to the government.

Go Opportunity cost of payments to the government, defined as the income which government would have received in the case of the employment of the local factors used by the firm in alternative occupations.

H Rentals paid by the firm for use of resources, facilities, etc., excluding payments to Government.

Ho Opportunity cost of resources, facilities, etc., rented or hired.

I New foreign financing of operations in the host economy, defined as the difference between total outlays (including factor payments made abroad) and total income from sales of products plus capital issues within the host economy.

Ko Opportunity cost of local capital employed.

L Goods and services purchased within the host country.

L' Local-factor content of L.

M Goods and services directly imported by the firm.

M' Import content of L.

R Royalties and technical fees paid abroad.

S Sales of goods and services in the host-country market.

V_d Value added domestically.

V_n Value added nationally.

W Total wages and salaries paid locally.

Wo Opportunity cost of (local) labour employed.

X F.o.b. export earnings.

Y National income effect of the firm's operations, as defined below.

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1. By 'firm' is understood an enterprise's activities in the host country. In the case of an international firm, the unit analysed is its host-country subsidiary or equivalent.

$\bar{Y}$ National income effect of the counterfactual firm, as defined below.

$^{-}$ Superscript used to denote the counterfactual firm's operations.

An early attempt to measure the development contribution of foreign firms in export sectors was that of Reynolds[1], who considered the key issue to be the balance-of-payments contribution made by such firms. This contribution is less than a firm's total sales by the amounts paid abroad for imports, capital, services, and repatriated profits. Foreign firms active in Latin American exports typically displayed high repatriated profits, and Reynolds argued that taxation of these profits represented the only effective means of integrating the firms with the host economy. In order to measure the degree of integration of the firm into the economy, Reynolds added up all payments made by the firm to local factors in the host economy, treating these payments as the value-added 'returned' - or, as Pearson later stated it, as 'the sum of ... transactions that cause the industry to purchase and use /local/... currency'.[2]

Equation 1 shows this quantity as the sum of local-economy outlays by the firm (with allowance made for second-round balance-of-payments costs, M'); and equation 2 gives it as the residual remaining from earnings and new foreign financing after all foreign charges have been met:

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1. 'Development Problems of an Export Economy', pp. 276-278.
2. Pearson, Petroleum and the Nigerian Economy, p. 75.

$$B = G + W + H + C + L' \quad \ldots\ldots\ldots\ldots\ldots 1$$

$$= X + S + I - M - M' - R - D \quad \ldots\ldots\ldots\ldots\ldots 2$$

In the literature, B has been variously labelled 'returned value',[1] 'net foreign-exchange contribution'[2], 'balance of payments impact'[3], and 'direct balance of payments effect'[4], all of which have essentially the same meaning.[5]

Reynolds treated B as equivalent to a measure of the direct income effect of a firm's operations for the host economy, although he noted that multiplier effects and savings-generating effects should be taken into account also. His discussion contains the implicit assumption that the supply of foreign exchange is a binding constraint on economic growth (i.e. that local factors brought into employment by the initial foreign investment and subsequent flow of additional foreign-exchange earnings have opportunity costs of zero, since they would otherwise be un-employed for lack of foreign exchange). This assumption may be deduced from the fact that Reynolds made no attempt to subtract an allowance for opportunity costs of local factors from his returned value measure. Similar criticism applies to the Mikesell studies' use of the concept.

Pearson, for his study of the Nigerian oil industry, rejected this

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1. Reynolds, p. 276.
2. Mikesell, pp. 23-24.
3. Pearson, p. 75.
4. Lall, S., Balance-of-Payments and Income Effects of Private Foreign Investment in Manufacturing: Case Studies of India and Iran, pp. 125-127.
5. Not all writers separate M' from L'; both Reynolds and Lall simply use L in place of L' in equation 1.

approach in favour of an attempt to measure a firm's contribution to value added, assuming no foreign-exchange constraint. His method was to take the total value added to GNP by the firm's activities, and subtract from this the opportunity cost of the local factors employed. He begins with the usual definition of value added domestically:

$$V_d = G + H + W + C + R + D \quad \ldots\ldots\ldots\ldots\ldots 3$$

$$= X + S + I - M - L \quad \ldots\ldots\ldots\ldots\ldots 4$$

Value added nationally is then obtained by subtracting factor incomes paid abroad:

$$V_n = V_d - R - D$$

$$= G + H + W + C \quad \ldots\ldots\ldots\ldots\ldots 5$$

$$= X + S + I - M - L - R - D \quad \ldots\ldots\ldots\ldots\ldots 6$$

From this, the direct contribution to national income is obtained by subtracting the opportunity costs of local factors employed:

$$Y = V_n - Go - Wo - Ho - Ko \quad \ldots\ldots\ldots\ldots\ldots 7$$

$$= (G-Go) + (W-Wo) + (H-Ho) + (C-Ko) \quad \ldots\ldots\ldots\ldots\ldots 8 \text{ (from 5 and 7)}$$

$$= X + S + I - L - M - R - D - Go - Wo - Ho - Ko \quad \ldots 9 \text{ (from 6 and 7)}$$

$$= B - L' - Go - Ho - Wo - Ko \quad \ldots\ldots\ldots\ldots\ldots 10 \text{ (from 2 and 9)}$$

It will be seen from equation 10 that Y, the direct income effect of the firm's activities, is lower than returned value B by the amount of local purchases of inputs plus the opportunity costs of local factors. The exclusion of local purchases, L, from the Pearson measure is important, since it is in this category of transactions that the

class of developmental effects known as 'linkages' operate. In a fully-employed economy, linkages produce income effects when they increase demand for certain products sufficiently for local suppliers to reap economies of scale, and when they generate externalities (e.g. the creation of infrastructure such as railways, which affect also other sectors of the economy). In an economy with underemployed resources, linkages may provide a means of drawing these into employment and producing multiplier effects. Equations 8 and 9 thus provide a complete measure of net income effects only under fairly restrictive assumptions, including no externalities and a fully-employed economy. These assumptions introduce important biasses into the results, particularly in the case of projects sufficiently large to be non-marginal in the national economy, so that their existence affects the general level of prices and incomes. The solution adopted by Pearson is to begin with the restricted calculation of Y, and subsequently take account of indirect and dynamic income effects in a qualitative discussion.

In the case studies presented below, this approach will be used, although with some modification. Quantitative analysis will be taken as far as the nature of the data justify, and it will then be asked whether non-quantifiable effects were sufficient to overturn or modify the conclusions thus reached. This is not to say that the quantifiable effects are necessarily the more important. It must be emphasized that despite the relative sophistication of the apparatus for the quantitative work, the final conclusions must rest upon qualitative judgements, and are correspondingly tentative. As the authors of a recent series of

cost-benefit studies of FDI in manufacturing point out,[1]

> ... we should bear in mind that quantitative studies of the effects of foreign investment suffer from severe limitations. The most basic of these is that the effects of such investment are to a large extent non-economic and cannot be studied without a number of implicit judgements about social values and objectives. But even within the domain of economic analysis, a number of factors, which seem qualitatively to be of great importance, cannot be quantified meaningfully. The results of quantitative studies ... are, therefore, of limited significance, though ... they bring out some points of great interest.

2) Specification of Hypothetical Alternatives. None of the enclave writers, as has been noted already, took into account the possibility of hypothetically 'replacing' the foreign firm with a locally-based alternative, and their models therefore made no distinction between the foreign firm's share of national product (whether measured by balance-of-payments contribution or by national value-added), and its net contribution to national income. Introducing the possibility that, in the absence of foreign investment, there would have existed local enterprises engaged in the same activity, makes it necessary to distinguish between the two concepts. The net addition to national income attributable to the presence of the foreign firm now becomes equal to the contribution to national income from the activity as developed by the foreign firm, minus the contribution which would have been made by the same activity under local control (taking into account the wider implications for other sectors of the economy of the existence of local rather than foreign ownership in the sector considered). In

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1. Streeten and Lall, Evaluation of Methods and Main Findings of UNCTAD Study, p. 6.

terms of the symbols above, if the national income effect attributable to the activity under foreign control is Y, and the effect which would have occurred in the case of local control is $\bar{Y}$, then the net national income contribution of the foreign firm per se is $(Y - \bar{Y})$.

The standard project-evaluation framework is relevant here. The stream of net benefits flowing from a foreign-investment project, A, when that project is considered in isolation from (or in the absence of) any alternative projects will be equal to Y; but if an alternative project B (local investment in the same sector) is excluded by undertaking A, then the expected benefits from B ($\bar{Y}$, in the terms of the above discussion) become costs of project A. In a standard project evaluation, carried out before the fact, the net income streams expected from the two alternatives would be compared, and the (socially) superior firm allowed to proceed with the project. The framework has to be modified when, instead of evaluating a future project, the aim is to evaluate retrospectively the net benefits of a project carried out in the past. In such a case the analyst has available to him figures showing the income stream which was in fact generated by the firm which undertook the project - this firm will hereafter be referred to as the 'factual firm'. Against this known (or at least partly known) stream must be placed reasonable estimates of the income stream which would have resulted from the alternative firm's undertaking the project. Since this firm did not exist in fact (its existence being foreclosed by the entry of the factual firm) it will hereafter be referred to as the 'counterfactual firm'. The conceptual basis for historical evaluation of this type was laid in the debate among US economic historians over

the role of railways in nineteenth-century economic development.[1]

Obviously, the larger is $\bar{Y}$, the smaller are the benefits which may properly be attributed to the existence of the factual firm. If $\bar{Y}$ were to exceed Y, this would signify that the national economy was absolutely worse off with the factual firm than it would have been without it - that is, that a policy which excluded the factual firm, or an historical conjuncture from which it was absent, would have been historically preferable, other things being equal. Clearly, the assumptions and methods used in estimating $\bar{Y}$ are the crucial point in any such analysis, and it is precisely in the estimating of hypothetical historical 'might-have-beens' that the greatest possibilities for errors or differences of opinion arise. In the studies presented below, alternative possibilities have been evaluated on the basis of the qualitative historical record, but the realism of the results is only as good as the interpretation of that record offered below.

As a general framework for the specification and analysis of counterfactual alternatives, the model developed for the UNCTAD studies of FDI in manufacturing has been adopted[2], with some modifications to allow for the fact that it is being transferred from analysis of the manufacturing sector to the context of mineral export sectors. Three broad categories of locally-controlled counterfactual possibilities[3]

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1. Fogel, Railroads and American Economic Growth; Fishlow, American Railroads and the Transformation of the Antebellum Economy; David, 'Transport and Economic Growth' in Economic History Review, 1969; McClelland, 'Social Rates of Return on American Railroads in the Nineteenth Century' in Economic History Review 1972. For a debate on methodology see Andreano, The New Economic History.
2. Lall, pp. 7-9; and Streeten and Lall, p. 8.
3. The possibility of counterfactual development of the activity by a different foreign firm, operating in ways more favourable to the host economy, or of development by the same foreign firm under more stringent governmental regulation, is not dealt with in these studies. The important issue is considered to be the comparison of local-enterprise possibilities against actual foreign-controlled experience. This amounts to the making of a working assumption that the foreign firms which existed in fact offered terms typical of international firms at the time, and that they were regulated to the limit of governmental policy and will.

are proposed, and then set against the actual experience of Peru with foreign firms. The three categories are:

Alternative I: do without the activity altogether. That is, assume that the absence of the factual firm would imply non-development of the resource. (This possibility incorporates Alternatives I and IV of the UNCTAD model).

Alternative II: a locally-controlled counterfactual firm assumed identical in all ways to the factual firm, except that ownership is local rather than foreign.

Alternative III: a locally-controlled counterfactual firm assumed to differ in various (specified) ways from the factual firm, probably in the directions of greater inefficiency, less favourable access to overseas markets, and lower-level technology.

Of these, the interesting cases are Alternative II and III. Alternative II reveals whether the host economy would be better or worse off if it took over from the foreign firm all the costs and returns of the enterprise, without any change in output or profitability. This amounts to the question whether the firm repatriates profits on its capital above the social opportunity cost of an equal body of capital in the host economy. Under Alternative II assumptions, the foreign investment yields net benefits to the host economy only if it is undertaking an activity the repatriated-profit rate on which would be below the rate of return required to justify the use of domestic capital in the same activity. From equation 9 above, the respective income effects of the factual firm (Y) and the counterfactual firm ($\bar{Y}$) are given by the following:

$$Y = X + S + I - M - L - R - D - Go - Ho - Wo - Ko \quad \ldots\ldots\ldots 9$$

but since Ko = 0 (i.e. no local capital is employed, in this case)

$$Y = X + S + I - M - L - R - D - Go - Ho - Wo \quad \ldots\ldots\ldots 11$$

Similarly,

$$\bar{Y} = \bar{X} + \bar{S} + \bar{I} - \bar{M} - \bar{L} - \bar{R} - \bar{D} - \bar{Go} - \bar{Ho} - \bar{Wo} - \bar{Ko} \quad \ldots\ldots 9a$$

but since $\bar{I} = \bar{D} = 0$ (i.e. no foreign capital is employed), and all other costs and earnings (except $\bar{Ko}$) are equal to those of the factual firm,

$$\bar{Y} = X + S - M - L - R - Go - Ho - Wo - \bar{Ko} \quad \ldots\ldots\ldots 11b$$

Now, subtracting equation (11b) from equation (11), we have

$$Y - \bar{Y} = I - D + \bar{Ko} \quad \ldots\ldots\ldots 11c$$

For analytical purposes, this is best expressed in terms of three general possible conclusions. If Y exceeds $\bar{Y}$, then the foreign firm is superior to the counterfactual local firm, ceteris paribus. If $\bar{Y}$ exceeds Y, the foreign firm is inferior to its counterfactual alternative. If $Y = \bar{Y}$, then $I - D + \bar{Ko} = 0$, and the national economy may be considered indifferent between the two alternatives. The condition for the foreign firm to be superior to an Alternative II replacement is therefore that

$$\bar{Ko} > D - I \quad \ldots\ldots\ldots 11d$$

The simulation of Alternative III situations is rather more complex, since it is necessary to make assumptions about the differences between factual and counterfactual firms. Once made, these assumptions can be introduced into equation 9:

$$Y = X + S - I - M - L - D - R - Go - Wo - Ho - Ko \quad \ldots\ldots 9$$

In this equation, the foreign-exchange income of the firm (in the case

of an international firm, the income of the local subsidiary) is shown by the items (X + I), or by (X + S + I) if local sales are considered equivalent to exports. The foreign charges against this income are given by (M + D + R); the costs of local purchases are L; and the opportunity costs of local factors are given by (Go + Ho + Wo + Ko). According to the assumptions made about the nature of the difference between factual and counterfactual firms, various of these elements will be modified for the calculation of $\bar{Y}$. Some simple cases are set out below.

(a) Suppose that, because of the privileged position in export markets held by the foreign firm, a local replacement would be unable to command the same prices for its product, or unable to place the same quantities abroad. In this case, X will be reduced by the appropriate proportion in the calculation of $\bar{Y}$. If all costs are assumed to remain constant, and the fall in export prices is a proportion 'd' of the prices received by the factual firm, then

$$\bar{Y} = X - dX + S - M - L - R - Go - Ho - Wo - \bar{K}o \quad \ldots\ldots\ldots \text{12a}$$

The quantities I and D are eliminated from this equation, since for a locally-owned firm these are zero.

(b) Suppose that the replacement firm is less efficient than the factual firm; then this inefficiency will appear as a rise in cost per unit of output; or (what amounts to the same thing) an increase in all inputs used in the production process. Thus, the equation for $\bar{Y}$ becomes

$$\bar{Y} = X + S - (1+m)M - (1+r)R - (1+l)L - (1+g)Go - (1+h)Ho - (1+w)Wo - (1+k)\bar{K}c$$

$\ldots\ldots\ldots$ 12c

where 'm', 'r', 'l', 'g', 'h', 'w', 'k' are the respective proportional increases in the various inputs; or if these are combined into a weighted average 'c',

$$\bar{Y} = X + S - (1+c)(M + R + L + Go + Ho + Wo + Ko) \quad \ldots\ldots\ldots 12d$$

In all these various cases, the general principle adopted for analysis will be to establish, on the basis of available quantitative evidence, the conditions for the quantity $(Y - \bar{Y})$ to be positive (i.e. for the foreign firm to be unequivocally superior to domestic replacement firms), and then to enquire as to the realism of these quantitative conditions. A result having been obtained, the discussion then turns to the non-quantified aspects, asking whether the introduction of these into the calculation would reinforce, weaken or overturn the conclusions reached in the initial quantitative stage. Four lines of non-quantified discussion deserve particular emphasis:

(i) The linkage effects created by an export industry comprise the first important set of external effects.[1] These effects are set up by local sales, 'S', and by the firm's expenditure on local inputs, 'L', both of which in the simple quantitative model are treated simply as additions to or subtractions from the firm's income. These sales and purchases, however, may have very significant dynamic effects on other sectors of the national economy, especially in the case of a poorly-integrated economy with underemployed factors, in which the creation or expansion of industries servicing or benefiting from the export sector may generate a large amount of additional economic activity.

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1. For the original statement of the theory of linkages see Hirschman, The Strategy of Economic Development, Chapter 6.

(ii) The second important category concerns improvement in the quality of local factors as a result of employment in an export sector. These effects cover not only the training of a skilled labour force, but also the potential improvement in local entrepreneurship, management skills, and technology which may flow from the establishment and growth of a counterfactual local firm, or from the incorporation of more local capital, managers, engineers, etc., into a foreign firm.

(iii) The third important set of issues relates to the marginality or non-marginality of the activity considered in the national economy. A firm whose size makes it non-marginal will have a measurable effect on such national economic variables as the exchange rate, the level of wages and prices, and the interest rate. All these have to be taken into consideration when dealing with firms of the magnitude of IPC and Cerro.

(iv) Finally, some account must be taken of the distribution of the income effects generated by an exporting firm. The replacement of a foreign by a local firm might well imply a change in the relative shares of capital, labour, government and rentiers in the income generated, and such changes may have dynamic implications. For example, a redistribution towards high-savings groups could be expected to raise the rate of capital formation, and vice versa. In addition, the distribution of expenditures on material inputs as between imported and locally-produced products may be affected by the nationality of the exporting firm, opening the possibility that replacement may be significant for import-substituting manufacturing development.

3) Valuation Problems. The basis for the construction of the statistical series used deserves some comment, especially in the light of the emphasis which modern cost-benefit methods lay upon the establishment of correct accounting prices.[1] Such adjustments have not been attempted for this study, and it is very doubtful that elaborate adjustments would produce any real improvement in the quality of the results. The Peruvian exchange rate floated, free of controls, throughout the period considered, so that it corresponded to a market-clearing rate. In addition, the general level of tariffs was low - ranging from 8% to 16% of the value of imports in various years - and the relationship between domestic prices and world prices was not greatly out of line. Materials and equipment bought locally (if any) are therefore entered at their reported local price, and imported materials are entered at their reported pre-duty import price C.I.F., without any adjustments.

The most important basic statistic - the true foreign-exchange value of the output of mineral-export sectors - is already available from the published official foreign-trade statistics. Peruvian statisticians early rejected the reported values given by foreign-owned exporting firms, and instead constructed their own series by applying international market prices to the volume of exports.[2] The export

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1. Little and Mirrlees, Manual of Industrial Project Analysis, Vol. 2. See also 'Symposium on the Little-Mirrlees Manual' in B.O.U.I.E.S. February 1972.
2. B.O.M.P. No. 15 (1925) pp. 55-57 gives figures comparing the value of IPC exports as declared by the firm with the value at international prices; the former is considerably lower. The customs authorities had definitely switched to use of international prices for their valuations by the early 1920's; it is not clear whether declared values or shadow values provide the basis for the 1916-1920 statistics. The official figures for those years have here been used without any attempt at correction, although the effect may be to bias the results in the companies' favour (by reducing their apparent profitability.)

figures therefore are already valued at shadow prices. Output sold on the local market (in the case of the petroleum industry) was priced effectively equal to the C.I.F. price (including duties) of competing imports, which in the context of generally low tariffs provides a reasonable approximation to international prices. (Any adjustment made on this score would be cancelled out in the analysis, as the contribution represented by locally-sold production is identical between factual and counterfactual firms). The real problem of accounting values arises not in the flows which are easily identifiable and measurable from the published statistics, but in the field of opportunity costs - the shadow wage rate, and the accounting rate of interest.[1]

Neither of these can be laid down with any certainty for the Peruvian economy in the 1920's. The majority of the workforce on the oilfields and in the mines probably correspond to the general category of 'skilled labour', although in the case of the mines a good part of this workforce were in fact temporary migrants from the rural sector. There are however three major reasons for inability to calculate a precise shadow wage rate (SWR). The first is the practical impossibility of determining the division of the labour force into skilled and unskilled categories. The second is the absence of any useful estimate whatsoever of marginal product in the agricultural sector at that time. The third is the fact that, even if all the labour force in the sectors studied is assumed to have been skilled, the enterprises employing that labour were definitely non-marginal in the national economy. The IPC

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1. Little and Mirrlees, Chapters 13 and 14.

accounted for 25% of Peru's export earnings, employed 5-10% of the country's skilled labour force[1], and represented the largest single chunk of capital investment in Peru[2]. The redeployment of this 5 - 10% of the skilled labour force in the absence of the IPC could be expected to measurably depress wages in other sectors, so that the opportunity cost of this labour would have been below 100% of the wage rate. In the absence of any indication of the shape and slope of the demand curve for labour, however, precise estimates for the SWR are impossible. The solution adopted, therefore, has been to work within a wide range of possible estimates of the SWR, from zero to 100% of the wage rate, with particular emphasis on the results obtained with 50%, 75% and 100% assumptions.[3] It may be considered

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1. The IPC employed about 2,000 workers and technicians at the beginning of the 1920's; this rose to about 5,500 in the late 1920's, then fell to 4,000 by 1934. (B.C.I.M. No. 103, p. 62, and No. 112, p. 172; and B.O. M.P. No. 33, p. 64). This should be compared with total employment in the Peruvian mining sector of about 22,000 in 1920, 28,000 by 1928, and 18,000 in 1934. (Extracto Estadístico del Perú 1934-1935, Table 102, p. 155.) Manufacturing employment in Peru was probably about 15,000 in 1920 and 20,000 by 1934 (Hohagen, 'Las Industrias en el Perú', in B.C. I.M. No. 114, 1936, p.xvii.) If total mining and manufacturing employment is taken as the skilled labour force, then the IPC represented 5% of the total in 1920 and about 10% by the early 1930's.
2. By 1925 the IPC's investment was £p16.5 million - about one-third of total foreign direct investment in Peru; equal to perhaps five times the total capital of the largest manufacturing sector, cotton textiles; 30% greater than the total face value of stocks and bonds quoted on the Lima stock exchange (£p12.5 million). (For the last figure see Bolsa Comercial de Lima, Memoria 1925, Anexo I.)
3. It should be noted that in order to simplify the calculations, the opportunity costs of labour and the government sector are run together as an average. The consolidated result represents merely a combination of various possible hypotheses concerning the actual level of the components. Thus, for example, an opportunity-cost estimate of 75% of actual receipts (in the terminology of Appendix D, b=0.75) could be read as the assumption that both SWR and government opportunity cost were 75% of the actual levels of receipts of wages and taxes, respectively.

most likely that the correct SWR would have lain between 75% and 100% of the actual wage rate.

As for the accounting rate of interest (ARI), a similar procedure is adopted. The use of the ARI is to show whether the rate of return on the capital invested in a given project exceeds or falls below the rate of return in the marginal project undertaken in the economy, assuming that this marginal project is the one which exhausts the available supply of investment resources, and that all projects offering higher rates of return are undertaken. The precise meaning of this measure becomes rather uncertain in a context such as Peru, where there was evidence of periodic excess capital, and a considerable amount of capital flight, conspicious consumption, and socially unprofitable investment (e.g. in real-estate speculation in the 1920's). Peruvians in the 1920's tended to expect a return of about 8-10% on their capital - that is, it was difficult to attract capital into local projects offering returns below this, but a new project offering returns above 10% would tend to attract resources away from capital flight and other locally-unproductive uses, rather than away from other paying projects.[1] The true opportunity cost of such capital would thus be given by an ARI rather lower than 10%. However, in order to provide ample leeway in the analysis, the calculations have been performed using three possible assumptions for the level of ARI: 5%, 10% and

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1. Correspondingly, the redeployment of the capital tied up in a venture the size of the IPC might boost capital flight and unproductive expenditure rather than causing a general fall of interest rates elsewhere in the economy.

15%. Of these, most attention is paid to the results with a 10% level, but use of an ARI between 5% and 10% could be easily defended.

Finally, the treatment of capital and of the returns from investment projects deserve some comment; both are discussed at more length in Appendix D. The concept of capital cost used is similar to that adopted by Lall for his 'adjusted capital cost' model[1], but the methods of measurement differ, necessarily, from those used by Lall. The available data is inadequate to permit the construction of a series showing the annual real 'use of capital' by the firm, and consequently capital expenditures are included on an unadjusted basis - that is, the full expenditure on each new item of investment is allocated as a cost in the year in which the investment occurs. Since the analysis covers a period of roughly twenty years, the unequal distribution of investment outlays over time tends to average out in the final results; and the main problem with using capital costs unadjusted - namely, that comparisons with other firms of different ages are rendered difficult[2] - does not arise in the context of a one-firm analysis, where the only comparison is with counterfactual alternative firms. The other component of capital cost - the opportunity cost of capital - is calculated using two polar assumptions as to the proportion of the return on capital which is re-invested. For one set of calculations it is assumed that all returns on capital invested are consumed (or valued as equal to consumption); on this basis

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1. Lall, pp. 23-25.
2. Ibid., p. 23.

the annual opportunity cost of capital is equal to the net capital stock multiplied by the accounting rate of interest. For the other set of calculations, both opportunity cost and the return on factual investment are calculated assuming that all such returns accrue to a group with 100% marginal propensity to save and invest, and all such reinvestment is compounded forward at the accounting rate of interest. A realistic result would lie somewhere between these two limiting cases, denoted below as Version A and Version B respectively.

In both the IPC and Cerro studies, all inputs and outputs have been valued in Peruvian currency, and deflated using the wholesale price index in order to bring them onto a roughly comparable basis over the time spans covered. The reliability of the Peruvian price index cannot be guaranteed, and raises particular problems in the case of analysis of non-marginal enterprises such as those considered here. It also introduces some degree of error into the figures on the net capital of the two firms, since nominal book values expressed in dollars are converted to Libras and deflated, although these processes are as likely to involve a shift away from real values as towards them. The series for the opportunity cost of local capital are correspondingly shaky.

To conclude this discussion of methodology, two general points should be made. The first is that the various alternative situations proposed above are ideal types, designed to show the effects of varying one or another of the elements of the counterfactual firm's performance in isolation. In any completely realistic counterfactual model several of these ideal types would be combined. The same applies to the clear distinction between local and foreign ownership, which rules out, for

analytical purposes, the possibility of various forms of counter-factual joint venture; such matters can be reintroduced in the final stage of the discussion.

The second point concerns the limitations of what counterfactual analysis actually shows. The quantitative analysis will reveal whether there were positive or negative static income effects attributable to the foreign firm's presence; but a set of findings which indicated, for example, that the foreign firm caused negative effects, would not provide any assurance that simply eliminating the foreign firm as such would be a sufficient condition for the realisation of major development gains. This point is taken up again in Chapter 8.

Cost-benefit Assessment of the International Petroleum Company

The available quantitative information on the operations of the oil companies in Peru is set out and analysed in the three Appendixes B, C, and D. Appendix B undertakes the estimation of the quantity 'B' in the earlier equations - the returned value of the companies. Wage and salary payments, and payments to the government, are derived from the published official statistics of the industry, and an estimate is added to allow for miscellaneous costs including local purchases of goods and services. The figures presented on wages and miscellaneous outlays may be considered biassed on the high side (i.e. in the direction of higher returned value), since wages have been calculated on the basis of a 365-day year, and miscellaneous expenditure has been assumed equal to 10% of total other costs despite qualitative evidence which

suggests that local purchases were virtually zero.[1]

Appendix C estimates the oil companies' income from sales on the domestic market, using quantities derived from the shipping statistics, and estimated ex-refinery prices. Appendix D, drawing upon the other two for basic data, then assembles figures on the net contribution to national value added of the International Petroleum Company, and explores the implications of Alternative II and Alternative III replacement hypotheses. In the section which follows here, the results of this quantitative analysis are summarised, and then reconsidered in the light of evidence bearing upon the non-quantifiable variables.

The results of the quantitative cost-benefit analysis undertaken in Appendix D may be summarised as follows.

(i) Alternative II Assumptions: Financial Replacement. Assuming that in place of the IPC an identical locally-owned firm operated the

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1. No indication could be found in contemporary sources that the oil companies were supplied with any of their production inputs from Lima or other industrial centres within Peru. A survey of the English-language Lima newspaper The West Coast Leader for the thirteen years 1919 to 1931 failed to produce a single reference to any sales of goods or equipment to the oilfields by Lima firms, although numerous articles were published describing the oil industry in detail. Had any such sales occurred on a regular basis, the information would undoubtedly have surfaced in the Leader, which devoted much attention to inside information on transactions of this type. Detailed descriptions of the machinery and equipment used in the oil industry appeared in the official statistical publications, particularly, in the 1920's, B.O. M.P. Nos. 10, 15 and 21. These studies all agreed on the universal use of imported equipment. Further confirmation is provided by the absence in Peru of the industrial capacity for production of some of the most important items needed by the companies - especially iron and steel pipes and tubes, and simple pumping gear. The only reference unearthed to an important purchase by an oil company within Peru concerned the IPC's purchase of cement for its Lima-Callao storage and distribution facilities, from the Lima cement plant (Leader, 1930, 'Special Industrial Supplement', p. 6.)

oilfield, selling in the same markets at the same prices and incurring identical costs of production (apart from payments to foreign capitalists), Appendix D finds that Peru would have been unquestionably better-off with the replacement firm than with the IPC, at least over the period 1916-1934. Table IV.2 reproduces the results of using an Alternative II model with an ARI of 10%. The annual net gain in Peruvian national income which would result from such replacement ranges from £p3 million to £p6 million, on average over the nineteen years. Stated the other way round, Table IV.2 indicates that the presence of the IPC in Peru caused a net annual national-income loss of £p3 million to £p6 million, on Alternative II assumptions. The losses for Peru were concentrated in the years after 1922 (that is, after the settling of the IPC's dispute with the Government[1]).

The assumption on which the Alternative II model rests, namely that the counterfactual firm would have been identical in all respects to the IPC, is obviously open to challenge on grounds of unrealism. On the one hand, as defenders of the IPC would be quick to point out, the profitability of the firm (which is what an Alternative II model measures) rested at least in part upon a level of technological sophistication and overseas marketing access which a Peruvian firm might have had difficulty in attaining. On the other hand, this first point implies that the character of a Peruvian replacement firm would have been rather different from that of the IPC, reflecting the former's dependence upon

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1. See Chapter 6.

TABLE IV.2

Net Income Effect ($\bar{Y}$-Y) of Alternative II Replacement of IPC, 1916-1934

£p million at 1925 prices

Year	$\bar{Y}$-Y, calculated using an ARI of 10%	
	Version A	Version B
1916	0.6	0.6
1917	0.0	0.1
1918	0.1	0.2
1919	0.6	0.7
1920	-0.1	0.1
1921	0.7	0.7
1922	3.4	3.6
1923	1.9	2.6
1924	3.1	4.0
1925	2.1	3.4
1926	2.6	4.2
1927	5.3	7.3
1928	7.8	10.6
1929	9.4	13.2
1930	4.1	9.2
1931	2.7	8.7
1932	4.5	11.4
1933	5.6	13.7
1934	7.2	16.7
Total	61.7	110.8
Average	3.2	5.8
Total IPC sales	126.0	126.0
$\bar{Y}$-Y as a % of sales	49.0%	87.9%

Source: Appendix D, Table D6. Total Sales from Table D4.

Note: Version A results calculated assuming that the net return on all capital is valued as consumption and not discounted.

Version B results calculated assuming that all net returns on capital are reinvested at the accounting rate of interest.

Totals may not add exactly, due to rounding.

more local technology, personnel, and finance, and its consequent greater degree of responsiveness to local conditions. In particular, it is to be doubted that Peruvian development of the Negritos oilfield would have resulted in the growth of a single gigantic firm of the magnitude of IPC. More probably, a number of medium-sized firms would have developed; and insofar as there were important economies of scale in the Peruvian oil industry, these replacement enterprises might have suffered from some loss of profitability by comparison with the IPC. Insofar, furthermore, as there were specific problems of inefficiency or isolation from markets to be faced by Peruvian enterprises, these should be taken into account, and the Alternative II model will fail to show their significance. A variety of Alternative III models are therefore simulated in Appendix D. The models are developed on the basis of a comparison between the IPC and a single replacement firm; this single counterfactual unit can be viewed either as a genuine unified enterprise, or as a conceptual grouping-together of a number of smaller Peruvian firms, with their output, costs and profitability aggregated into one.

The real usefulness of the Alternative II results is not so much that they provide a realistic picture of how actual replacement would have operated, but that they serve to define the amount of leeway within which feasible replacement options would have to fall. If an ARI of 10% is used, as in Table IV.2, then the Version A results in that table indicate that a replacement firm which was inferior to the IPC, but inferior to the tune of less than £p60 million over the nineteen years, would give net social benefits by comparison with the IPC. The Alternative III calculations serve to bring out the implications of this area of leeway.

(ii) Alternative III Replacement with Limited Exports. Access to overseas markets is often cited as a decisive advantage possessed by the large international firm, from which it follows that the exporting country would be unable, or very limited in its ability, to develop its export industry in the absence of the foreign firm. A recent commentator has observed:[1]

> In industries which are organised on tight, vertically-integrated lines, such as the aluminium industry, the material-producing countries place a very high value on access to markets; in industries where the vertical structure is less pervasive, as in copper and oil, countries producing the raw materials usually sense that market access may have a little less value; in cocoa or palm oil, where a free international market exists, guaranteed market access may have little value for the less developed country ... In the case of raw materials produced in tightly-controlled industries, the presumption is strong that US-controlled investment contributes favourably to the balance of payments position of the host country.

Oil, according to Vernon, occupies an intermediate position, as one of the commodities in which market access is difficult, but not impossible, for the host country to obtain without the assistance of international firms. This being the case, the benefits of easy marketing need to be set against any costs associated with the presence of foreign firms in control of a country's oil sector.

Taking into account the oligopolistic nature of the international oil market in the 1920's[2], and the fact that the IPC was part of the

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1. Vernon, 'United States Enterprise in the Less Developed Countries' in Ranis, The Gap Between Rich and Poor Nations pp. 218-219 and 223-224.
2. Cf Penrose, The Large International Firm in Developing Countries, Chapter 3, especially pp. 53-62.

world-wide empire of Standard Oil of New Jersey, it would appear probable that the marketing opportunities open to a Peruvian replacement firm seeking to export would have been less than those enjoyed by the IPC. The counterfactual firm would have had to find a customer possessing distribution outlets in overseas oil markets, and might well have had to be satisfied with a lower price than that obtained by the IPC. In the extreme case, Peruvian replacement firms might have been completely unable to break into export markets.

This extreme case is considered first. The counterfactual firm is assumed to be barred from export markets, with the result that its output is limited to the quantities necessary to supply the domestic Peruvian market. The IPC, in other words, is assumed to be replaced by an import-substituting, but non-exporting, counterfactual. Various further assumptions are required in order to make the calculations manageable. Most importantly, the replacement firm is assumed to have identical production costs per unit of sales revenue to the factual firm; that is, the replacement firm is assumed to have the same technology, product mix, factor proportions and level of efficiency as the IPC. Appendix D explores the implications of various assumptions concerning opportunity costs, and concludes that for any combination of assumptions which may be considered at all realistic, a net gain results from replacement even though the replacement firm is only about 20% the size of the IPC. Table IV.3 reproduces the results obtained if the accounting rate of interest is taken as 10%, and if the opportunity costs of factors other than capital are assumed to average 75% of total factor payments. Using these assumptions, the net benefits of replacement are

TABLE IV.3

Alternative III Replacement of IPC by a Non-Exporting Counterfactual Firm

Net Income Effect 1916-1934: £p million at 1925 prices

Year	$\bar{Y}$-Y calculated using an ARI of 10%, and assuming b = 0.75	
	Version A	Version B
1916	-0.04	-0.04
1917	-0.04	-0.04
1918	0.04	0.04
1919	0.01	0.0
1920	0.00	0.0
1921	-0.04	-0.04
1922	0.01	0.01
1923	0.2	0.1
1924	0.3	0.3
1925	0.4	0.4
1926	0.1	0.2
1927	0.4	0.5
1928	0.7	0.9
1929	0.7	0.9
1930	0.7	1.0
1931	0.6	1.0
1932	0.4	0.9
1933	0.2	0.8
1934	0.4	1.1
Total	5.1	8.1
Average	0.3	0.4
% of total sales	4.0%	6.4%

Source: Appendix D, Table D12.

Note: Totals may not add exactly, due to rounding.

substantial, totalling between £p5 million and £p8 million over the nineteen years. Use of a lower ARI increases the benefits of replacement, as does the assumption of opportunity costs averaging above 75% of factor remuneration. Only in the case of very low proportional opportunity costs, and/or an ARI of 15% or above, is it possible to construct a model which favours retention of the IPC - and these requirements can be dismissed as quite unrealistic.

If the restrictive assumptions concerning technology, factor proportions, product mix, and efficiency are relaxed, the quantitative findings are subject to some modification. It is, however, to be doubted that dropping the assumptions will substantially improve the IPC's showing, even if it were possible to make meaningful estimates for all these elements independently. There is no very strong reason for supposing that Peruvian replacements would have been significantly less efficient than the IPC (see below); and the use of different technology, factor proportions, and product mixes might affect the results in either direction. There is thus no a priori case for supposing that the making of these assumptions biasses the results against the IPC.

If a non-exporting replacement shows up so well by comparison with the IPC, it is to be expected that a replacement firm able to expand into export markets (even under disadvantageous conditions) would also compare well. Appendix D finds that a replacement firm which exported the same quantities of oil products as did the IPC would have represented a net loss for the Peruvian economy only if the prices received for its products abroad were very substantially below those of the IPC. The use of an ARI of 10% gives the results presented in Table IV.4, showing that a replacement firm receiving

TABLE IV.4

Alternative III Replacement of the IPC, if Export Prices Fall: 1916-1934

Results with ARI = 10%

Year	Percentage fall in export prices necessary to equilibrate $\bar{Y}$ and Y	
	Version A	Version B
1916	31	31
1917	0	5
1918	14	20
1919	36	41
1920	- 9	5
1921	19	19
1922	62	66
1923	48	63
1924	56	72
1925	46	74
1926	41	67
1927	60	84
1928	74	100
1929	77	109
1930	64	144
1931	55	178
1932	61	156
1933	61	147
1934	63	145
Average (weighted)	58	103

Source: Appendix D, Table D15.

prices less than half those obtained by the IPC in foreign markets would still have yielded net income gains. Table IV.5 gives figures on the net income effect of a replacement firm with the same output and production costs as the IPC, but receiving a price for exports 30% lower. Net gains from replacement total between £p30 million and £p78 million for the nineteen-year period, or an average of between £p1.5 million and £p4 million annually, on average.

Tables IV.4 and IV.5 bring out a point which is clear also in the other results already presented: namely, the fact that averaging over the entire period covered conceals important differences between the period 1916-1921 and the period from 1922 on. In Table IV.5, if the years up to 1921 are taken by themselves, replacement with export prices 30% down on factual levels implies a net income loss of £p1 million or a little more over the six years. It was the signing of an agreement between the IPC and the Government in early 1922 which accounts in large part for the abrupt change in the IPC's performance thereafter, with rapidly-increasing losses for Peru as a result. From the point of view of a Peruvian decision-maker in 1916, however, with very imperfect knowledge concerning the future of the oil industry in the 1920's, results such as those in Table IV.5 might have seemed to justify retaining the IPC in preference to setting up a replacement (particularly since there would have been substantial costs involved in an actual process of replacement - costs which are ignored in the calculations presented here). To reach such a conclusion, the hypothetical decision-maker would have to have had very pessimistic expectations of the IPC's performance after the settling of the dispute; or a very high discount rate; or very short time horizon. Since the Peruvian Government in fact took a decision

TABLE IV.5

Income Effects of Alternative III Replacement with Export Prices 30% Lower

£p million at 1925 prices

Year	$\bar{Y}$-Y calculated using an ARI of 10%	
	Version A	Version B
1916	0.0	0.0
1917	-0.3	-0.4
1918	-0.2	-0.1
1919	0.1	0.2
1920	-0.4	-0.3
1921	-0.4	-0.4
1922	1.8	2.0
1923	0.7	1.3
1924	1.5	2.3
1925	0.7	2.0
1926	0.7	2.3
1927	2.6	4.7
1928	4.7	7.4
1929	5.7	9.5
1930	2.2	7.3
1931	1.2	7.3
1932	2.3	9.2
1933	2.8	10.9
1934	3.8	13.2
Total	29.5	78.4
Annual Average	1.6	4.1
% of total sales	23.4%	62.2%

Source: Appendix D, Table D6 for $(D-I-\bar{K}o)_1$ and Table D15 for X.
Figures calculated using $\bar{Y}-Y=D-I-\bar{K}o-dX$.

in 1916 (and reaffirmed it in 1918) that the IPC was not to be replaced by a Peruvian enterprise; and since the 1922 Agreement which had such immediate negative effects for Peru followed directly from those earlier decisions, it is important to know what calculations in fact were made about the IPC's presence in the country. Because of the importance of the issue, it has been taken up in detail in Chapter 6.

(iii) Alternative III Replacement with Reduced Efficiency. The third set of hypothetical possibilities considered in Appendix D involves a replacement firm with higher average unit costs than those of the IPC, due to lower efficiency. In this model, the inputs of factors and materials required for the production of total output (X+S) are increased by a proportion 'c'. The results indicate that a replacement firm having the same output and technology as the IPC, and receiving the same prices for its products, would remain superior to the IPC even if its unit costs of production were 100% above those of the IPC. In fact, there is no evidence to suggest that a replacement firm's costs need have exceeded those of the IPC by anything like this amount, if at all.

Summary

Taking 10% as a provisional accounting rate of interest, the quantitative analysis to this point has indicated that (ceteris paribus) a replacement firm or firms, to remain socially superior to the IPC, could have absorbed a drop in total sales of over 80%; or a fall in export prices of 58%; or a rise in unit costs of 192% (assuming opportunity costs of 75%) by comparison with the IPC's performance. Evidently, a replacement firm could absorb a combination of a lesser

fall in prices and sales plus a lesser rise in unit costs, and yet remain socially preferable. The realism of counterfactual propositions concerning replacement hinges not so much upon detailed calculations of just what combinations would be satisfactory, as upon qualitative judgments of what could have been expected from Peruvian enterprises. The counterfactual case would be endangered by clear evidence which tended to show that a replacement firm would have suffered major diseconomies of scale, or crippling technological deprivation, or gross managerial inefficiency; or that no local entrepreneurs existed willing to enter the industry. Available evidence, however, is if anything to the contrary, as the next section indicates; and the inclusion in the analysis of qualitative elements relating to externalities, non-marginality, linkages and distribution similarly fails to weaken the counterfactual case.

The Qualitative (Non-quantifiable) Issues

The ability of local Peruvian entrepreneurs to run an efficient oil company with current technology was demonstrated clearly enough up to 1920 by the successful performance of the Piaggio company, established by a Callao merchant in the 1880's.[1] Unfortunately this firm ran into difficulties in the 1920's which disqualify it from acting as a pilot study for counterfactual possibilities during that

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1. The fact that Piaggio was an immigrant Italian does not affect the statement that he was a local entrepreneur. The capitalist classes of both South and North America included a fair proportion of immigrant blood in the nineteenth century; on the Latin American case, cf Glade, The Latin American Economies, pp. 277-278.

decade. Piaggio's health deteriorated in the early 1920's, and he died in 1924.[1] Serious management problems struck the firm at this time, both because of Piaggio's death and because of the subsequent appointment of an inefficient U.S. engineer to take over the Zorritos refinery from Peruvians, the immediate result being a catastrophic fall in efficiency and output.[2] The engineer was fired in late 1925, but this setback and the firm's loss of direction contributed to poor performance during the remainder of the decade. Perhaps more important even than this was the declining productivity of the Zorritos oilfield, which had been worked for over forty years by the 1920's; the shrinking resource base prevented the firm from attempting to expand output, and was probably the crucial factor in keeping it out of export markets, since output never exceeded the demand of the local market after about 1910. Counterfactual firms based on Negritos, on the other hand, would have been able to set their output independently of the constraints imposed by limited natural resources. Within those constraints, the Piaggio company up until 1920 was as efficient as the IPC[3], and contemporary opinion was that its products were of higher quality than those of the IPC, and fetched a corresponding premium in price.[4]

Piaggio, of course, was an isolated case, and it might be suggested that other local entrepreneurs would not have been interested in

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1. Leader, February 19th, 1924, p. 2.
2. B.O.M.P. No. 15, p. 17.
3. See labour productivity figures in Appendix D, Table D14.
4. Manners, Report on the Financial, Commercial and Economic Conditions of Peru (1922) p. 13.

entering the industry, at least not in sufficient numbers to provide a meaningful replacement to the IPC. This is refuted by the long history of attempts by Peruvians to set up oil enterprises, as detailed in Chapter 3 for the years up to 1920, and in Chapter 6 for the 1920's. Entrepreneurs from a variety of other sectors - cotton and sugar growers, mine-owners, and merchants - were all keen to enter the petroleum business in the 1920's. The critical constraint on such locally-based activity was the supply of natural resources: there were no more major oilfields to be discovered. It is therefore entirely realistic to speak in terms of a number of local counterfactual replacement firms in place of the IPC on the Negritos oilfield, and to suggest that such firms would have been fully capable of developing the industry. It is now time, therefore, to turn to the non-quantifiable issues in such replacement, to enquire whether these would have affected the desirability, or at least feasibility, of replacing IPC, as revealed by the earlier quantitative material.

(i) Linkage Effects. In the quantitative model used above to determine net contribution to national value-added, it was assumed that the oil industry was a marginal element in a fully-employed economy - this being implicit in the assumption 'no externalities'. Consequently no national income effect was associated with the industry's purchases of goods and services from the rest of the economy, given by the quantity 'L' in the equations. Instead, it was presumed that the value-added represented by those goods and services would have existed in any case in the absence of the oil industry. Since, however, the IPC was not

marginal to the economy, and also since underemployment of resources and poor integration were characteristic of the Peruvian economy, such purchases are of considerable potential importance. In addition to these 'backward linkages', it is necessary to consider also possible 'forward linkages' - industries brought into being, or benefited by reduced costs, as a result of the supply of products by the petroleum industry.

One approach to the analysis of 'enclaves' emphasizes the fact that linkages run abroad from the export industry, rather than into the host economy. Inputs are imported directly, and output leaves after undergoing a minimum of local processing.[1] The IPC in certain ways corresponded to this model: virtually all equipment and material inputs were imported rather than locally-supplied, and the main products exported were crude petroleum and naphtha. However, the firm was also a major supplier of fuel for the Peruvian economy, which raised the possibility that substantial forward linkages might have flowed from its operations. It is probably best to separate the discussion of linkages into the two types, 'backward' and 'forward', for further discussion.

Backward linkages arise because the demand for certain inputs by one industry induces the establishment or expansion of other industries, with beneficial effects on economic development. This may occur for various reasons. The new demand may expand the domestic market for certain products to the point where local production becomes feasible

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1. Hirschman, p. 110.

(i.e. may enable potential local producers to base their expectations on an enlarged market with the possibility of substantial scale economies). It may, in a context of structural underemployment of local factors, provide the impetus for bringing those factors into employment, with multiplier effects through the economy. And it may involve the creation of activities which in turn provide external economies for other sectors (the most obvious examples being the setting up of infrastructure such as ports, railways, electricity generating plant and so on). Linkages may be set up both by the direct purchases of the industry, and by the Government's expenditure of the revenue derived from the industry.[1] Further down the line, the expenditure of the incremental factor incomes generated by the new activity may also produce linkage effects.

As has been noted already, the IPC set up no significant backward linkages in Peru through direct purchases of inputs. The only areas in which backward linkages may have occurred in fact were the expenditure (on foodstuffs and consumer goods) of factor incomes generated, and the expenditure of incremental government income. The possibilities for direct backward linkages from a petroleum industry are, however, considerable. In Hirschman's table of sectoral interdependence (showing the ratio of interindustry purchases of inputs to total output), petroleum ranks sixth out of 29 industries in the advanced countries,[2] which makes the absence of local interindustry purchases by the IPC

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1. This outline of linkage effects is based upon Pearson, pp. 46-47. See also Thoburn, 'Exports and the Malaysian Engineering Industry'.
2. Hirschman, pp. 106-107.

remarkable. Insofar as the absence of intersectoral flows reflected the impossibility of local supply, or its gross inefficiency as compared with imports, there was no loss of national income associated with the IPC's practice of importing its needs rather than purchasing locally. Analysis of the performance of international firms in mineral-export sectors has suggested, however, that the generalised preference of these firms for imports reflects not so much the real possibilities or relative prices of local supply, but rather the international integration of the firms and their preference for dealing with single suppliers, often connected with the parent firm.[1] It might well be the case, therefore, that a Peruvian-controlled oil industry would have provided local suppliers with a market which the IPC, as a matter of company policy, did not. Many of the items used by the oil industry were relatively simple engineering and foundry products - derricks, iron pipe, pumping gear - which would probably have been within the capacity of the local capital capital-goods industry to produce (how competitively, cannot be said with certainty.) Similarly, the construction of oil storage tanks involved simple technology and should have been within the capacity of local engineering firms.

In fact, the Peruvian capital-goods sector was in decline from the beginning of the twentieth century.[2] In large part this was a result of the improvement of ocean transport and reduction of freight rates, which made imported capital goods increasingly competitive with local supply. The sector also suffered, however, from a diversion of demand

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1. See Girvan, 'Multinational Corporations and Dependent Underdevelopment in Mineral Export Economies', in Social and Economic Studies, 1970.
2. Cf Bollinger, pp. 29-31.

away from locally-made equipment towards imports, as a result the takeover by foreign firms of the oil and copper export sectors. Deprived of large-scale demand from the mineral export sectors, the national capital-goods industry was greatly weakened in its attempts to obtain some measure of protection, and lost the possibility of moving into the development and production of equipment on a scale at which economies might have become significant. In addition to this (the usual infant-industry argument for protection)the case in favour of preserving a domestic capacity to generate technology also deserves attention. What is here suggested is that a Peruvian-owned oil industry would have offered a more receptive potential market for locally-produced equipment, particularly if Government had elected to support domestic technological development, than did the foreign-controlled oil industry in fact. Whether the local capital-goods producers could have taken advantage of this alternative, more favourable, set of market possibilities must remain, however, a speculative issue. The general conclusion which emerges from this discussion is that insofar as the replacement of the IPC by a counterfactual local firm would have implied any change in the type of backward linkages generated by the oil industry, those changes would have been in a direction benefiting Peruvian suppliers - and that therefore any such changes would have been in a direction strengthening the earlier quantitative conclusion in favour of replacement. If the possibility of backward linkages is dismissed as too speculative, no modification to the quantitative findings would be implied.

Forward linkages are also an area in which the IPC made no perceptible contribution to the Peruvian economy. The fuel which was supplied

to Peruvian consumers was priced at a level roughly equal to the price of competing imports - that is, at CIF prices.[1] Import substitution of oil products therefore did not involve linkage gains for the Peruvian economy beyond the income effects generated by the existence of the substituting firm. It is, of course, true that a switch to imports of oil supplies would have caused some downward pressure on the exchange rate, an externality which has thus far been ignored, with indeterminate effects on the rest of the economy (the immediate income loss from higher import prices might have been offset by the effects of increased protection). This, however, is rather different from the question of forward linkage per se. Forward linkages would arise either if oil became the raw material for local processing industries (petrochemicals, for example), or if the price of fuel supplies to domestic users were sufficiently below the price of imports to confer major cost savings, and thereby improve the competitive position of Peruvian producers. Of these two possibilities, the latter is the important one in the context of the 1920's. Analysis of the pricing policies of the IPC in Chapter 6 below concludes that major price reductions would have been feasible without threatening the profitability of the enterprise. Effective price control imposed by the government could have brought about such reductions, and thereby opened the possibility of important gains for manufacturing industry. Similar possibilities would have existed in the case of replacement by local firms, although insofar as these firms had higher costs than the IPC, price reductions would have had to be less. In either case, such reductions would

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1. For a full discussion of IPC pricing policy, see Chapter 6.

imply an income transfer from the oil industry to oil consumers. Such a transfer from the IPC would have reduced the size of repatriated profits, and consequently would have increased Peruvian national income. A transfer from a locally-controlled oil industry would not have involved any such first-round income gains, but would have benefited the economy if cheap fuel led to more rapid growth than occurred in the expensive-fuel situation.

The failure of government to force such a price reduction on the IPC is explicable in terms of the aims of government and the nature of its bargaining relations with the company, as described in Chapter 6. In the case of hypothetical replacement, it is not necessarily the case that government would have used price control against local companies, but the possibility would have been greater. If competition among such counterfactual companies failed to bring prices down to competitive levels, government might well have chosen to leave prices at monopolistic levels and capture the gains for itself by taxation; in this case, dynamic gains of the type discussed here would not have occurred. The possibility, however, remains open that under counterfactual conditions, fuel prices for Peruvian industry and transport could have been significantly lower, and this might have translated itself into an increase in the range of imports which could be efficiently substituted.

One possibility which might bear further exploration is that the Peruvian iron and steel industry might have got off to an earlier and more dynamic start if oil fuel had been cheapter. The industry was

several times proposed during the 1920's,[1] on the basis of coal reserves near Chimbote, but the absence of a railway linking the coalfields to the coast constituted an insuperable barrier. Considering that fuel accounted in the 1960's for about a quarter of the total production costs of steel[2], and that the figure for the 1920's was probably similar or higher (in an era of lower wages), a cheap-fuel policy might have provided Peru with the base for an iron and steel industry using the local Marcona deposits of iron ore, and conceivably not too inefficient. (The Santa Corporation steelworks have since the 1940's played a central role in Peru's industrial growth).

Again, as in the case of backward linkages, this discussion of forward linkages leads to a general conclusion that a counterfactual firm could hardly have done worse than the IPC, and might have done significantly better.

(ii) Externalities. The most significant externality associated with an industry such as petroleum in Peru would be the improvement of the quality of local factors. In the case of a foreign firm, such

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1. For the history of repeated attempts to launch this project, see the following Leader articles: October 30th, 1919, p. 1; November 20th, 1919, p. 16; November 27th, 1919, p. 7; J.J. Bravo, 'Iron in Peru' March 19th, 1921, p. 8; and Leguía's annual messages for 1926 and 1929, in Leader July 27th, 1926, Supplement p. 1; October 22nd, 1929, Supplement p. 2; August 5th, 1930, p. 13. On the history of the earlier, unsuccessful, Chimbote Coal and Harbour Syndicate scheme, see Halsey, Investments in Latin America and the British West Indies, pp. 331-332.
2. Tanzer, The Political Economy of International Oil, p. 5.

effects are generally restricted to the training of a skilled labour force which may subsequently be redeployed, to the benefit of other sectors of the economy. There may also be some limited technical and managerial training provided for Peruvians admitted to positions in the firm. In the case of a locally-owned and locally-run firm, the range of such effects widens considerably. Closer involvement of local engineers and technicians in the development of the industry implies greater learning effects, and probably an impetus for improvement in the local capacity for autonomous technological development. Involvement of local entrepreneurship and management holds out the possibility of improvement through experience and training, and in addition may provide local employment for talent which might otherwise migrate from the country or remain idle. Significant improvement in the state of the local capital market might also be expected, both because of the greater activity which financing a large additional economic sector would imply, and because the relatively high profitability of the oil industry would have made it the source of an increase in the supply of investible funds available from local sources, and passing through the local capital market.

There would seem to exist something of a trade-off situation in the comparison between the IPC and counterfactual possibilities. The IPC, as a large, integrated enterprise, probably provided efficient training for more labour than replacements would have (although this is not certain), and almost certainly used technology of a higher level of sophistication, so that the skills acquired by native technical staff employed by the company would be superior to those obtained by similar

staff in a replacement firm. On the other hand, the replacement firms would provide superior managerial and entrepreneurial training, beneficial effects arising from the integration of the industry into the structure of national capital markets, and possibly technical skills of a type and quality better adjusted to the Peruvian environment.

A further important issue in this connection is the availability of technology itself. Although the question of market access has been dealt with earlier, reference has not yet been made to the possibility that the foreign firm may bring with it technological factors essential for the development of the industry. In the case of Peruvian petroleum in the 1920's, such was evidently not the case. The Piaggio company, operating independently, had been able to acquire all necessary technology for drilling and refining up to the early 1920's, and thereafter ceased to develop for reasons which were unconnected with the availability or otherwise of technology. The sinking of oil wells definitely remained well within Peruvian capability, and prospecting skills were fairly equal between foreign and Peruvian geologists, in an era when wildcatting was still the main form of exploration in the Peruvian northwest. This leaves refining, the most complex set of operations involved in the oil industry. Apart from the early evidence of success of the Piaggio refinery, it is worth noting that in the later 1920's the promoters of a scheme for the construction of a Peruvian national refinery were able to obtain offers of refinery-construction packages, with embodied technology, from several major international firms not directly connected with the oil business, notably Bethlehem Steel and Le Creuset.[1]

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1. For the history of the scheme, see Chapter 6 below. The national refinery never came to fruition, being forestalled by a deal between the Government and the IPC. Access to technology, however, never seems to have arisen as a problem; nor did foreign commentators on the scheme make any remark to that effect.

That technology obtained by these means would have worked out significantly more expensive than technology obtained via foreign direct investment in the form of the IPC is unlikely. Access to technology thus is not likely to affect the earlier calculations very significantly.

(iii) Non-marginality. As has been noted at various points, a calculation which assumes the IPC to be marginal to a fully-employed economy contains an element of unreality. Non-marginality distorts the level of real opportunity costs, and means that important balance-of-payments and exchange-rate issues may have been ignored. Many of these effects, however, cancel out in the process of comparing the IPC with a counterfactual firm, although they would be vital in an Alternative I calculation (evaluating the IPC on the assumption that in its absence the industry would not exist). The case of the exchange rate provides an interesting case. Withdrawal of the IPC without replacement would cause a fall in the exchange rate reflecting the loss of export earnings and the rise in imports of oil products. The magnitude of the foreign-exchange loss is given by the returned value, or net foreign-exchange contribution, 'B'. In Table IV.6 this quantity is compared with Peru's total export earnings; the burden imposed on the balance of payments by IPC withdrawal proves to be of the order of 2 - 5% of export earnings, rising in the early 1930's. This obviously would depress the exchange rate to a significant degree. If, however, IPC withdrawal were coupled with the introduction of an import-substituting Peruvian replacement firm, the problem vanishes. The threat to the balance of payments proves to rest entirely upon the rise in the import bill caused by the need to service local demand. Column 4 of Table IV.6 subtracts from B the amount S

TABLE IV.6

Balance-of-Payments Implications of IPC Withdrawal

Year	IPC Returned Value £p000	Total Peruvian exports £p000	Column 1 as % of Column 2	B - S £p000	B - S as a % of exports
1916	257	16,713	1.5	103	0.6
1917	257	18,158	1.4	33	0.2
1918	246	18,384	1.3	-144	-0.8
1919	407	26,562	1.5	- 1	0.0
1920	506	31,530	1.6	- 92	-0.3
1921	572	23,147	2.5	- 35	-0.2
1922	925	25,208	3.7	417	1.6
1923	691	29,888	2.3	- 11	0.0
1924	829	26,085	3.2	- 34	-0.1
1925	888	23,497	3.8	-349	-1.5
1926	1,228	26,494	4.6	157	0.6
1927	1,288	28,791	4.5	- 30	-0.1
1928	1,343	28,050	4.8	-149	-0.5
1929	1,378	29,301	4.7	- 93	-0.3
1930	1,157	23,599	4.9	-282	-1.2
1931	1,032	19,742	5.2	-355	-1.8
1932	1,418	17,853	7.9	246	1.4
1933	1,999	25,697	7.8	772	3.0
1934	2,444	30,509	8.0	930	3.0

Sources: Column 1 from Appendix B.

Column 2 from Extracto Estadístico 1934-35, p. 76, with exchange adjustment made to exports up to 1923.

Column 4 from Appendix D.

(local sales of petroleum products) in order to obtain the effect on the balance of payments which would have followed from the withdrawal of the IPC but the continued availability of supplies of oil for the domestic market from other firms. Over most of the period, the effect is negative - in other words, an IPC withdrawal on these terms would have actually improved the balance of payments.

(iv) Distribution. The distribution of the income gains from a counterfactual replacement firm could have differed from those of the IPC in a number of ways. One example is provided by the fact that an import-substituting replacement would have paid a lower rate of tax than did the IPC, since taxes fell more heavily on export production than on local sales. This would imply higher profits and lower government income unless the tax structure were also hypothetically altered. Another example would be a fall in efficiency which raised the share of labour and reduced that of capitalists. Such distributional shifts would not affect the income effects as they have been calculated above, but would certainly affect levels of saving and investment out of that income. If, thus, savings were to be distinguished from consumption in the calculation of income effects, it would be necessary to take account of the varying saving propensities of government, labour, capitalists and other benefiting groups.

Distributional factors would operate in favour of the IPC, in the earlier calculations, only if the inevitable consequence of replacement were a strong redistribution of the income generated by the oil industry away from saving groups towards consumption. Any form of replacement

which increased the income of a saving group would increase also future incomes, via investment. There seems no reason to believe that such distributive effects would have been such as to overturn the earlier results.

Conclusions.

In Chapter 1 three general questions concerning foreign capital were posed: was foreign direct investment filling gaps in Peru's resource endowment; was foreign capital responsible for initiating activities which would not otherwise have come to fruition; and was there a net gain for Peruvian development as a result of the presence of foreign investment? The answers to all three questions, when applied to the IPC, appear to be negative. Evidence of Peruvian inability to initiate a native oil industry, either because of 'traditional society' elements or because of inadequate resource endowment, does not exist. On the contrary, evidence has been presented which suggests that Peruvian operators, epitomised by Piaggio, were perfectly capable of developing the country's oil resources, once given access to oil-bearing territory. Quantitative analysis of the net contribution of the IPC to the Peruvian economy suggests that the contribution was negative, if anything.

This may appear a paradoxical result. If the conditions for Peruvian development of the industry existed, why was it left to foreign firms? Unless Peru was a very isolated case, there should have been some case elsewhere of a country which developed its own oil; yet no such case exists (except perhaps for the discouraging experience of

Argentina). This is a problem which goes to the heart of the whole counterfactual approach to the evaluation of foreign direct investment. The fact is that, even in cases such as the Negritos oilfield where foreign investment brought no benefits to the national economy, control nevertheless passed to foreigners by the free consent of local resource owners. As Glade notes,[1]

> Of the land factors employed in plantation agriculture and mining /in Latin America/, a not inconsiderable amount was transferred to foreign ownership at a modest cost ...

Once entrenched in control, it is easy to see how large international firms were able to defend their position, and strike tough bargains in negotiations with local governments whose power and will did not always measure up to the requirements of the case. Once established, foreign firms are notoriously difficult to dislodge by such techniques as expropriation. The valuation which is placed upon the resources by buyers and sellers at the moment of entry of the foreign firm is thus of critical importance; for unless the initial price of the assets is set high enough to compensate the host economy for future losses resulting from the presence of a firm such as the IPC, it follows that economic growth must suffer. The IPC's predecessor, London and Pacific Petroleum, paid £18,000 in 1888 for monopoly control of the Negritos oilfield. It is to be doubted that this price fully compensated the Peruvian economy for the subsequent damage suffered as a result of foreign control, even when due allowance is made for the inherent uncertainties of the situation. Certainly, in hindsight, Peru would have been better off retaining control

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1. P. 257 fn, printed on p. 601.

of all or part of the oilfield; and furthermore, at a later stage when the IPC entered into direct conflict with the government, it can be persuasively argued that expropriation of the company would have been historically the most satisfactory course of action.

CHAPTER 5

Foreign Capital and the Mining Industry: an Evaluation of Cerro de Pasco Copper Corporation

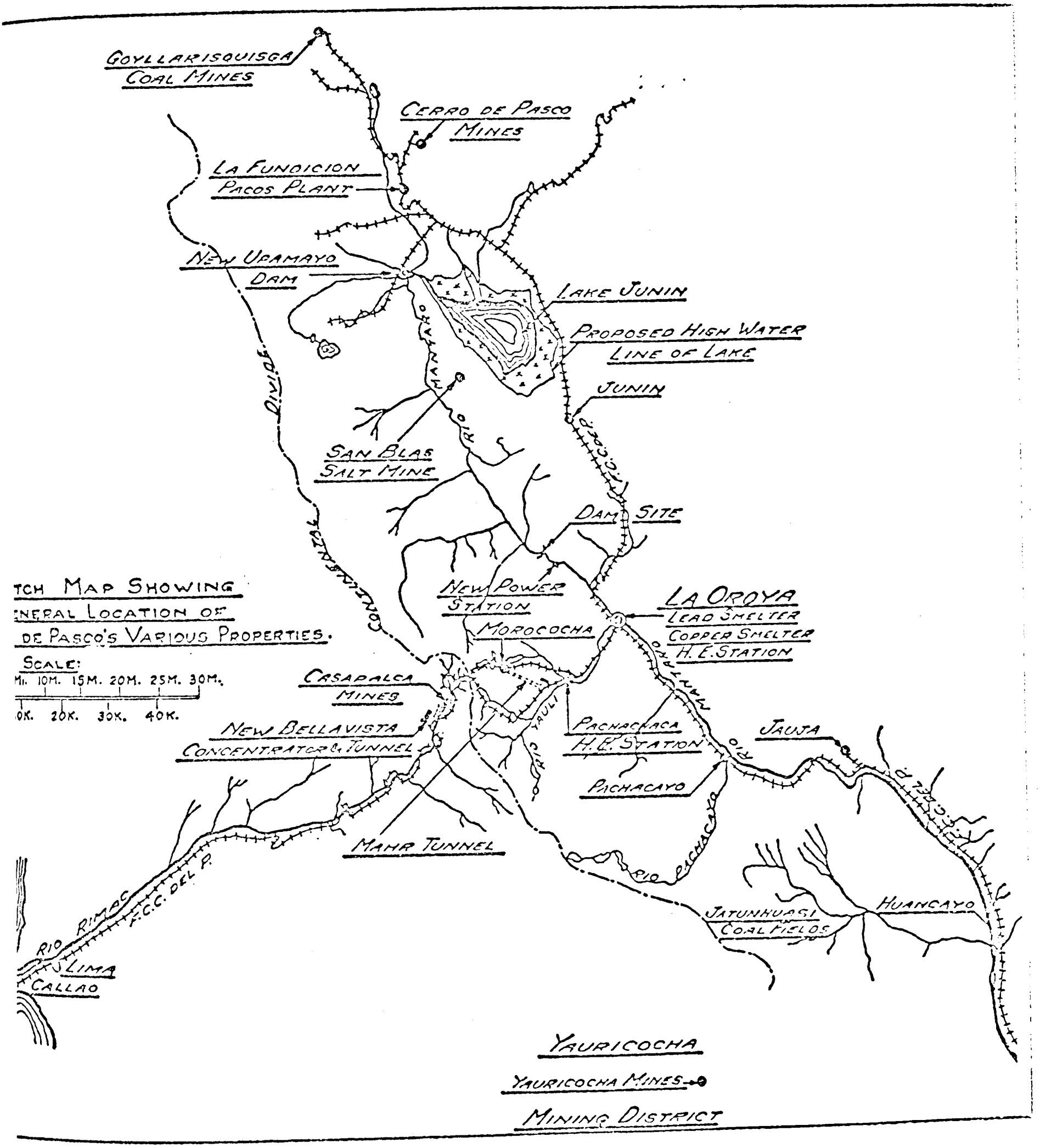
In contrast to the relative simplicity of the structure of the oil industry, copper presents a more difficult case. The oil industry, it has been seen, was geographically isolated, its links with the Peruvian economy tenuous except for the extraction of monopoly quasi-rents from the local market, and its export sector almost completely monopolised by foreign capital. A number of striking features distinguished the copper mining industry from this simple pattern. In the first place, the main mines were located in the midst of populated regions, and in close inter-relationship with the local economies. The great copper-silver mines of the Central Sierra - Cerro de Pasco and Morococha - are close to the densely-populated Mantaro Valley, from where a large part of the mining labour force has been drawn, often in the form of migrant workers who returned to their villages with cash earned in the mines. This flow of labour, plus the opportunities opened for peasants and small traders of the Mantaro Valley to supply the mines with timber, textiles, and foodstuffs, created a positive link between the mines and the regional economy.[1] Similar comments, although on a reduced scale, apply to the other important centre of mining development in the 1920's, the Quiruvilca and Millhuachaqui mines of Northern Peru Mining and Smelting Co in La Libertad.

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1. See Laite, Industrialisation and Land Tenure in the Peruvian Andes, and Roberts, Urban Migration and Change in Provincial Organization in the Central Sierra of Peru espec.pp. 2-4.

FIGURE V.1

Cerro de Pasco Copper Corporation's Mining Properties As Of 1929.



cce: Cerro de Pasco Copper Corporation, Annual Report to December 31, 1929.

Secondly, the infrastructure set up to serve the mining industry was simultaneously useful to other economic sectors; in particular the rail link from Lima to Oroya, completed in 1893 and extended to Cerro de Pasco in 1904 and Huancayo in 1908, (see map in Figure V.1), which connected the Mantaro economy with Lima and thereby set off a long series of social and economic changes in the region.

Thirdly, the giant foreign enterprises which dominated copper and silver mining during the 1920's existed in a close symbiotic relationship with Peruvian capitalists. This point has been discussed in Chapter 3 above.

During the 1920's Cerro continued to expand the scope of its operations. The new central smelter at La Oroya, opened in 1922, underwent a steady horizontal diversification as new processes were added; notably Cottrell filters on the flues in 1925, a lead furnace in 1927, and an electrolytic lead and bismuth plant which opened in 1934. The company did not, however, progress from the production of blister copper to the electrolytic refining stage.

Two major influences on Cerro's performance between the First World War and the mid-1930's deserve brief mention. The first was the movement of world prices, shown in Table V.1. The wartime boom, which reached a peak in 1917, provided the impulse for the construction of the Oroya smelter, but was followed by a sharp recession which halved prices by 1921. Cerro's profits during this recession rested upon the silver and gold contained in its blister copper, since prices for those metals held up. Prices firmed after 1921, and for the rest of the decade Cerro's profitability was secure. A brief price rise in 1928-1929 was cut short by the world depression in 1930.

TABLE V.1

Movement of Copper Prices in London and New York, 1913-1934

Year	New York price cents per lb	London price £ per long ton
1913	15.3	68.4
1914	13.6	61.5
1915	17.3	72.5
1916	27.2	116.1
1917	27.2	124.9
1918	24.6	115.5
1919	18.7	90.8
1920	17.5	97.5
1921	12.5	69.4
1922	13.4	62.1
1923	14.4	65.8
1924	13.0	63.1
1925	14.0	61.9
1926	13.8	58.0
1927	12.9	55.7
1928	14.6	63.7
1929	18.1	75.4
1930	13.0	54.6
1931	8.1	38.3
1932	5.6	31.7
1933	7.0	32.5
1934	8.4	n.a.

Source: Skelton, 'Copper' in Elliott et al, International Control in the Non-Ferrous Metals, pp. 507-508.

The second influence on Cerro's operations was the political furore which followed pollution of a wide stretch of countryside around Oroya by the fumes from the new smelter.[1] To settle the dispute Cerro bought up roughly 230,000 hectares of agricultural and grazing land (becoming thereby the largest landowner of the Central Sierra) and installed a growing number of filters at the plant itself. The dispute came to a head in 1924-25, and as a short-term solution one of the furnances at Oroya was shut down in mid-1924, cutting output and exports for 1924 and 1925.

Quantitative Evaluation

Quantitative data on the operations of Cerro in Peru are available in detail only from 1916 on. Prior to that date, only the roughest of estimates can be made of the income earned and outlays made. The evaluation which follows is therefore divided into two stages. In the first stage the years 1916-1937 are analysed in detail, assuming that both Cerro and counterfactual firms existed only from 1915; this is equivalent to an analysis of the income effects of a costless expropriation taking place in 1915. In the second stage of the evaluation, an attempt is made to estimate the income effects generated by Cerro in its early years (particularly 1901-1906 when the firm brought in huge sums of foreign capital) and these earlier estimates are integrated with the figures from 1916-1937, in order to derive an overall picture of the results of Cerro's first 35 years in Peru.

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1. See López Aliaga, 'La Fundición de La Oroya' in Vida Agrícola 1924; Bravo, 'Informe sobre los Humos de la Oroya' in B.C.I.M. No. 108; and Laite, pp. 8 ff.

Tables V.2 and V.3 provide most of the data for the first stage of the analysis. In Table V.2 appear estimates of the income to Cerro from exports of metals, earnings of the railway, and capital gains on its mineral properties. Income from the Corporation's livestock section is not included.

The figures in Table V.3 show total outlays by Cerro within the Peruvian economy for the years 1922-1937. These figures were prepared and issued at various times by the local office of the Corporation, and cover the consolidated total costs of local operations, including investments. They are therefore equivalent to the balance-of-payments contribution, or returned value, of Cerro (although some correction should be made to allow for second-round balance-of-payments leakages, particularly repatriated earnings of the Central Railway). What is immediately striking is the relatively high proportion of earnings represented by this returned value: over 50%, compared with the IPC's 17%, and the 30-40% level found by Reynolds in the case of the Gran Minería in Chile at the same time.[1] Corresponding to this rather high returned value was a level of profitability considerably below that of the IPC, although still sufficient to make Cerro one of the world's most profitable copper producers.[2]

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1. Reynolds, p. 378.
2. The key to Cerro's profitability was its diversified production; the silver and gold contained in its blister copper carried the firm through recessions in the world copper market, and kept the corporation profitable even when US copper prices fell below 12 cents per pound, the minimum which any US producer could sustain. (See Leader, November 13th, 1923, p. 1.)

TABLE V.2

Income from the Peruvian Operations of Cerro, £p000

Year	(1) Exports FOB	(2) Railway earnings	(3) Total
1916	4,267[a]	61[b]	4,328
1917	4,341[a]	178[b]	4,519
1918	4,025[a]	180[b]	4,205
1919	3,566[a]	189[b]	3,755
1920	3,733	359[b]	4,092
1921	4,834	325	5,159
1922	4,401	307	4,708
1923	5,054	291	5,345
1924	3,577	353	3,930
1925	4,243	354	4,597
1926	4,298	452	4,750
1927	4,990	338[b]	5,328
1928	6,172	237[b]	6,409
1929	7,521	294[b]	7,815
1930	5,296	253[b]	5,549
1931	3,392	140[b]	3,532
1932	1,464	83[b]	1,547
1933	2,578	204[b]	2,782
1934	3,080	125[b]	3,205
1935	4,833	118[b]	4,951
1936	4,954	84[b]	5,038
1937	5,955	116[b]	6,071

a. For these years, when Backus and Johnston were exporting independently of Cerro, the shares of the two firms in Callao exports of copper bars have been assumed equal to their shares of export duties paid on copper-bar exports, as reported in B.C.I.H. No 86, pp.174-175 and No 95, pp.272-273.

b. Estimated as 70% of consolidated miscellaneous earnings of Cerro, on the basis of the average for 1921-1927, the only period for which the Corporation's accounts showed railway earnings separately from other earnings.

Sources: Column 1 from Estadistica del Comercio Especial, figures for exports through Callao of the metals produced by Cerro. 1916-1923 adjusted for exchange error.

Column 2 from Cerro de Pasco Copper Corporation, Annual Report and Balance Sheet, 1916-1937.

TABLE V3

Local Expenditures by Cerro de Pasco Copper Corporation

£p000

Year	Wages and Salaries	Central Railway freight	Peruvian Steamship Co freight, plus wharf charges	Purchases of local wood, cement, etc.	Purchases of ores from independent mines	Payments to Government sector	Purchases of property	Total local outlays	Earnings of Cerro	Outlays as a % of earnings
1922	963	248	30	182[b]	562	127	(b)	2,111	4,708	45
1923	1,135	369	101	17	516	210	4	2,352	5,345	44
1924	1,012	329	99	24	420	210	160	2,254	3,930	57
1925	985	326	85	13	702	240	78	2,429	4,597	53
1926	1,208	497	126	20	674	255	480	3,260	4,750	69
1927	1,449	624	142	62	683	275	59	3,295	5,328	62
1928	1,491	623	122	41	844	302	37	3,461	6,409	54
1929	1,724	627	76	29	742	413	70	3,682	7,815	47
1930	1,866	648	61[a]	34	228	329	74	3,240	5,549	58
1931	1,619	545	19	50	63	198	8	2,502	3,532	71
1932	996	263	10	9	20	99	1	1,399	1,547	90
1933	848	335	10	9	94	106	6	1,408	2,782	51
1934	967	386	20	25	101	137	2	1,639	3,205	51
1935	1,297	400	25	30	157	294	30	2,233	4,951	45
1936	1,544	543	102	62	309	394	36	2,990	5,038	59
1937	1,666	525	53	51	681	549	24	3,549	6,071	58

a. Cerro ceased using the Peruvian Steamship Company in 1929; from 1930 on this column represents wharfage charges only.
b. Included in purchases of local materials.

Sources: Figures prepared by the Lima office of Cerro for company use, but occasionally released for publication, in the following:
1922 from Fernandez, 'Los Humos de la Fundición de la Oroya' in B.O.M.P. No. 3, 1923, p. 9.
1923-1931 from Alvarez Calderon, El Problema de la Plata y el Convenio de Londres p. 92.
1932-1937 from Hohagen, 'La Minería en el Perú 1937' in B.C.I.M. No. 122, p. 262A.
Earnings from Table V2.

Note: Totals may not all add exactly, due to rounding.

As may be gathered from the returned value figures, the question whether Peru gained or lost, on balance, from the presence of Cerro is much less clear-cut than was the case with the IPC. Appendix F, using the data from Tables V.2 and V.3, constructs estimates of the sums repatriated by Cerro over the period 1922-1937, and by use of material drawn from the annual reports of the corporation, extends the series back to 1916. With the exceptions of the Depression years 1930-1934, and the years 1926-1927 (when heavy investments in Peru cut back repatriated profits), Cerro was a very profitable enterprise throughout this period. The figures appear in Table V.4, and show that in 10 of the 22 years covered, repatriated earnings were more than 15% of net capital, while in over half the years (12 or 15 years, depending which estimate of D-I is adopted) repatriated earnings exceeded 12% of capital. For the US investors in Cerro, the return on their original capital was far higher than this.

If, as was suggested in the previous chapter, the correct accounting rate of interest for Peru in the 1920's lay somewhere between 5% and 10%, then it is quickly obvious from Table V.4 that Peru would have reaped substantial net advantages in the 1920's from local control of the Cerro operation, provided that the locally-controlled version had output and profits fairly similar to those of Cerro. If 1916 is taken as the starting point for simulated replacement (that is, if we assume that the counterfactual firm 'buys in' to the industry in 1915 and that this process involves no costs other than outlays equal to Cerro's net capital stock at the end of 1915) then the calculations for Alternative II replacement yield results which strongly favour such replacement by

TABLE V.4

Cerro's Repatriated Earnings (D-I) as a Percentage of Capital and Sales, 1916-37

Year	(D-I) as a % of capital		(D-I) as a % of sales	
	Low estimate	High estimate	Low estimate	High estimate
1916	20	20	42	42
1917	24	24	49	49
1918	23	23	52	52
1919	17	17	44	44
1920	19	19	49	49
1921	13	13	28	28
1922	17	18	46	51
1923	22	25	45	51
1924	9	12	27	35
1925	16	19	34	41
1926	5	9	12	22
1927	7	12	16	27
1928	19	22	35	40
1929	30	34	42	48
1930	12	17	23	32
1931	3	6	13	21
1932	0	1	0	0
1933	5	6	34	42
1934	8	10	31	40
1935	15	19	36	45
1936	7	13	16	28
1937	9	16	16	29

Source: Calculated from data in Appendix F.

comparison with retention of Cerro. For the 22 years 1916-1937, the findings are as shown in Table V.5. The net gains to Peru's national income from replacement come to a total of between £p8 million (7% of total sales) and £p61 million (56% of total sales), depending upon the assumptions used concerning the accounting rate of interest, the marginal propensity to reinvest returns on capital, and the correct estimate of imports, M (which determines the value of D-I; the high estimate of D-I is the more probable).

These figures, however, do not suffice to show that Peru would in reality have been better-off without Cerro, since they rest upon two propositions which are quite artificial: the assumption that a Peruvian-controlled industry would have been identical to Cerro, and the assumption that a replacement firm could have 'bought in' to the industry in 1915 for £p9 million. The first of these - the assumption of identical factual and counterfactual firms - can be relaxed to some extent without upsetting the general conclusion in favour of replacement. Provided that the inefficiency or other handicaps of the replacement firm, relative to Cerro, caused a 'loss' of less than $(\bar{Y}-Y)$ in Table V.5, there would still be a net gain from replacement, and the net contribution of Cerro to the Peruvian economy would remain negative for those 22 years. The key issue here, which cannot possibly be conclusively settled by any amount of juggling of precise quantitative guesses, is whether a Peruvian-owned mining industry would or would not have been substantially inferior to Cerro in either the production of copper, or the capacity to market it abroad. This issue is taken up later.

TABLE V.5

Summary Results of Application of an Alternative II Replacement Model to Cerro, 1916-1937

£p millions at 1925 prices

Total values of $(\bar{Y}-Y)$ for the 22 years, for various assumptions:

	ARI=5%		ARI=10%	
	Version A	Version B	Version A	Version B
Low est.	21.0	42.0	7.5	47.1
High est.	27.6	51.2	14.0	60.6

$(\bar{Y}-Y)$ as a percentage of total earnings of Cerro in Peru:

	ARI=5%		ARI=10%	
	Version A	Version B	Version A	Version B
Low est.	20	39	7	44
High est.	26	48	13	56

Source: Appendix F.

The second assumption used in the construction of Table V.5 is, however, more of a problem. The Alternative II model there is based solely on data for the years 1916-1937, and assumes in effect that both factual and counterfactual firms begin production in 1916 on the basis of an investment programme entirely carried out in 1915. Both firms enter 1916 with identical records (zero net income effects prior to 1916), and their performances are compared thereafter on this basis. In fact, however, Cerro had been operating in Peru since 1901; and the counterfactual firm or firms which might have existed would also have dated from that period, or from the 1890's. It is therefore important to enquire whether Cerro may not have made substantial net contributions to the Peruvian economy in earlier years, which might be sufficient to outweigh net benefits associated with replacement in the years 1916-1937.[1] The period in which there might have been important differences between Cerro and counterfactual replacement firms is easily identifiable, and corresponds to the years 1901-1906, immediately following the US takeover of the mines from their Peruvian owners. During this period Cerro brought in large sums of foreign finance and pushed ahead with an accelerated programme of development of the mines and of processing plant. The firm then settled down to a slower pace of expansion, financed out of earnings. A Peruvian firm or firms, one might suggest (this is discussed at more length below) would have reached much the same overall scale of operation by the First World War, but

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1. As Appendix F notes, this possibility is much less important in the case of the IPC, where there was no period in which the foreign firm brought in overseas finance on anything like the scale of Cerro during 1901-1906, and where the performances of factual and counterfactual firms would have been closely parallel throughout the period from 1890.

by a slower development path involving the steady reinvestment of profits and raising of finance in Lima.

Appendix F constructs a modified Alternative II model on these lines, as a means of striking some balance between Cerro's initial period in Peru and the later years from 1916 on which full figures are available. Expenditure estimates for the six years 1901-1906 are assembled, and counterfactual performance is simulated on the assumption that the investment and employment of the replacement firm would have been 75% the level achieved by Cerro during those early years, and that during the following decade 1907-1915 the counterfactual firm would have steadily caught up, reaching a true Alternative II position by 1916. Opportunity costs of factors are assumed to have averaged 75% of actual remuneration during the period 1901-1906, and all local outlays of Cerro are assumed to have been factor payments. (These last two are merely convenient working assumptions; the results are not sensitive to them). The decade 1906-1916 is filled in by a simple linear interpolation, for want of any data on Cerro's actual performance during that period.

The results obtained with this model are set out in Appendix F, Table F.11.[1] With Alternative II assumptions from 1916 on, positive values of $(\bar{Y}-Y)$ are obtained over the 37-year period for all except one of the sets of assumptions tested. The early net income contribution of Cerro in the 1901-1906 period suffices to outweigh the later outflow of repatriated profits only if the accounting rate of interest

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1. Below, p. 396.

is taken as 10%, and all net income effects are assumed to be invested and subsequent returns reinvested. In that case the initial outlay on purchases of the mines, compounded forward at 10%, carries enormous weight in the calculations. Reduction of the accounting rate of interest used to 7% suffices to turn the Version B results against Cerro again, as does a reduction of the proportion of income gains assumed to be reinvested at 10%. The results are thus sensitive to the assumptions made on these two scores. Consideration of the circumstances under which the mines were sold to Cerro indicates that realistic assumptions would yield an overall income effect for Cerro which would be zero or negative over the period 1901-1937, on the basis of the modified Alternative II model used.

The essential point is that the former mine-owners of Cerro de Pasco were not able to invest and reinvest all of their receipts from the sale of mines at 10% - or at the very least, they evidently did not do so. The Peruvian economy at the turn of the century was not characterised by an unlimited supply of high-yielding investment opportunities for free venture capital. The most lucrative non-mining activities - other primary-product export industries, and Lima financial institutions - had already been developed by well-established local enterprises which were largely self-financing, given their high level of profits at that time. New export enterprises could be established only on the basis of spare land resources; but the supply of such resources, whether in the form of irrigated land or accessible mineral deposits,

was inelastic.[1] The only export activity which was entering upon rapid expansion on the basis of free land resources was rubber-gathering in the Amazon basin, which however was so isolated from the rest of Peru at that time as to constitute a completely separate capital market (in addition to which the risks were fairly high, and the need for capital investment quite low). The best investment opportunities in Lima were already controlled by existing enterprises; and any new high-yielding project there was already assured of abundant finance. The Compañía Salinera, for example, set up by Payán in 1901 (before the Cerro de Pasco mine-owners received their payments) with a nominal capital of £p100,000, attracted no less than £p1.2 million in subscriptions immediately the shares were offered publicly.[2]

The sale of the mines at Cerro de Pasco, and the heavy foreign investment which followed, therefore did not occur in a context of capital scarcity. Rather, capital was relatively abundant and seeking new opportunities. The sale of the Cerro de Pasco mines to US interests meant the injection of an additional £p1.1 million into the local capital market over six years, at the same time as it closed off one of the most promising and rapidly-expanding areas for investment - the nascent copper industry. Neither of these events were marginal to the investment situation of the time. In a closed economy with a fixed marginal propensity to save, where the purchase of the mines would be an

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1. Expansion of the supply of natural resources accessible to new export enterprises relied upon either large 'lumpy' investments in infrastructure (roads, railways, huge irrigation projects), which were rare in the early 1900's; or upon a redistribution of resources already held by existing enterprises - such as the Negritos oilfield.
2. Basadre, Historia, Vol. 7, p. 3305.

exogenous injection of capital, such an increase on the supply side of the capital market would depress the interest rate and lead to the financing of new marginal projects offering returns below the previous cut-off level. In an open economy with a positive supply elasticity of savings with respect to the interest rate, on the other hand, the result could well be merely an increase in capitalists' consumption[1], combined with capital flight (funds placed abroad at returns regarded as competitive with those obtainable at home). (Increased capitalists' consumption, of course, would have some multiplier effects and thereby lead to an increase in aggregate savings[2]; while capital placed abroad would bring in a return, though as noted below, this would be unlikely to have reached 10% on average. There would, thus, be at least some savings-generating effects, even if none of the purchase price of the assets were directly reinvested in Peru. Such effects would not, however, have been the equivalent of direct reinvestment at 10%.)

Since the available qualitative surveys of the Peruvian economy in the 1900's make no mention of any boost to domestic investment following the dramatic injection of funds via the Cerro de Pasco mine-owners; and since a careful study of the lists of major capitalists active in the 1920's reveals only one, exceptional, case of a man who

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1. For a recent debate on similar issues in the context of foreign aid see Griffin, 'Foreign Capital, Domestic Savings and Economic Development' in B.O.U.I.E.S. May 1970; and the criticisms and defence of this article published in B.O.U.I.E.S. May 1971. (Note that the suggestion being made above is not that total savings necessarily fell as a result of foreign investment, but that they failed to rise in proportion).
2. Cf Eshag, 'Comment', pp. 150-152.

had invested and reinvested his gains from the sale of mines, and become a major figure[1], it seems likely that the effect of Cerro's entry to Peru corresponded to the second of the above patterns rather than the first. That is, the funds paid out by the US syndicate to Peruvian entrepreneurs probably went in large part towards increased consumption and overseas investment (the latter in turn probably financing such activities as the education abroad of the children of Peruvians, and the European tours which were a popular activity among those who could afford them). This being the case, it is unrealistic to assume that all the income gains attributable to Cerro in 1901-1906 were reinvested, and equally to assume that the rate of return on the funds actually invested would have been as high as 10% - much of the money, invested abroad, would probably not have fetched above 5%. If the above arguments are accepted, the implication would be that the Alternative II findings for 1901-37 which used low accounting rates of interest and low reinvestment would be the most probable. These yielded results favouring replacement of Cerro by a margin of nearly £p1 million annually on average - a substantial amount of leeway within which Alternative III inferiority could be accommodated, although considerably narrower than was found in the case of the IPC. Because of the sensitivity of precise results to the assumptions made, and the lack of data for years before 1916, the working-out of Alternative III models has not been undertaken. The really crucial question is in any case a qualitative one: would Peruvian enterprises

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1. Agustín Arias was a Spanish immigrant who made a fortune by a combination of successful mining activity and astute speculation in mineral properties. Up to at least 1930 he was the sole supplier of lime to the Cerro smelters, and also operated important silver mines in the Central Sierra. During the 1920's he moved into manufacturing and construction activities in Lima and became a leading figure in the Capital. A biographical sketch is in Pacheco, Cabezas Dirigentes.

have achieved a close approximation to Alternative II replacement if left to themselves?

Qualitative Issues

What, then, can be said about the ability or otherwise of Peruvians to develop a counterfactual copper-silver industry? From the outset it is clear that no technological barrier existed which could not have been surmounted by local enterprises. The technology of large-scale mining at high altitudes was quite well-developed in Peru by the turn of the century; and Peruvian entrepreneurs such as Fernandini, Proaño and Marcionelli[1] continued in this activity with success and high efficiency throughout the period considered. Smelting technology and metallurgical analysis were more complex (notably more complex than in Chile or Rhodesia)[2] but nevertheless not beyond local capabilities. The simplest stage of smelting, involving the conversion of copper ore into matte (containing also such metals as silver, gold, and lead) was undertaken in numerous plants in Peru both before and after the arrival of Cerro. The matte-producing smelters of Fernandini at Huaraucaca, and of the Compagnie des Mines de Huarón at San José, closed down in the 1920's not for any lack of technology, but simply because of the advantages of selling ore direct to Cerro under special contracts. Matte continued to be produced by a small-scale Peruvian firm, Juan Galliver, at Huacracocha, for sale to the Cerro smelter at Oroya.

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1. Owner of the Puquiococha mines at Morococha. For a description of this enterprise emphasizing its efficiency and technological sophistication see Leader, January 1st, 1924, Supplement, p. 32.
2. It should be pointed out that Peru enjoyed a countervailing advantage over Chile, in that the ores mined and processed up to the 1930's at least were of high grade, and consequently did not require treatment on quite the massive scale of the Chilean Gran Minería.

The second stage of smelting, involving the conversion of matte into blister copper bars containing only minor impurities and some secondary metals (mostly gold and silver) began in Peru during the first fifteen years of the century in two plants: the new Tinyahuarco smelter built by Cerro, and the older-established Casapalca plant of Backus and Johnston Mining Co.[1] The fact that the latter plant was able to expand into production of copper bars indicates that the technology involved did not require installations as massive as those at Tinyahuarco. Indeed, the fact that Backus and Johnston were able to produce blister makes it possible to say with certainty that the Tamboraque smelter of Proaño would also have been quite capable of moving into this activity, had it not been forcibly closed down as described earlier. The same could be said of Fernandini's Huaraucaca smelter, which was, by 1905, an advanced and complex establishment, with a first-rate metallurgical laboratory. Fernandini refrained from investing further in copper-bar technology because of his proximity to the Cerro plant at Tinyahuarco, which offered him a good price for his matte and made it unnecessary for Fernandini to incur the expense of an expansion programme in his own smelter.

The third stage of copper smelting - refining of the copper bars by electrolytic processes - was not undertaken in Peru until the 1940's, as Cerro preferred to send its copper bars for refining in the USA. By 1917, however, several Peruvians in a position to know were promoting the idea that Peru was capable of building a national copper refinery.

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1. The Casapalca smelter began production of blister, from a single converter, in January 1914. (Handley, 'Peru', in Supplements to US Commerce Reports, July 1915, p. 11).

The refinery lobby was led by Proaño, and the debate on the proposal at the 1917 National Mining Congress[1] reveals no fear on the part of Peruvian miners and metallurgists that the technology involved in refinery might be beyond Peruvian capability.

If technology was no barrier to Peruvian development of the copper industry, what of efficiency? The evidence on this score is not conclusive, but it does seem clear that inefficiency was not a major problem of the leading Peruvian mine-owners of the 1920's. The extremely high profits reaped by Fernandini in the Centre and the Bozas in La Libertad speak for themselves, while other operators confined to smaller scale by the more limited resources which they controlled also showed every sign of being hard-headed and efficient businessmen - Arias, Marsano, Proaño and Marcionelli were but the leading examples of this group. Most of these had sufficient entrepreneurial energy to devote themselves to a variety of activities outside mining with every sign of success. Apart from possible economies of scale, it is not clear in what ways enterprises run by these men would have fallen short of the levels of efficiency attained by Cerro.

Nor is there any evidence to suggest that access to copper markets abroad would have been a critical problem for a large Peruvian-owned mining sector. World copper markets were relatively open, particularly European markets, and numerous small-scale Peruvian mines were able to

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1. Cuerpo de Ingenieros de Minas, Anales del Congreso Nacional de la Minería, Vol. 1, pp. 201-207. Proaño's motion calling for the Government to establish a refinery at Callao was passed unanimously by the Congress after a very brief debate. Proaño, in his speech, pointed out that for the project to succeed, Cerro and Backus and Johnston would have to be forced to send their blister copper to the national refinery instead of exporting it. (Ibid., p. 203).

sell ore and matte through commercial houses without difficulty. Successive attempts to form selling cartels among the large US producing firms failed completely.[1]

Peruvian native development of the copper industry would have been dominated by a few leading firms - Fernandini and Proaño, plus some of the lesser Cerro de Pasco miners and smelters of the turn of the century. It would have involved rapid expansion of output at Morococha, as occurred in fact under the impetus of Proaño, and a somewhat delayed expansion of the industry at Cerro de Pasco, where only the Fernandini mines at Colquijirca were in a position to maintain large-scale output during the first decade of the century until the Rumihallana drainage tunnel was completed. Cerro de Pasco development would also have been slowed by the transport bottleneck, since full expansion would have been impossible until a railway was built giving access to the coast. The gestation period of these two infrastructure projects represented the waiting period which had necessarily to intervene before the mines in waterlogged areas could realise their full potential.[2] The high-pressure construction of the tunnel and the railway which followed the entry of foreign capital indicates the minimum time period which had to elapse before their completion. In the case of the railway, construction began in 1902 and was completed in

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1. See Skelton.
2. It was only waterlogged mines which passed easily into Cerro's hands in the early period. The leading independent firms of the 1910's and 1920's - Fernandini, Proaño, the French Compagnie des Mines de Huarón - were all enterprises which had had no drainage problem at the turn of the century, and whose willingness to sell was correspondingly reduced.

1904, at a total cost of $4 million (£p800,000).[1] The drainage tunnel, already under way by 1901, was pushed through with Peruvian capital, against strong opposition and physical sabotage from Cerro, and was completed by 1908 (the first mines in the waterlogged area were being drained by 1905).[2]

The prerequisite for full development of the Cerro de Pasco mines was therefore about £p1 million worth of infrastructural investment. Part of this had already been raised locally when US capital entered, but the largest project (the railway) had not got off the ground. It can be assumed that, in the absence of Cerro, the railway would have been built either by the Government or by the Peruvian Corporation.[3] A likely estimate of the delay involved would be about four years, in which case the railway would have been completed at about the same time as the drainage tunnel, in 1908.

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1. Estimates of the cost of the railway vary widely. A figure of $2 million appears in Halsey, p. 332, and also in Perú en su Centenario, p. 80. Mayer, in The Conduct of the Cerro de Pasco Mining Company, gives $3 million. Engineering and Mining Journal, January 18th, 1908, gives $6 million. The first published accounts of Cerro, in 1916, showed the railway with gross book value, including rolling stock, of $4.5 million. It seems probable that actual construction cost between $2 and $3 million, with rolling stock and other equipment accounting for $1-2 million.
2. By 1905 the avowed object of the Socavón Company capitalists was to blackmail Cerro into buying them out at a high price. Their concession entitled them to receive 20% of the gross earnings of all mines drained by the tunnel; they therefore proceeded to drain all Cerro's mines, and claim their royalty. Cerro, after attempting to avoid use of the socavón by employing pumps, was eventually obliged to buy the company for $3 million in Cerro shares. (See copy of the settlement dated January 1908, Item 41885 in FO371/508.)
3. The Peruvian Corporation refused in 1900 to build a line to Cerro de Pasco. By 1905, however, when the Corporation was embarking on a general programme of expansion of its network, this would have been logically the top priority.

Finally, it is worth re-emphasizing that scarcity of capital would not have imposed a binding long-run constraint upon the development of the counterfactual copper industry. Capital was available in Peru for the initial burst of development at Cerro de Pasco, and for the construction of the Rumihallana drainage tunnel. Various options for the financing of the Cerro de Pasco railway was also open. The difference between the factual and counterfactual situations on this score (as was discussed in the earlier quantitative analysis) was that the US capitalists entered Cerro de Pasco with virtually unlimited funds immediately available, and carried out all the pending infrastructural work in a single burst. Peruvian firms would have followed a rather slower growth path in the early years, for a number of reasons, but there is no reason to suppose that they could not have caught up with Cerro subsequently. The profits out of which investment in the expansion of individual enterprises would have been partly financed were temporarily depressed in mid-1901 by the collapse of New York copper prices (caused by the failure of an attempt by Standard Oil to create a monopoly position for itself); and it would have been a couple of years before the Peruvian Corporation moved out of the inertia which characterised it at the turn of the century and began to invest seriously in expansion of its rail network. To suggest that Peruvian mining ventures in the Central Sierra were chronically starved of capital would, however, be quite inaccurate. The scale of the resources which would have become available over time from mine profits is indicated by some examples of the incomes of those mine-owners who continued to operate their own enterprises. The La Docena mine at Cerro de Pasco, a small bonanza worked for a few years from around 1910,

yielded profits of £p1 million to Manuel Mújica and his partners.[1] Fernandini's net income from his mines at Colquijirca was £p400,000 ($1.6 million) in 1924, and £p350,000 ($1.3 million) in 1926,[2] in addition to which he drew large dividends from Vanadium Corporation of America.[3] Proaño received $500,000 annually from his Alapampa mines during the First World War, when he was being defrauded of the greater part of their earnings[4], and in the late 1920's Alapampa, although nearing exhaustion, was bringing him £p92,000 ($370,000) annually[5], in addition to income from his other mines. Had Proaño not been unfortunate in his relations with Backus and Johnston, his enterprises would undoubtedly have rivalled Fernandini's. Financial resources of this magnitude would have enabled either of these two to undertake projects comparable in scale to the Cerro smelter at La Oroya, which cost about $12 million (£p2.5 million).

All the above points indicate that the absence of Cerro from Peru would have left the field clear for Peruvian firms whose performance need not have fallen much short of Cerro's. The earlier conclusion that Cerro made no significant net contribution to Peruvian national income, and may have had some negative direct effects, thus stands. Finally, it remains to say something about dynamic factors and externalities which have not yet entered the analysis. The three most important are linkages, factor improvement, and factor displacement.

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1. Diez Canseco, '40 Años de la Minería', p. 132.
2. B.O.M.P. No. 8, pp. 143 ff; and No. 20, p. 9.
3. See Chapter 3 above, p. 105 fn.
4. Proaño, La Titulada Memoria.
5. Proaño, La Industria Minera Nacional de 1903 a 1931, Anexo 2.

(i) Linkages. Although Cerro created substantial backwards demand in certain products - particularly local cement and timber - the US firm never used Peruvian capital goods or technology. This was particularly evident in the case of the Oroya smelter, which was designed and prefabricated as a complete package in the USA with all-US equipment, even including the buildings in which the smelter was to be housed. The equipment was imported free of duty and erected by an imported force of 140 US steel erectors, with only 200 Peruvians employed on unskilled labouring tasks.[1] The benefits accruing to Peru from the construction of this smelter, either in direct payments or in terms of learning and technological development, were very slight indeed. Cerro's policy from the outset was to send in teams of skilled personnel from the USA to undertake all development work on both mines and smelters.[2] This was in marked contrast to the deliberate policy of Lizandro Proaño, who contracted his equipment from Peruvian suppliers if at all possible; the Tamboraque smelter was entirely of Peruvian construction, with equipment designed and made by the Piedra Lisa Foundry in Lima.[3] A steadily-evolving Peruvian-owned copper industry would probably have continued to obtain much of its equipment from the Peruvian capital goods industry, particularly since the capital-goods industry was

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1. West Coast Leader, May 10th, 1922, p. 1. It should be noted that Peruvians were capable of quite complicated steel erection tasks - witness the building of the Northern Peru Mining and Smelting Company's aerial tramway, and the same firm's mill and smelter installations at Shorey.
2. For example, in 1902 soon after the purchase of the mines, it was reported that 'a large party of expert silver and copper miners from (Butte, Mo) and Salt Lake City have just sailed from San Francisco to Peru, to enter the employ of A.W. MacCune and J.B. Haggin ...' (Wall Street Journal, February 7th, 1902, p. 7.)
3. Pacheco, Cabezas Dirigentes, p. 176.

concentrated in Lima with direct rail connections to the central Sierra, while competing foreign equipment had to come by sea. Continued reliance on the local capital-goods industry could have helped prevent the stagnation of that sector which occurred in fact, and might have enabled it to expand from a secure base in mining equipment into the supply of equipment for other sectors. It is perhaps worth recalling that around the turn of the century the three largest industrial activities in Central Peru were the textile industry, the smelting industry in the mining areas, and the Lima engineering industry, with the Central Railway workshops at Guadalupe as its core. Of these three major industries the first was taken over by foreign capital; the second was replaced by foreign capital; and the third (the railway workshops being already foreign-controlled, by the Peruvian Corporation, but the other plants in local hands) stagnated. A Peruvian-controlled development of the mining industry might have implied important dynamic gains from the development of equipment, skills and technology in two of these major industrial sectors. This was the most important of the possible linkages which might have been set up by a counterfactual situation.[1]

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1. Although Peruvian control of the mining industry would probably have implied a better demand situation for the domestic capital-goods sector, it cannot be said with any certainty that the sector could have remained competitive into the twentieth century without some degree of protection. The generally high weight-value ratio of capital goods provides some natural protection; but the improvement of sea transport and falling freight rates of the early twentieth century eroded this. A full analysis of the capital-goods issue would have to compare the dynamic gains from protecting the sector with the losses caused by relative inefficiency when compared with the giant enterprises of the metropolitan countries.

(ii) Factor improvement. The possible development of indigenous technology in the capital-goods industry as a result of demand from the counterfactual copper sector would have been closely linked with the technological advances achieved within that sector itself. It has already been pointed out that the entry of Cerro brought to a halt a pre-existing process of innovation and experiment in Peruvian mining and smelting. The adaptation of foreign technology to Peruvian conditions, and the evolution of locally-generated technology, were activities in which the quality of Peruvian engineers and managers would have been subject to progressive improvement; whereas in fact these advantages of 'learning by doing'[1] accrued to the managers and engineers of Cerro. The Tinyahuarco plant, for example, presented major teething troubles which were overcome only by a long process of research and development on the spot[2] - tasks carried out not by Peruvian mineralogists and metallurgists (although these certainly existed) but by US employees of Cerro sent over for the purpose. The mining industry in Peru was not only an important potential source of economic dynamism and investible surplus. Perhaps more important, it could have been the leading sector in the development of high-level technological skills within the local economy - skills which could subsequently have benefited other sectors. No attempt has been made here to measure the precise magnitude of such effects, but they should certainly not be

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1. Arrow, 'The Economic Implications of Learning by Doing' in Review of Economic Studies, 1962.
2. Cf Colley, 'Reminiscences'.

ignored in any evaluation of Cerro's impact.

(iii) Factor displacement. In an economy such as that of Peru, where active entrepreneurial and managerial talent is often said to be relatively scarce, it is clearly important to develop particularly those sectors which economise on such talent at the same time as developing it. It is ironic that export sectors, often cited as being too complex for local management, are in fact the sectors which make the most economical use of management and entrepreneurship, compared with activities such as manufacturing or finance which are relatively intricate. An export industry is typically a monoproduct sector, operating on a large scale and requiring relatively few entrepreneurial or management decisions per unit of output. In this sense, so long as there are no technological or financial barriers, such sectors are the ideal ones for efficient employment of entrepreneurs and managers. One implication of this is that local entrepreneurs may be prepared to mobilise larger sums of capital for investment in a mineral-export sector than for investment elsewhere, since the individual capitalist may wish to retain personal supervision over all projects he finances. A single entrepreneur can retain effective control over the operations of a mining and smelting operation representing an investment of £p1 million or more, as did Fernandini and Proaño; whereas a manufacturing or financial enterprise with capital half this sum or less requires more management and may have to be controlled by a group. In a country where capital had a strong tendency to be concentrated in the form of a few individual or

family fortunes, the attractiveness of activities of the former type for such capital was, obviously enough, greater than the latter type. This is not, of course, to suggest that Peruvian capitalists were unready to enter partnerships or joint-stock enterprises, since such was obviously not the case. It can, however, be argued that capital was more readily forthcoming, and in larger quantities accompanied by more entrepreneurial devotion, when the enterprise concerned was owned by a single capitalist or family.

The displacement of domestic enterprises from the copper-mining sector was therefore also a re-allocation of Peru's supply of entrepreneurial and managerial talent away from a type of activity in which that talent was efficiently employed, towards other, possibly less efficient uses. In a number of cases, the entry of Cerro probably meant the complete withdrawal from active entrepreneurial exertion of former mine-owners who found that by capitalising their expected earnings through sale they obtained sufficient capital to support them comfortably thereafter without any need to do more than place their money in securities or bank deposits. In the case of various other capitalists who continued to operate as active economic agents, the arrival of a large foreign firm provided them with an opportunity to enter into profitable partnership arrangements, whereby the foreign firm undertook the entrepreneurial functions while the local capitalist became in effect a rentier, drawing a secure income from his investments without any need to exercise his innovative or risk-taking capacities. Fernandini provides an important example of this latter tendency: a man with ample capital, rich mineral deposits, long experience, and technological

sophistication, who changed from being a leading innovative figure in Peruvian mining, to become the chief supplier of custom ores to Cerro, sheltered by long-term contracts and obliged to do no more than dig up the ore and pass it over to the nearby Cerro processing plants. Fernandini's withdrawal from Schumpeterian entrepreneurship was not total (he undertook a programme of development at the Huancavelica mercury mines from 1916 on, for example) but his ventures after 1906 had the character of dabbling rather than genuine exertion.

Summary and Conclusions

The evidence presented in this chapter has indicated that the presence of foreign capital in the metal mining sector brought no significant gains for the Peruvian economy, but did displace local capital and entrepreneurship from the sector. The decision of mine-owners to sell out to Cerro in 1901 was evidently rational from their point of view, but probably brought losses for the wider economy. Although it was not possible to measure accurately the gains and losses for Peru, there do seem to be grounds (on the basis of impressionistic evidence) for suggesting that the country would have been better-off without foreign investment in this sector, on the terms actually obtained.

The decision of the Peruvian owners of mines to sell out in 1901 can be most satisfactorily explained, as was suggested in Chapter 3, by differences between local and US capitalists in the role of risk

in their calculations. The differences between local and foreign firms in long-run productive capacity and market access were probably not very significant. The foreign firm, however, confronted a slightly shorter gestation period for the necessary infrastructural work (both because of its liquidity in 1901 and because of organisational integration), and almost certainly discounted its expected earnings much less heavily than did the local, smaller firms. A divergence in discount rates, in turn, would have made the early waiting period loom larger in the eyes of the local firms, and encouraged them to sell.

Finally, it may be worth noting that the attempt to apply sophisticated quantitative techniques to the cost-benefit analysis of Cerro's net income contribution was successful only to a limited extent, because of problems of scarce data for early years, and sensitivity to varying assumptions. More reliance is probably to be placed upon the conclusions reached by qualitative investigation than on those yielded by statistical manipulation, in this case. Both, however, point in much the same direction.

CHAPTER 6

The Peruvian Government as Bargainer and Regulator: the Case of the International Petroleum Company

In an earlier chapter it was suggested that the International Petroleum Company made no effective contribution to Peruvian development during the 1920's, partly as a result of the very lenient terms under which the company operated in Peru. This raises an interesting and important issue in the analysis of foreign direct investment: how did such a situation arise, in a country with a sovereign independent government? The issue is important, because the mere existence of a regulating government has often been adduced as a major argument in defence of the multinational firm. The case is stated clearly by one of the leading defenders of US foreign direct investment[1]:

> High profits ... are ... a function of monopoly restriction, which in turn is subject to control by host-country action .... What cannot be accepted intellectually, although it is understandable on other grounds, is the complaint that direct investment makes excessive profits, when those profits are the result of host-country action or inaction.

Foreign direct investment, according to Kindleberger's theory, occurs because certain large firms possess 'advantages'[2] which they are able to transform into monopoly rents by a process of direct foreign investment. These advantages may take the form of special products, new

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1. Kindleberger, American Business Abroad, pp. 132 and 135.
2. The advantages possessed by large integrated firms were an early subject of discussion among Marxist economists. (See Lenin, 'Imperialism, the Highest Stage of Capitalism', in Selected Works, p. 722). Contemporary debate was begun by Hymer's study, 'The International Operations of National Firms', which proposed 'advantages' as a superior explanation of foreign investment decisions.

techniques, or privileged access to certain international markets, all of which, once developed, have an opportunity cost of zero.[1] The underdeveloped country wishing to benefit from the firm's 'advantage' must pay a rent or quasi-rent, either in the form of licensing royalties, or in the form of return on direct investment by the firm concerned.[2]

In this context, the role assigned to host-country governments is clear: they seek to minimize the level of rent extracted by the firm, within the constraints imposed by their relative bargaining strength. Against the monopoly advantages of the firm, the country wields its sovereign powers of regulation. In the final analysis, if the firm's reserve price is too high, it will not be granted access to the host economy. Using the argument of 'revealed preference', all foreign direct investment actually in existence is considered to represent mutually-satisfactory bargains struck in the past; and, should current assessments change, the host country can always demand renegotiation, or expropriate the firm, or join other host countries in cartel arrangements in order to pose countervailing power against the multinationals.

Implicit in this approach to the regulation of foreign investment is a series of assumptions about the nature and objectives of host-country governments. Diaz-Alejandro has thus described the

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1. Johnson, 'The Efficiency and Welfare Implications of the International Corporation' in Kindleberger (ed) The International Corporation.
2. Further exploration of the theoretical issues is provided in Kindleberger, American Business Abroad, Chapter 1; Aliber, 'A Theory of Direct Investment' in Kindleberger (ed) The International Corporation; and Caves, 'International Corporations: the Industrial Economics of Foreign Investment' in Economica, February 1971.

type of government pitted against the international firm in standard bargaining models[1]:

> a strong public sector, relatively free from narrow special interest pressures arising either nationally or from abroad, and interested in long-run development for the benefit of the whole society.

In other words, it is assumed that host-country governments bargain using a social welfare function which fairly represents national, as distinct from sectional, interest; and it is further assumed that the main component of the 'national interest', thus defined, is long-run economic development. This, of course, is only one of a number of possible theories of the State which could be applied to the analysis of host-countries, and it seems worth enquiring how accurately it reflects reality, since upon the validity of the model rests the validity of Kindleberger's defence of FDI.

It is clear from the theory of welfare economics that the determination of a social welfare function lies in the realm of politics, not of economics, and that the task of economic analysis is to clarify the consequences of adoption of a given function by the political authorities. In this chapter the bargaining/regulating performance of the Peruvian government will be studied in order to indicate the nature of the implicit social welfare function which was used as a guide for policy-making. That function, deduced using the argument of revealed preference, is then contrasted to the ideal-type SWF assumed by the theorists mentioned above.

The view that government policy goals accurately reflect real national needs, and that those goals will lead to effective regulation

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1. Diaz-Alejandro, 'Planning the Foreign Sector in Latin America', in Kindleberger (ed) The International Corporation, p. 179.

of foreign firms, rests upon a model of politics widely espoused by Western political scientists, including many working in the less developed countries. The two key propositions involved are:

i) National politics is a process of harmonizing various interests, to reach a compromise which reflects the interests of all. Society, in other words, is an arena of consensus rather than conflict, and all social and economic classes within it have a definable common interest which is discovered through politics.

ii) Political institutions are those appropriate to this process - i.e. they approximate either to the ideal model of liberal democracy, or to that of the 'philosopher king'.[1]

Insofar as the State in a host economy fits this model, and insofar as the social welfare function thus derived gives priority to efficient economic development, the bargaining objectives of the government will be those appropriate, from the economist's point of view, for the regulation of foreign direct investment. If a government is seen to be failing to apply such an 'appropriate' set of criteria in its policy-making, the economist who wishes to retain the simplifying assumption of a perfect State argues that the problem is not any lack of commitment to proper goals, but rather various weaknesses and inefficiencies in the administrative apparatus of the State. Such States, it has been said, are 'soft'[2] - that is, although

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1. Cf Plato, The Republic, Part 7, pp. 231 ff.
2. Myrdal, Asian Drama, Chapter 16; also 'The Soft State in Less Developed Countries' in Streeten (ed) Unfashionable Economics.

committed to the appropriate goals of economic policy, they are unable to realize them because of practical problems: political instability, corruption, poor knowledge or foresight, simple bureaucratic inefficiency. The policy prescription which logically follows from this is to 'harden' the State by infusions of knowledge, honesty, efficiency and stability. The State, to summarise this view, chooses its objectives correctly but fails to apply them effectively.

An alternative model of the host-country State can be posed by simply reversing the last sentence, to read: the State regulates effectively, but fails to choose the 'correct' objectives. The assumption of an identity between the de facto government and the national interest is dropped. Governments, this theory suggests, are commonly dominated by special interest groups, pursue goals selected to benefit certain sections of the community as against others, and are heavily influenced by the administrative and fiscal pressures which weigh upon the rulers in the short run. The national interest thus plays a much larger role in government rhetoric than it does in real political calculations. Elements of this approach are found scattered throughout the writings of the 'new dependency' school in Latin America. In particular, Sunkel[1] has developed a fairly sophisticated model of the forces which act upon the State in a dependent economy. Sunkel views the world capitalist system as an integrated whole, in which the most important division is between those groups

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1. Sunkel, 'Capitalismo Transnacional y Desintegración Nacional' in Trimestre Económico, April-June 1971.

which are 'integrated' into the benefits of the system, and those which are 'marginalised' from them. Within the dependent economy this is the key line of division, producing a political, social, and economic duality between two heterogeneous groups with broadly opposed interests. Control of the State power rests primarily with the classes of the integrated pole, and economic regulation is conducted in their interest. Consequently, the primary aim of economic policy is not so much to remove distortions in the economy and spread the benefits of development to all classes, as it is to maximize the fruits of dependency for the clientele beneficiaries of the system.[1]

When a government of this type confronts a multinational firm in a bargaining relationship, the situation will differ, analytically, from one involving a genuinely representative government. A government which embodies the national interest, as defined above, will have as its bargaining goal the minimizing of rents paid to the foreign firm in exchange for benefits received. The bargaining stance will include a built-in reserve price for those benefits, below which the government will not concede access to the firm; and in the course of subsequent (post-bargain) regulation, the government would be prepared to carry its protection of the national interest to the point of confiscation.[2]

A sectional-interest government, on the other hand, will adopt a different standpoint. 'National interest' may be sacrificed if, as a

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1. Bodenheimer,'Dependency and Imperialism,'pp. 10-12, states clearly the dependency theorists' approach to client elites.
2. Cf Bronfenbrenner, 'The Appeal of Confiscation' in Economic Development and Cultural Change, 1955.

result, the clientele classes benefit. Government, furthermore, may see fit to put its own interests, as perceived by the rulers themselves, ahead even of the interests of the clientele classes. Such an approach to government has immediate relevance in the Latin American context, especially during the first half of the twentieth century. Government in Peru at that time performed a number of roles, but none which necessarily committed it to use abstract 'national interest' as its guideline in regulating either domestic or foreign firms. The classes with most influence on policy-makers were those who found the presence of foreign capital generally congenial, and who were unwilling to see a full-scale breach provoked between the Peruvian State and the foreign capitalist over terms of entry for the latter. Furthermore, the nature and objectives of the State itself must be taken into account. Government in Peru existed mainly to preserve order in the Peruvian social system on the one hand, and to maintain and operate the bureaucracy and the spoils system, on the other hand. Economic development was a constant theme of successive administrations, but with 'development' conceived in terms of growing profit opportunities for the elite rather than in terms of an improvement in mass standards of living. The main developmental role of government was the provision of infrastructure by means of public works, but the criteria by which public works were evaluated included not only their general developmental impact, but also (and often more important) the question of which members of the political spoils system obtained the contracts and the consequent profits.

Thus, when the Peruvian State is observed in its bargaining relations with foreign firms, such issues as national sovereignty or the long-run development contribution of an industry are seen to be subordinate to more immediate questions: can the government enlarge its own direct share in the income accruing to the foreign firm without provoking open conflict? Can the foreign firm be manoeuvred or pressured into under-the-counter emergency financing for government? Will there be beneficial spread effects for members of the government and their political dependents? Government, in other words, was often concerned primarily with the promotion of its own interest, secondarily with promotion of the interest of the ruling classes, and only marginally with the issues which writers such as Kindleberger assume to lie at the heart of policy-making: efficient regulation of monopoly, minimisation of rents captured by foreign corporations, and so on. This is not to say that such issues were ignored; simply that the Government's bargaining aims were not always very responsive to them.

The very high profitability of the International Petroleum Company in Peru during the 1920's and 1930's, and the small size or absence of benefits accruing to the Peruvian economy as a whole, rested upon two foundations, each of which reduces to the question of the bargaining relations between the firm and the government. These were

i) The company's monopoly control of its oilfield with special tax privileges, as a result of a 1922 agreement with the government; and

ii) the company's virtual monopoly of the domestic market for petroleum products, free of either price regulation or competi-

tion.[1]

The 1922 IPC Agreement

In 1922 the Government of Peru and the International Petroleum Company of Canada (i.e. the Standard Oil Company of New Jersey) signed a formal agreement[2] fixing the terms under which the company was to operate in Peru. This agreement was the outcome of twelve years of conflict, threats, diplomatic intervention, and negotiation. It was one of the relatively few occasions in the era of classical primary-product export economies when the government of a host economy was presented with the explicit opportunity to regulate the global character of a foreign firm's operations, and to confirm or reject the acceptability of the foreign firm as a development mechanism. The Agreement of 1922 is therefore of great interest for students of present-day bargaining. It was also probably the most important single economic deal made by any

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1. The Peruvian firm of Piaggio was the only other supplier of the domestic market; as discussed below, IPC and Piaggio operated an effective price-fixing agreement until 1938.
2. The signatories, strictly speaking, were the Governments of Peru and Britain, since the latter country had undertaken the defence of the IPC in an international arbitration. The text of the agreement, however, was negotiated between Peru and the IPC with no participation on the part of the British Foreign Office, who obtained a copy only three days before the tribunal was to sit, and nearly seven weeks after the document had been signed in Lima. (Draft supplied to Foreign Office by Piesse and Sons, April 18, 1922, Item A2557 in F0371/7240/pp. 88-92. A further copy arrived April 19th, as enclosure in Grant Duff, Despatch No. 37, dated March 13th, 1922, Item A2610 in F0371/7240/pp. 93ff.) In January 1922 the Foreign Office had authorised the Minister in Lima to sign any reasonable draft the company might produce (Instructions to Duff from the Foreign Secretary, Cable No. 3(R) of January 5th, 1922, Item A112 in F0371/7240. The complete file of material on the 1922 arbitration is in this volume, paginated from 1 to 107.) A minute written in connection with these instructions had noted that 'we are merely a cloak for these people's /i.e. the IPC solicitors'/ clients' (M. Shearman, minute on Item A112 op. cit.).

Peruvian government from 1900 until the 1950's. This section looks at the terms of the Agreement, and the bargaining process out of which it arose, in order to throw some light on the theoretical issues raised in the first part of this chapter.

The 1922 Agreement has recently aroused increasing interest in the wake of the 1968 expropriation of the IPC by the new military regime which came to power in that year. The expropriation was defended by the government on the grounds that the company's special property privileges and tax exemptions, as they had been set out in the 1922 Agreement, were unjust and illegal, and that all oil exported by the firm under the agreement had been illegally extracted and should be paid for (this amounted to a different way of stating the more familiar 'excess profit' argument).[1] By 1968 there had appeared a long series of books by Peruvian authors stating the nationalist case against the 1922 Agreement[2], most of them concentrating their attack almost entirely on the legal issues involved. One recent observer remarks[3]:

> It is strange that nationalist sentiment has focussed on a legal criticism, when a critique based on economic equity might have been more to the point. Unfortunately, no one has studied closely the question of economic equity of the Award.

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1. The Government case of 1968 is stated in Petroleum in Peru - for the World to Judge. The general legal issues involved are given an excellent historical survey in Lewis, The International Petroleum Company Versus Peru. A more technical legal survey, supporting the claim of 'illegal extraction', is Furnish, 'Peruvian Domestic Law Aspects of the La Brea y Parinas Controversy' in Kentucky Law Journal, 1970. Studies of the dispute during the 1960's include Olson, The Politics of Threat and Sanction, and Chapters 6 and 7 of Pinelo, The Nationalisation of the International Petroleum Company.
2. An early summary of the case, written in the early 1930's, is Laurie Solis, La Diplomacía del Petróleo. Among numerous other summaries may be noted Ramírez Novoa, Recuperación de La Brea y Pariñas; Zimmerman Závala, La Historia Secreta del Petróleo; and Macedo Mendoza, Nacionalicemos el Petróleo!
3. Lewis, pp. 28-29.

The legal issues will here be treated very briefly, merely to put the nature of the 1910-1922 dispute into perspective.[1]

In 1826 the Peruvian Government paid off an outstanding debt by granting a title to a 'pitch mine' known as Amotape, in the northwest of the country. The terms of the grant were such as to confer outright ownership of the mine (i.e. of the subsoil) to the recipient, a provision which contravened both colonial and republican mining law in Peru, which has always been based on the premise that the subsoil is the inalienable property of the State. The legality of the Amotape grant was consequently in doubt, as was the mine's precise status in relation to the mining laws. Owners of the pitch mine title until the 1880's regarded themselves as exempt from mining law, including taxation, since theirs was an exceptional property. Government officials were divided over whether to enforce the law, and if so, how strictly. By the 1880's the owners of the Amotape title were claiming control over crude petroleum resources below the entire area of the Hacienda La Brea-Pariñas, taking advantage of ambiguity in the size and nature of the 'pitch mine' covered by the 1826 deed; and a Government resolution in 1887 recognized this escalation of the area involved from a single shallow pitch mine, to an entire oilfield covering 640 square miles.[2] This

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1. The early history of the dispute is covered in Pinelo, Chapter 1. It is not intended here to dismiss the legal aspects of the case as unimportant, since obviously the economic effects of the IPC's Agreement were a function of legal provisions, and any subsequent attempt to cancel or modify the 1922 Agreement by legislative or judicial processes necessarily required (given the nature of those processes in Peru) elaborate legal arguments rather than detailed economics. The legalistic bias in policy-oriented writing on the case is thus perfectly understandable.
2. Lewis, pp. 6-10.

oilfield, known as Negritos, was to remain the largest proven field in Peru until the mid-twentieth century.[1]

The Peruvian owner of Negritos was seeking primarily to capitalise his asset by sale, and interested a British oil speculator in the property. A necessary condition for the sale was that the legal confusion be cleared up, which Helguero (the owner) accomplished in 1888, in a compromise arranged with the Government. The full subsoil title would be recognised on condition that mining tax was paid. The amount of tax due (at Soles 30 per claim) depended upon the number of claims comprising the property, and on this issue the Government (by a decree which was technically illegal[2]) made a major concession: instead of the 41,000-odd claims of 4 hectares each which a proper measurement under the 1877 Mining Code would have revealed, the Government authorised measurement into 10 claims, with a total tax burden of Soles 300 annually (equivalent to £30). With the situation thus clarified, the oilfield was sold to the British for £18,000,

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1. Up to 1960, four other fields were proved and played some role as producers. Two were relatively small fields: the Zorritos area near Tumbes in the North, scene of Peru's first successful commercial oil enterprise in the 1870's, which remained a minor producer through the period considered by this thesis, was nationalised in 1938, and became the basis of the State-controlled Empresa Petrolera Fiscal; and the Titicaca field in Puno, in the southern Sierra, which produced intermittently during the first two decades of the twentieth century and was then abandoned for many years. Third was the Lobitos field just north of Negritos on the north coast, a larger geological structure which was brought up to full capacity production only in the 1950's with IPC participation. Lobitos was staked out by British capital (Milne and Co.) in 1901. The fourth oilfield was Aguas Calientes, a jungle producer on the Ucayali river which was discovered in the late 1920's and brought into production in 1936 by the Ganso Azul company. Of these, the only areas of importance in the context of this discussion were the two northern fields near Negritos: Zorritos and Lobitos.
2. Lewis, p. 11.

in 1889.[1] The British, in turn, sold the field in 1913 to the Standard Oil Company of New Jersey - or rather, to its subsidiary the IPC.

When the Standard Oil Company entered the Peruvian economy in 1913, it inherited with the oilfield the long history of legal dispute, and the 1888 compromise tax deal. It stepped also into the middle of renewed controversy. In 1911 the Peruvian engineer Ricardo Deustua, in a lecture in Lima, denounced the anomalous tax position of the London and Pacific Petroleum Company, the British owners of Negritos. Correct measurement of the property into 41,000 claims, he pointed out, would increase the company's tax liability from £p30 to £p125,000.[2] Deustua's rediscovery of the issue aroused immediate Government interest, both because of the obvious appeal of increasing revenues, and because of the fact that the situation of the oil industry had changed dramatically since 1888. During the intervening twenty years the industry had progressed from a minor supplier of domestic kerosene to a large-scale supplier of oil fuel for the country's railways and, increasingly, for the industry of Lima.[3] In addition, oil clearly promised to become a dynamic export

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1. Lewis, commenting on the negotiations of 1887-1889, reaches a conclusion similar to that of this chapter on the 1910-1922 period: 'There was no defence of the national interest by the government. There was no evidence, even, of weak government caving in to foreign pressure. Ironically, the reverse seems to be true: criollo opportunism to get past laws inconvenient for a Peruvian's profit from La Brea, a profit derived from a foreigner unable to use Peruvian law to stake a claim' (Lewis, p. 12).
2. Deustua's lecture was reprinted in full in the Boletín de la Sociedad Geográfica de Lima, Vol. 28, 1911, pp. 12ff. His charges were repeated in a Denuncia of December 3rd, 1914, reprinted in Ministerio de Hacienda, Arreglo y Pago de las Reclamaciones Extranjeras, pp. 209ff.
3. The Central Railway switched to oil early in the 1900's and was the largest single consumer until the 1920's. (B.C.I.M., No. 86 1917, p. 54). The swing to oil as an industrial fuel was really consolidated by high coal prices during World War I.

sector as world demand boomed and Peruvian output rose.[1] Oil was becoming big business in Peru, and the original arguments for tax exemption (high risk, need to attract capital, etc) no longer held. The Government therefore ordered an immediate re-measurement of the Negritos concession, and application of full taxation. London and Pacific resisted, and took their case to the courts; and the Government did not press the issue. (The probable reason was preoccupation with political faction-fighting in Lima as the 1912 elections approached). At this stage the case rested when Standard Oil bought up London and Pacific Petroleum.

In 1914 the new Benavides government (installed by military coup) again ordered re-measurement, which was carried out despite obstruction from the IPC,[2] and the property was then registered officially as comprising 41,614 claims.[3] Two decrees issued in 1915 ordered payment of the appropriate tax, but to no effect: the company refused, and called in the diplomatic support of the British Embassy.

Here was a case of a dynamic export industry, controlled by a foreign firm whose ownership rights were legally dubious, and whose position was one of open defiance of the host-country government. The option of expropriation was clearly open to Peru, as was that of strict application of the tax laws to force the

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1. See figures in Chapter 4., Table IV.1.
2. Pinelo, p. 22.
3. The effect of this was to increase the number of registered oil claims in Peru from 1,741 in the 1914 statistics to 43,938 in 1915. (B.C.I.M. No. 95, 1917, p. 52).

IPC to pay for its entire 41,600 claims.[1] The Government decided instead to negotiate with the company over the term of its access to Peruvian oil. A compromise was worked out and sent to Congress in December 1915. This was the subject of a long and increasingly acrimonious debate in Congress until 1918, when the whole matter was referred to international arbitration. The arbitral tribunal finally met in 1922, and as in the meantime the Government and the company had reached full agreement by secret negotiations, its only task was to rubber-stamp this agreement.

The 1922 Agreement[2] left unsettled the question of whether or not the IPC held ownership rights over the oilfield, but it did settle the issues of de facto control and of taxation. The key elements were three:

i) The IPC would retain control of the entire Negritos oil-field, thereby denying access to other prospective developers.

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1. A vital point which no commentator brings out, is the fact that at no point did effective application of the tax laws automatically imply a tax burden for the company of £p125,000. Tax was payable only on the number of claims which a firm chose to stake out. Thus in 1915 the IPC could have elected to register only the 900 or so claims which it then had in production, with a tax liability of £p2,700, and relinquish its claim to the remainder of the oilfield. This of course would have destroyed the main barrier to entry on which the IPC corporate strategy rested, by opening Negritos oil to other capitalists who might later have become competitors. Throughout the negotiations which followed, the IPC's central goal was always to assure its continued monopoly control over the field, with a minimum of obligations. It is therefore quite false to assume, as did the British Ambassador, that the 1915 decrees automatically imposed tax of £p125,000 on the IPC, or to say, as does Lewis (p. 16) that the 1915 decrees 'did create far too large a tax burden for the company', or to calculate the costs to the firm on the assumption of an unvarying 41,600 claims (as does Pinelo, p. 23) without considering the countervailing benefits of monopoly control.
2. The terms of the Agreement are set out in Pinelo, Chapter 3, pp. 53-57.

The property was to be registered as 41,614 claims.

ii) Instead of applying normal legislation, the Government would collect full mining tax on only that part of the oilfield which was being actively exploited, while the remainder would be subjected to a very low taxation. The IPC would be exempt from all other taxes except export duties, which would be frozen for fifty years at the rate prevailing at the time of the Agreement.[1]

iii) To cancel all past claims of the Government against the company, the IPC paid to the Government US$1 million in cash.

The 1922 Agreement was a major determinant of the returned value from the IPC during the 1920's and 1930's. From the tables given in Appendix B, the following totals may be extracted for the ten years following the 1922 Agreement, 1922 to 1931 inclusive.

	Million £p
Total value of IPC sales	76.3
Total payments to Peruvian factors of production	10.8
Wages and salaries	4.9
Payments to Government	4.5
Miscellaneous	1.4

Returned value thus averaged about 14.2% of the value of sales during the period. The obvious comparison to make, is with the returns which might have accrued had the IPC carried out the same

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1. The rate, Soles 3.50 per metric ton of crude, was fixed in Law 4498, promulgated on March 1st, 1922, the day before the Agreement was signed. (West Coast Leader, March 1, 1922, p.15).

operation under the tax provisions of the new Petroleum Law which was passed in the same year as the IPC Agreement, 1922, to regulate the operations of other oil producers in the economy. In Table VI.1 are presented hypothetical figures showing the revenues which the IPC would have yielded under that law.[1] According to those figures, the actual revenue yielded during the ten years following the Agreement was only half the revenue which would have resulted from the same operation under the 1922 law. On this basis, the 'loss' to the Government alone as a result of the Agreement was in the vicinity of £p 5 million over ten years ($ 20 million at exchange of $ 4 = £p1). This amount, equal to 8% of the value of oil exports from IPC, would by itself have boosted returned value to over 25%.

In addition to the effect of the Agreement on Government revenues, its effect on the structure and development of the oil industry needs to be taken into account. As has been noted, the central aim of the IPC was to maintain control over the entire Negritos oilfield. Of the 41,600 claims held by the company, only some 1,000 were in actual production at any one time during the 1920's, while 98% of the area was held out of production as reserves.[2] These reserves fulfilled

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1. These figures have been constructed on the assumption that output on Negritos field would have been the same under full taxation as it was i fact. This seems the most probable outcome, despite Lewis' suggestion 26, on the basis of a dubious inference from the performance of Lobitos under the full tax laws) that the low taxes boosted IPC output. The de erminant of IPC's output in Peru was not so much the details of its tax tion, as the degree of security enjoyed by the firm, and the demands of the parent company for supplies of crude from intra-firm sources. Once the issue of security had been settled (which it would have been equall by full application of the tax laws), corporate strategy became the sol determinant of output. It is conceivable that there may have existed a possible threshold level of taxation at which the firm would have felt induced to run down its Peruvian operations; but considering the level profits which the IPC would have earned even under full taxation, it is quite implausible that this would have been a factor in this hypothetic situation. It is worth noting that output was in fact run down in the 1930's in response to corporate strategy, despite continuing low taxes.

2. This figure of course somewhat overstates the reserves, since not a the non-producing area was necessarily petroleum-bearing. Most of it, however, was potentially productive.

TABLE VI.1

Hypothetical Revenue from IPC under the 1922 Petroleum Law

1922-1931

Year	Import and export duty £p000	Surface tax £p000	10% of crude output 000 tons	Value of 10% royalty £p000	Total hypothetical revenue £p000	Actual revenue £p000
1922	233	5	57.8	289	527	480[a]
1923	236	5	61.2	306	547	264
1924	299	5	85.5	428	732	371
1925	343	5	98.4	492	840	356
1926	444	5	114.6	573	1,022	478
1927	447	5	102.9	515	967	428
1928	521	5	126.1	631	1,157	567
1929	497	5	143.3	717	1,219	682[b]
1930	515	5	129.9	649	1,169	533
1931	553	5	101.9	509	1,067	572
TOTAL	4,088	50	1,021.6	5,109	9,247	4,731

a. Including £1 million paid for 1922 Agreement.
b. Including £600,000 'donation' paid for 1929 contract (see below, p.250).

Sources: Import and export duties are those actually paid, from Appendix B
Surface tax calculated at £p1 per claim on 40,614 idle claims, and £p0.0.50 per claim on 1,000 claims in production.
Royalty value calculated using a price of £p5 per ton for crude, equal to the official price during most of the 1920's (1925-26 prices were slightly higher and 1930-31 prices slightly lower).
Actual revenue series from Appendix B.
Output figures on which the royalties are calculated are from Hohagen, 'La Industria Minera en el Perú 1937', in B.C.I.M. No 122, p.262A.

the dual function of assuring future supplies for the firm, while excluding other firms from drilling on the Negritos field. Had there been no other firms interested in developing Peruvian oil, this latter point would have represented no loss to the economy. Insofar as competing foreign or domestic firms were prevented from establishing themselves in the oil industry, the losses resulting from this barrier to entry need to be taken into account, as was indicated in Chapter 4.

In fact, the decade following the end of the 1914-18 war in Europe was the high point of both international and Peruvian interest in Peruvian oil. Peru until 1924 was the largest producer in South America[1] and ranked ninth among the world's petroleum producers (with around 1% of total output).[2] The strategic value

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1. The following figures for South American oil output were prepared for the American Petroleum Institute in New York and published in Petroleum Facts and Figures, 5th edition, 1937:

Year	Peru	Colombia	Venezuela	Argentina	Ecuador	Trinidad
1910	1.3	-	-	-	-	0.1
1920	2.8	-	0.5	1.7	0.1	2.1
1921	3.7	0.1	1.4	2.0	0.1	2.4
1922	5.3	0.3	2.2	2.9	0.1	2.4
1923	5.7	0.4	4.2	3.4	0.1	3.1
1924	8.4	0.4	9.0	4.6	0.1	4.1
1925	9.2	1.0	19.7	6.3	0.2	4.4
1926	10.8	6.4	36.9	7.9	0.2	5.0
1927	10.1	15.0	63.1	8.6	0.5	5.4
1928	12.0	19.9	105.7	9.1	1.1	7.7
1929	13.4	20.4	137.5	9.4	1.4	8.7
1930	12.4	20.3	136.7	9.0	1.6	9.4

Figures are for millions of barrels of 42 US gallons.

2. From figures in Petroleum Facts and Figures, pp. 56-57. Peru was the tenth-largest producer in 1900, had risen to ninth by 1910 and held this position until the 1930's. The country's proportion of world output was 0.4% in 1910, 0.4% in 1920, 0.9% in 1925, 0.9% in 1930, and 1.0% in 1936.

of its major fields was greatly increased by their location on the Pacific coast (the only large West Coast producer south of the USA). In addition to the known coastal fields, there were widespread indications of oil in the huge jungle area east of the Andes[1], and hopes for the future development of the Titicaca oilfield in Puno. Elsewhere in the country scattered seepages attracted prospectors.

Immediately after the war, the large European and US companies began manoeuvring for advantages in Peru. A stream of representatives from Royal Dutch Shell, British Controlled Oilfields, Sinclair Oil, Lewis Emery, and International Petroleum Company passed through Lima, in 1920, to negotiate with the Government[2]. Later in the 1920's

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1. The full exploration and development of the jungle oilfields is only now being undertaken, revealing what may be the largest reserves in Latin America.
2. A report on the arrival of foreign firms seeking concessions appeared in the Leader, April 4, 1920, p. 16. The activities of the British firms aroused the anxieties of the US State Department as papers in Decimal File 823.6363 indicate. (A summary of US diplomatic papers on the issue is in Pinelo, pp. 46-50). The British Foreign Office provided some limited assistance to Shell, British Controlled, and Anglo-Person in their negotiations in Peru; see 1920 diplomatic correspondence beginning with Item A1468 and concluding with A2060, in F0371/4545. Especially instructions to Rennie (the Minister in Lima) in Cypher Cable No. 18, of March 26, 1920, Item A1468. These papers are paginated 1-25.

came a renewed bid by Shell and exploration by Phillips Petroleum[1]. This strong foreign interest, and the boom of petroleum exports and profits, also attracted increasing numbers of Peruvians, a trend which was accentuated by the decline of profits in sugar and cotton in the mid 1920's. In early 1920 reports in the Lima press[2] noted

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1. A Royal Dutch Shell subsidiary came to Peru in 1924 and took options on large numbers of oil claims held by Peruvians in the north. Company geologists carried out preliminary surveys of areas in the Sechura desert, and a Peruvian subsidiary was formed in January 1925. (Leader, February 3rd, 1925, p. 1). Shell, however, abruptly abandoned the project in June, alleging adverse geological reports, after spending about £p100,000. (Leader, June 23rd, 1925, p. 36). Shell's reasons for departure included also a secret agreement with Standard Oil, granting concessions elsewhere in exchange for Shell withdrawal from Peru. (See Despatch No. 399 from Miles Poindexter, US Ambassador in Lima, to US Secretary of State, June 29th, 1925, D.F. 823.6363/78, on which a surmise to this effect is approved with a large tick. Microfilm M746 Roll 26 Frame 848). Following the Shell debacle, the Government declared a national petroleum reserve in the North and made a contract with Phillips Petroleum for its exploration. Phillips carried out fruitless studies during 1927 and 1928, and withdrew in November 1928. (Leader, August 2nd, 1928, p. 1; January 10th, 1928, p. 28; July 31st, 1928, p. 1, and November 27th, 1928, p. 3. See also Norman, 'El Petróleo en el Perú', p. 282).

Interest in jungle concessions continued throughout the 1920's. Standard Oil geologists were active throughout the decade from a base in Iquitos (Leader, April 6th, 1926, p. 4; September 21st, 1926, Supplement p. 1; also Huntley, L.G., 'Northeastern Peru - the Next Oil Field in South America' in National Petroleum News 1928, reprinted in Leader, November 6th, 1928, pp. 20-21.) In connection with the 'Lee Concession' to build a railway to the Marañon, various US and British oil companies were also involved in the hope of finding oil in the area of the concession: Benedum and Trees of Pittsburgh in 1928 and 1930 (Leader, September 18th, 1928, p. 6 and July 1st, 1930, p. 2); and British Mexican Petroleum Co. in 1929 (Leader, May 21st, 1929, p. 6). A full history of the Marañon concession is 'The Pacific-Amazon Railroad' in Leader, February 4th, 1930, Supplement, pp. 5ff.

2. E.g. article from La Prensa reprinted in Leader, April 8th, 1920, p. 16.

the formation of a Peruvian company to search for oil in Parinocochas (in the montaña), and the prospecting (by Government engineers) of President Leguía's Hacienda Plateros near Tumbes in the north. The promulgation of the 1922 Petroleum Law, which reopened the north coast to claim-stakers after a ten-year moratorium[1] was followed by a rush of Peruvians eager to obtain a foothold in the country's main oil region. In 1922, with the moratorium still in force, the Padrón de Minas (claims register) showed 43,051 claims registered in the north coast region. In 1922-23 the administration was swamped with new claims and when the situation stabilised in 1924, there were 206,824 oil claims registered in the North, an increase of 400% in roughly two years of activity.[2] Not all the new claims were registered by Peruvians: Lobitos Oilfields and the IPC both took out substantial exploration concessions under the new law.[3] The list, however, was dominated by the names of Peruvians already active in other fields of economic endeavour: Alfonso Benavides, Victor L. Criado, Manuel C. Gallagher, Alfredo Alvarez Calderón, Alfredo Solf y Muro, Julio Gallese, Severino Marcionelli, Guillermo Gastañeta, Edmundo de Habich, Ricardo Barreda, Demetrio Olavegoya, Roberto Thorndike, and Miguel Checa, to name but a few.[4]

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1. Registration of new claims on the north coast was halted by decree of September 2nd,1910, until such time as a catastral survey of the area was completed. The Government was evidently worried about the possibility of overlapping and conflicting claims, and may also have intended at that time to establish a State oil reserve. (Leon Kay article on oil legislation, in Leader, April 22nd, 1924, p. 27.)
2. Figures based on the Padrón lists were published in the annual mining statistics in B.C.I.M. and B.O.M.P.
3. Jochamowitz, 'El Problema Petrolífera en el Perú' in B.C.I.M. No. 125, 1939, pp. 30-33. The IPC registered an additional 49,897 claims under the 1922 law, in various areas of the North, and drilled 22 wells at a cost of over £p50,000, without striking traces of oil. Lobitos Oilfields also drilled several unsuccessful wells on new claims.
4. Names drawn from the lists published in B.O.M.P. No. 7 (1924) pp. 90-95; and No. 12 (1926) pp. 34-61.

Not all of these Peruvians planned to undertake, unaided, the task of exploring and developing their concessions. The great majority probably hoped to use their holdings for either joint ventures with, or sale to, large foreign firms. (The Royal Dutch Shell venture of 1925[1] was based upon these Peruvian-held claims.) Some Peruvians, however, were seriously interested in developing their oil lands. One such was Carlos Cillóniz, one of the Cañete cotton kings. Cillóniz' imagaination was fired when an artesian well drilled for irrigation purposes on his hacienda produced traces of petroleum.[2] He took up a number of claims in the North, obtained a drilling rig, and began sinking wildcat wells. Luck, however, was not with him, and he finally abandoned the attempt after completing three exploration wells.[3] Another Peruvian group in 1924 was interested in a joint venture with the German Stinnes interests, whose agents in Peru were Gildemeister and Co. In connection with this project a block of 65,000 claims near Piura was registered by Carlos Ortíz de Zevallos[4], and a very speculative 4,000-claim concession was taken along the coast between Callao and Ancón by a group headed by Roberto Thorndike.[5] Both concessions were prospected by a German

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1. See Note 1, p. 214.
2. Broggi, 'Posibilidades Petroleras en la Faja Costañera Lima-Ica', in Sintesis de la Minería Peruana en el Centenario de Ayacucho, Vol. 2.
3. Jochamowitz, p. 30. Wildcatting, it may be noted, was still at that time the normal means of exploration in the northern desert. IPC drilling crews, operating in three different locations at the same time as Cillóniz, had an even worse run of failures. See Note 3, p. 215.
4. Leader, January 7, 1924, p. 3 of Supplement.
5. Ibid., May 6, 1924, p.1.

geologist sent over for the purpose.

None of these various projects bore fruit, primarily because no new oilfields remained to be discovered on the coast. The only basis on which the Cillóniz or Gildemeister schemes might have borne fruit, would have been access to a known oil-bearing zone where the risks involved in exploration and development would have been lower. Specifically, this would have been possible if parts of the Negritos oilfield had been available for these new enterprises.[1] The IPC's monopoly of Negritos thus prevented the growth of domestic oil companies, which (hypothetically) might have used capital derived from the coastal fields to develop elsewhere. At the very least, the returned value accruing from the industry under conditions of partly-national control would have been increased, and more competition might have had some effect on domestic oil prices.

In addition to preventing the establishment of new Peruvian enterprises, the closure of Negritos to Peruvians prevented the expansion of an existing Peruvian enterprise, the Piaggio company which worked the Zorritos oilfield. The potential benefits to Peru from expansion by Piaggio would have been even greater than those derived from the establishment of new companies, since this was a long-established functioning enterprise possessing expertise in the exploration and drilling stages, plus the knowledge and technology derived from a forty-year history of successful refining. The company was rather moribund in the early 1920's, both because of the

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1. At the time of negotiations for the 1922 Agreement, of course, the Government was probably unaware of the real scarcity of oil resources on the north coast, and might well have calculated that further development would take place through new discoveries. The convenience of basing such exploration on initial access to already-known reserves must, however, have been obvious even at that stage.

advancing age of its founder-owner[1], and because of the limitations imposed on expansion by the smallness of the geological structure on which it was based. With access to other fields, assisted perhaps by Government encouragement and some partnership arrangement with the other capitalists mentioned above in order to raise capital, the Piaggio company could have taken over a large part of the domestic market from the IPC, and provided the basis for a nationally-owned oil exporting industry.

Finally in this survey of the implications of the 1922 Agreement, it should be noted that the structure of taxes agreed for the IPC ran directly counter to the tax policy then generally accepted in Latin America. The 1922 Petroleum Law, like its Mexican and Venezuelan predecessors, imposed surface taxation according to a scale which discriminated against idle claims. The old tax of £p3 per claim on a flat-rate basis was replaced by a sliding scale from £p1 per claim for idle areas down to £p0.0.50 per claim for areas in full production. Unworked claims, thus,were taxed twenty times more heavily than worked ones. The IPC's agreement gave it the opposite status: producing claims were subject to a tax rate (£p3) thirty times higher than that for idle claims (£p0.1.00). This was virtually a charter for the IPC to hold large areas out of production, and must have materially encouraged the company in its policy of piecemeal development of the Negritos oilfield.[2]

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1. Faustino G. Piaggio died in Lima in 1924, (Leader, February 19th 1924, p. 2). He had migrated to Peru in 1862. (Peru Today December 1913, p. 1083).
2. B.O.M.P. No. 9. (1925) p. 36 points out that it was the deliberate policy of the IPC to work the field below capacity, 'conserving supplies of crude ... until a better time, when market conditions should justify extractions on a larger scale ...'. This was at a time of spectacularly high prices and world supply shortages. (Cf Penrose, The Large International Firm in Developing Countries).

In Chapter 4 it was shown that Peru was not demonstrably made better-off by the presence of IPC, and could be argued to have suffered a net loss by comparison with reasonable alternative possibilities. The points just covered suggest that the 1922 Agreement played a central role in causing that loss. The Agreement was not accepted simply for lack of alternatives; a different foreign firm, admitted to Peru on condition that it abided by the normal tax laws, or a national firm (owned by Peruvians or the Government or both) of sufficient size to supply the domestic market (and if possible to export as well) would have shown better results. Either would have been perfectly feasible in the conditions of 1922.

The 1922 deal was inimical to Peru's development. It reduced effective foreign-exchange earnings, long-run government revenue, backward and forward linkages greatly below levels which were feasible in the 1920's.[1] Why then did the Government ever close the deal? There appear to be two possible answers, as outlined in the first section of this chapter: either the Government, although sincerely committed to development goals, was an incompetent bargainer, or it had different objectives. In what follows, it is suggested that incompetence

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1. It might be argued that the Agreement, by settling Peru's only major outstanding disagreement with US capital, was a vital element in permitting the huge expansion of US private lending to Peru in the mid-late 1920's. It seems probable, however, that any Government act which imposed a firm conclusion to the controversy, and thereby removed uncertainty, would have been compatible with the later US loans so long as the State Department did not choose to apply a veto on US lending to Peru (e.g. in the case of Peruvian confiscation of the company). The State Department, as noted elsewhere, was not entirely enthusiastic about the IPC's case against Peru, and would probably have been quite prepared to countenance action by the Peruvian Government much firmer than that which was in fact taken. The only US loan which was clearly directly dependent on the Agreement was the 1922 Petroleum Loan, of £2.5 million, all of which was used to pay off the Government's deficit in connection with the unproductive Centenary jamboree of 1921. See below, p.237.

fails to provide a convincing answer, and the bargaining process itself is then scrutinised for evidence on what the Government was really doing.

An explanation based on incompetence would have to show that the Government suffered from very imperfect knowledge, or that it miscalculated the real options which were open to it. To begin with imperfect knowledge, it might be argued that the Government failed to understand properly the issues which were at stake. This is most implausible, if only because of the clarity with which both sides in the dispute set out their positions at several points during the negotiations, and in the final settlement in 1922. The issues of control and taxation were always given prominence in the discussions, and the IPC left the Government in no doubt as to its essential goals. It is also unlikely because of the intensity of the public debate in which the entire Peruvian political elite participated for four years, from 1915 to 1918, during which every facet of the question was exhaustively scrutinised and various options canvassed.[1] This debate was inspired by a draft agreement presented to Congress in December 1915 which in all essentials was indistinguishable from the final 1922 version.[2]

Ignorance of the issues involved in the regulation of oil companies is also ruled out by the fact that at the same time as the

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1. Various accounts of the debate are available. A good summary of the positions adopted is in Basadre, Historia de la República, pp. 3885 ff. See also Laurie Solis, pp. 121-149; Pinelo, pp. 28-37; Lewis, pp. 17-20.
2. The only change of substance in the 1922 version was a scale of taxes still more favourable to the IPC than that proposed in 1915: more favourable, indeed, than a Senate project of 1917 which the IPC had accepted in principle (Laurie Solis, pp. 175-6).

Government was negotiating the final deal with the IPC, in 1920-21, it was simultaneously drafting a new Petroleum Law precisely for the purpose of regulating oil companies. The new law was promulgated on January 2nd, 1922[1] and its Reglamento was issued in September of that year.[2] The Government's agreement with the IPC, signed on March 2nd and rubber-stamped by the arbitral tribunal on April 24th, 1922[3], was explicitly designed to exempt the IPC from the provisions of this law; the Government, thus, was hardly ignorant of the terms which it might have imposed on the IPC. Those terms, furthermore, would have been no more harsh than the terms already in force in two other Latin American oil countries, Mexico and Venezuela, on whose petroleum legislation the Peruvian law was modelled.[4] The law involved several features which were missing from the IPC Agreement: the obligation to develop idle concessions, on pain of forfeiture; a tax structure which reinforced this by discriminating in favour of intensively-exploited claims, and which linked revenues directly to output by means of royalty payments; and a limitation on the size of concession which could be held by any one firm. The IPC's Agreement gave it complete security of tenure with no obligation to develop,

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1. Leader, January 4, 1922, pp. 15-16.
2. Ibid., September 27th, 1922, p. 15.
3. Item A1927 filed in F0371/7240.
4. The Peruvian law, by the time it emerged from the legislative process, was in fact rather more lenient than current legislation in the other two countries. Thus even application of the full 1922 taxation to IPC would not have meant that the firm was operating in a 'high-tax' environment, by 1920's standards. The 1922 Peruvian law was generally considered reasonably lenient by industry sources. 'The rents and royalties demanded are not considered onerous as compared with requirements in other countries', reported the Foreign Office Petroleum Department (Memo No. P.D.561 of August 17, 1921, Item A6022, in F0371/5611, commenting on an early draft of the law - the final draft was further watered down.)

and a tax structure radically opposed to the recognised principles of Latin American oil taxation at the time.

Failure to perceive real bargaining options is the second possible version of the 'incompetence' argument. Here the point made above concerning the intensity of public debate on the issue again applies. The options promoted by various political groups during the debate of 1915-1918 included strict application of tax legislation (coupled with the suggestion that the IPC divest itself of part of its concession)[1]; and outright expropriation of the company, to replace it by a national firm or rival foreigners.[2] Yet not only the Government, but also the great majority of the political elite, were in agreement in regarding the compromise proposal of 1915 as an acceptable settlement in principle; the substantive amendments which Congress actually inserted during the three years of debate affected only the details, not the broad outline. 'I was struck', says Lewis[3],

> by the differences between the passion and absolutism of nationalist rhetoric and the pragmatism and apparent fairness /sic/ of their proposed solutions.

There was, thus, a wide measure of agreement over the bargaining outcome, which suggests that the compromise deal met the aims which

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1. This was the initial stance of Antonio Miró Quesada and his newspaper, El Comercio. (Lewis, p. 18).
2. In October 1918, the point of maximum tension in the dispute, both El Comercio and La Prensa (the leading Lima dailies) called for expropriation. El Comercio of October 25th, 1918 called for the establishment of a State company to take over the oilfields; and La Prensa on October 26th presented an alternative proposal calling for the oilfields to be thrown open to Peruvian capitalists. (Based on a cable of September 27th, 1918 from Benton McMillin to Secretary of State, D.F. 823.6363 /11; Microfilm M746 Roll 25.)
3. Lewis, p. 18.

government had set itself. Yet everyone, including Government, possessed the necessary information to have enabled them to calculate (had they been genuine nationalists), that the compromise was an inferior option when compared with other possibilities.[1] Once more, it is clear that the key lies in bargaining aims rather than performance.

Finally it is interesting that the negotiations from 1915 to 1922 were conducted by two successive administrations: that of José Pardo (1915-1919) and that of Augusto Leguía (1919-1930). Each of these accepted substantially the same outcome over the question of the terms to be imposed on the IPC. This is particularly interesting in view of the sharpness of the political break of 1919, in the course of which Leguía used every weapon he could find to smear the reputation of Pardo and the Civilista Party - yet at no point did he accuse Pardo of a sellout on the IPC issue, nor modify the previous administration's approach to the problem in any way.

If now we rule out, on the grounds just given, the possibility that the Government, as a result of poor knowledge or incorrect calculation, accepted an absurd contract by mistake, we are forced to ask why the 1922 Agreement happened. The usual answer given at the time

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1. It might be argued that Government really believed the IPC to be facing economic hardship in the event that full taxation was applied to the firm. I.e. that Pardo and Leguía were taken in by the cries of anguish emitted by the IPC's managers at the mention of taxation. It is, however, unlikely that the negotiators were unaware of the real profitability of the IPC operation. IPC reports, setting out dividends, were available in Peru and were periodically remarked on both in official publications on the oil industry, and in other authoritative Peruvian sources. Ricardo Deustua, the originator of the controversy, published in 1921 a book, El Petróleo en el Perú, which commented (p. 68) on the level of IPC profits.

was that the alternative was an IPC withdrawal, which would have been disastrous for the Peruvian economy. This argument held water only in the short-run sense that an IPC withdrawal, if done abruptly and in the absence of adequate government preparation for a Peruvian replacement, would have involved a considerable burden on the government administration and would have meant a temporary halt of oil production. In the longer run, there is no evidence that Peru would have been worse off without the IPC than with it under the 1922 terms; indeed, there are grounds for the supposing that Peru would have been better off. An alternative theory, which has more recently been popular, is that the bargaining power of the IPC was so much greater than that of the Government that no better solution was attainable.[1] The Agreement, in this view, was imposed on a helpless Peru by US imperialist might. This view does not tally with the internal evidence on the negotiating process, which shows Peru to have possessed considerable reserve power which the Government elected not to exercise against the company.

To summarise the argument which follows, the IPC obtained its deal for two related reasons:

i) Because of the integrated character of US economic penetration, and the attitude towards it of the Peruvian elite, the IPC case could not be treated, as it should have been, as an individual project. The Peruvian entrepreneurial elite and the Peruvian State, having

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1. This argument is used, for example, by Felipe Barreda y Laos, the leader of the 1918 Congress majority, to justify in retrospect the 1918 abandonment of the attempt to regulate the company. Rather weakly, Barreda claimed in 1961 that no agreement had been possible between the firm and the Government, and that only arbitration could solve the problem. Barreda suggested that in the last analysis the US might have sent Marines to Peru. (Reported in Basadre, Historia, pp. 3893-5.)

decided in principle that their future was bound up with foreign capital, could not regulate one foreign sector without repercussions in other sectors. Both the 'confidence' of US capitalists and the willingness to US bankers to lend to Peru, rested upon the security of all foreign investments, no matter how exploitative these might be. It was not until 1968 that Peru made the effort to deal with the IPC as an individual case, and even then the 'special case' argument proved extremely difficult to put across. The Peruvian elite, thus, elected not to play the role of national bourgeoisie, and this was reflected in the bargaining aims of Government.

ii) Secondly, and more important, was the fact that Government took an interest in foreign firms more as vital elements in short-run financing than in terms of long-run development of either the national economy or the public sector. Governments operated with short time horizons and under constant pressure to keep up their patronage payments. The great advantage of foreign firms was that they could open the way to foreign loans which might otherwise have been condemned as 'unsound'; that they could often provide emergency support to a government when revenue was hit by a local recession; and that they were prepared to pay large bribes. The Governments of Pardo and Leguía were not bargaining to maximise the IPC's returned value, or foreign-exchange contribution, or spread effects. They were bargaining, first, to keep the lines open to Wall Street and London; and second, to maximise their short-term financial payoff. The history of the bargaining process shows this clearly.

As mentioned earlier, the dispute began in 1911, when the fraudulent 1888 survey of Negritos was exposed and remeasurement was ordered by the first Leguía administration. Legal manoeuvres by the company kept the surveyors off until 1915, when President Benavides had the survey conducted and ordered payment of full taxes. At that point the dispute ceased to be an internal Peruvian question, and became an international issue. Imperial Oil, the Canadian subsidiary of Jersey Standard, called in the British Foreign Office to support the IPC's stand, and the British Ambassador in Lima duly delivered a Note[1] to the Peruvian Government protesting at the application of unfair taxation to the company: the Note, which was probably drafted by the IPC, 'distorted the situation in nearly every substantive reference'[2], and peremptorily demanded the withdrawal of the tax decrees.

Neither Benavides, nor President Pardo, who took office later in 1915, imposed any sanctions on the company for its defiance of

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1. The text of this Note has been widely reproduced, as a case study of British pressure on Peru. The British rather than the US Government was chosen for support because of the political unpopularity which Standard Oil still suffered in the US; it is a luxury available only to multinational companies to pick and choose among governments to decide which will best promote their interests. At the same time as this strong protest was obtained from Britain, the parent firm persuaded the US State Department to deliver a milder message through the Ambassador in Lima, asking the Government to postpone application of the tax decrees until the IPC had had time to present its case more fully. (Cable of April 12, 1915 from William H. Libby of Standard Oil to State Department, and Department's instructions to Lima: D.F.823.6363/5, M746 Roll 25.) The Ambassador presented this protest, but pointed out in his report that the IPC appeared to have been evading its legal tax liabilities. (D.F.823.6363/6, cable McMillin to Secretary of State, April 17, 1915). The State Department played no further role in the dispute until 1921.
2. Lewis, p. 16.

the law. Both Presidents, and the company itself, took it for granted that the object of the dispute was to reach a mutually-acceptable agreement which would not affect the willingness of foreigners to invest in Peru. To put it more bluntly, the Government, having chosen finally to bring the issue to a head, expected to be bought off. An agreement in principle between Pardo and the IPC took only a month or so to draft, and was sent to Congress in December 1915. This draft, differing only very marginally from that of 1922, represented the actual terms which the Government was prepared to offer the company, despite all the public fury about illegal ownership claims, US exploitation, and tax evasion. The proposed settlement, like its 1922 successor, offered to legalise the tax evasion, leave the ownership issue unchallenged, and impose no restriction on exploitation. What the Government wanted in return was cash.

To understand the sudden decision by the Government to put the screws on the IPC one has to look at the condition of Peruvian public finance in 1915. Revenues and expenditures had been on a rising curve since 1900. Revenues were £p1.5 million in 1902, £p2.5 million in 1906, and £p3.5 million in 1913.[1] Then came the war in Europe, and the upward swing of revenues was abruptly reversed. Foreign trade fell sharply, and with it went import duties.[2] In 1914 and 1915 revenues were down

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1. Extracto Estadístico 1935, p. 280. See also McQueen, Peruvian Public Finance, pp. 24-25.
2. The collapse of tariff rates also contributed to the fiscal crisis - see discussion in Chapter 7.

to around £p3 million a year, 15 or 20% below expected levels on which expenditure had been budgeted. In both years the government ran deficits of about £p80,000 despite a drastic 37% cut in spending over the course of two years. Not surprisingly, those two years saw two changes of government.

Taking power in 1915, Pardo needed, above all else, money in the Treasury with which to consolidate his administration. The key to that money was the IPC. In November 1915, as the draft of the oilfields agreement neared completion in Lima, the Standard Oil Company was at work in the US making arrangements for a loan of $15 million for the Peruvian Government. The negotiations, with the National City Bank, were conducted in the utmost secrecy and were recognised by all concerned to be the quid pro quo for an agreement on Negritos.[1] As negotiations for the loan were progressing rapidly, Pardo duly sent the oilfields draft to Congress for approval. Thereafter, however, the loan scheme ran into trouble. Attempting to pass the enabling legislation through Congress in secret, Pardo was acutely embarrassed when details were leaked to the Lima press in January 1916,[2] arousing a storm of protest. Secret negotiations with the bankers continued,[3] but

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1. Despatch from Handley (US Consul in Lima) to Secretary of State, January 17th, 1916, D.F. 823.51/114, M746 Roll 17 Frames 592-6: 'The Standard Oil interests were ... prepared to arrange with allied financial interests certain arrangements in reference to the properties of the London and Pacific Petroleum Company'. Also Ernest Rennie (British Minister in Lima) to Foreign Office, Despatch No. 7, January 18th, 1916, Item 32098 in FO371/2738, and Despatch No. 8, March 2nd, 1916, Item 75930 in Ibid. Both British and US sources indicate that in addition to an agreement on La Brea-Pariñas, IPC wanted its export duties frozen at the 1915 level (1 shilling per ton) for the term of the proposed loan.
2. Rennie Despatch No. 7 of January 18th, 1916, Item 32098 in FO371/2738. The loan was to be issued at 88, bearing 7% interest.
3. Pardo attempted to float the loan elsewhere in the USA through the Banco del Perú y Londres (Rennie Despatch No. 8 of March 2nd, 1916, Item 75930 in FO371/2738), then negotiated further with the National City Bank, and finally turned, without success, to the Guaranty Trust Company. (Letter from Oliver Bury, Managing Director of Peruvian Corporation, to Foreign Office, June 9th, 1916, Item 112268/35A in FO371/2738.)

another problem had emerged for Pardo. The British-owned Peruvian Corporation, to which Peru owed a large debt, was bringing diplomatic pressure to bear in Washington, demanding that the State Department veto any loan not earmarked for payment to the Corporation.[1]

By March 1916 Pardo had decided that the loan was a fading hope, and from that point on he ceased all attempts to get the draft oilfields agreement through Congress.[2] The loan scheme was finally

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1. The Peruvian Corporation became aware of Pardo's loan negotiations in November 1915, and immediately obtained the assistance of W.R. Grace and Co. in putting pressure on the National City Bank to earmark loan money for Peru's foreign creditors. (Letter from H.D. Yates, Secretary of Peruvian Corporation, to Foreign Office, December 31st, 1915, and enclosures, Item 488 in FO371/2738. In January the Corporation produced a hostile memorandum summarising Peru's debt history ('Peru and its Creditors', 8-page memo dated January 17th, 1916, enclosed in letter from H. D. Yates to Foreign Office, January 19th, 1916, Item 12319 in FO371/2738). This was forwarded to the US State Department with a request that pressure be applied officially to the bankers. (Note from Sir C. Spring-Rice, British Ambassador in Washington to US Secretary of State, March 1st, 1916, enclosed in his Despatch No. 215 of March 3rd, 1916, Item 51465, in Ibid.) The State Department was non-committal (see Item 68776 in Ibid., and D.F. 823.51/117, M746 Roll 17 Frames 602-13.)

2. As the British Minister remarked in 1918, 'President could have project authorised if he gave it his genuine support' (Cable Rennie to Foreign Secretary, April 24th, 1918, Item 73793 in FO371/3276). It is worth noting that the organiser and leader of congressional obstruction of the IPC agreement was Felipe Barreda, the President's cousin, and that 'there was evidence that he was in very close touch with the President'. (Rennie Despatch No. 131, December 9th, 1918, Item 12934 in FO371/3893.) One factor which reduced the urgency of the fiscal crisis in early 1916, and hence made it easier for Pardo to let the loan plans slide, was the growing stream of income to the Government from the newly-instituted system of export duties, legislated in late 1915 and effective in 1916. (US. Dept. of Commerce, Latin American Circular No. 63, reprinted in Leader, July 10th, 1920, pp. 4-5.) Another interesting outcome of the 1915 fiscal squeeze was a startling jump in the revenue derived from direct taxes, up from £p300,000 to 1915 to £p796,000 in 1916; this may reflect a drive to apply effectively the existing assessments, or may have been a result of recalculation of the tax lists. Government finances were out of trouble by mid-1916, and the IPC issue correspondingly went into mothballs. (See figures in Extracto Estadístico 1934-35, Table 197, p. 280).

killed by the State Department in July 1916.[1] The Peruvian Government had now for the moment lost interest in settling the IPC dispute, but it did not mind keeping the issue open, and debates on the 1915 draft were allowed to continue during the next three years, providing nationalist oratory with an excellent safety valve and causing growing annoyance to the company, which had no wish to be thus subjected to public scrutiny. In order to remove the case from the limelight, the company began pressure aimed to transfer the case from the Peruvian Congress to the more tranquil atmosphere of an arbitration court, where if necessary the issue could be allowed to die.[2]

Accordingly the IPC, from 1916 on, used both its own bargaining power and the support of the British Embassy in an attempt to force Pardo to act one way or another: either the draft agreement must be pushed through Congress, or the case must go to arbitration.[3] The tactics adopted were ultimately effective only when the company went to extreme lengths.

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1. Item 139749 in FO371/2738.
2. In March 1916 the British Minister reported that LeSueur, the IPC negotiator, 'had ... come to the conclusion that little confidence was to be placed in the doings of Congress and that it was quite likely that difficulties might prevent the acceptance of the ... Bill of December 7th. He would therefore propose to his superiors that, should the Bill ... fail to pass, the question be submitted to the arbitration of the Hague Tribunal'. (Rennie Despatch No. 8, March 2nd 1916, Item 75930 in FO371/2738.
3. Since Pardo had no intention of giving the IPC its agreement for nothing, the obvious outcome was arbitration. Pardo also had come to this conclusion by 1917, but preferred not to call off the Congress debate prematurely.

On the diplomatic side, the IPC proceeded with great skill. The British Ambassador in Lima was used as an agent of the company, with the acquiescence of the Foreign Office - an acquiescence due firstly to the Foreign Office's total ignorance about the case apart from information fed them by the IPC[1] and secondly to a skilful campaign of innuendo against the Pardo Government conducted by the IPC's London solicitors.[2]

On the side of direct bargaining, the IPC finally began to escalate from argument to action in 1918. The company had two oil tankers operating on the west coast at that time, to supply the Peruvian market In January one of them disappeared, allegedly requisitioned by the Canadian Government for war duties.[3] An article in the West Coast Leader pointed out that, with tanker capacity now 1,000 tons below monthly consumption (5,000 tons), an oil famine was in the offing. The motivation was left in no doubt:[4]

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1. It was not until March 1919 that the relevant Foreign Office section even became aware that the IPC was not a British company, but was owned by Standard Oil (Memo P.E.561 from Petroleum Executive to Foreign Office, March 13th 1919, Item 40477, in FO371/3893). The Foreign Office never gave much importance to the dispute, which appeared to them merely a minor tax squabble, and the British Minister in Lima encouraged them in this view, suggesting that the case had been inflated out of proportion (Rennie to Foreign Secretary, Despatch No. 131, December 9th, 1918, Item 12934 in FO371/3893.)
2. The substance of this campaign was the claim that Pardo, who was mildly pro-German on the issue of the European war, intended 'to confiscate under German influence so that this valuable oil property might ultimately pass into German hands' (Piesse and Son letter to Foreign Office, April 13th 1918, Item 66455 in FO371/3276). In early 1918, the period of the great German Western Front offensive, Foreign Office minds were unusually susceptible to such arguments. See also enclosure in Piesse and Sons letter to Foreign Office, April 16th, 1918, Item 150046 in Ibid.
3. US State Department enquiries to the Canadian Government were answered with a denial that the tanker had been requisitioned, although no public denial ever appeared. See Pinelo, p. 37.
4. 'Petroleum Famine' in Leader, January 12th, 1918, p. 1.

> The /Canadian/ ... Government had tacitly agreed to allow the IPC to maintain its two oil tankers on this coast, if thereby a favourable settlement of the oil controversy could be effected with the Peruvian Government. The increasing pressure of war necessities, and failure of the Peruvian Government to take definite action or, for that matter, to take any action at all, has removed the essential cause for the Canadian Government's forbearance in the question of the tankers.

During the first half of 1918 oil supplies ran short in Lima and prices began to rise, but Pardo was not prepared to guillotine the debate in Congress at the behest of the company, and he stalled. In June the British Ambassador was pressuring him to cut the Congress debate,[1] and in July the IPC took steps to intensify the crisis by slowing down output on the oilfields and laying off workers.[2] The oilworkers' union joined the company in pressuring Pardo to settle, and he hastily assured the company that Congress would settle the issue in its next session. This won a delay until September, when the company announced the total stoppage of work on the fields.[3] This threatened not only the supply of oil for Lima, but also the Government's revenue from export duties. In addition, the company abruptly announced that its sole remaining tanker would be sent north for repairs, thereby cutting off altogether the supply of oil to Lima.[4] In October industry and transport in Lima ground to

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1. Cable No. 151, Rennie to Foreign Secretary, June 5th, 1918, Item 100274 in FO371/3276; also Despatch No. 84 from Rennie, July 22nd, 1918, Item 150046 in Ibid.
2. Rennie Despatch No. 84, July 22nd, 1918, Item 150046 in FO371/3276.
3. Interview with LeSueur, the IPC vice president, published in El Tiempo (Lima), September 24th, 1918. Reported in cable from McMillin to US Secretary of State, September 27th, 1918, D.F. 823.6363/11.
4. Despatch No. 131, Rennie to Foreign Secretary, December 9th, 1918, Item 12934 in FO371/3893. In early October the Government ordered the IPC to load their tanker with oil for Lima (Rennie to Foreign Secretary, October 12th, 1918, Item 171617 in FO371/3276). The company complied, but then announced that the ship had developed 'mechanical difficulties' (Rennie to Foreign Secretary, October 16th, 1918, Item 173919 in FO371/3276). In mid-October the ship was reported 'laid up at Talara having her boilers overhauled'. (Leader, October 19th, 1918, p. 1.)

a halt as the last oil stocks were exhausted. One further shipment was obtained from the north,[1] but it was clear that the crunch had arrived: either the IPC had to be expropriated or intervened by the Government, or the company's demands had to be met. Both the main Lima papers argued for expropriation[2], but Pardo had long ago decided otherwise. On October 15th he called a secret meeting of Congress, at which he made a deal with the members. The Congressional debate on the IPC could proceed for a little longer; then Congress must pass, without question or modification, either the Government proposal of 1915, or a bill sending the issue to arbitration. The deputies agreed.[3]

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1. The shipment,of 3,000 tons, arrived in the second week of November and temporarily eased the crisis in Lima (Leader, November 9th, 1918, p. 1). It was obtained by Government pressure on both IPC and Lobitos Oilfields. Lobitos were refused an export licence for November unless they delivered oil to Lima. (Note from M. de Freyre, Peruvian Ambassador to Washington, to Secretary of State, October 28th, 1918, D.F. 823. 6363/12. Also Item 167846 in F0371/3276). Lobitos refused. In early November, a decree forbade any ships to load oil for export in Peruvian ports (Leader, November 2nd, 1918, p. 3), and the port at Talara was closed by the authorities, forcing a waiting tanker to sail in ballast (Leader, November 9th, 1918, p. 1). The IPC, in order to obtain permission to load 6,000 tons for export, agreed to allow the 3,000 ton shipment to Callao, but only on condition that a rapid settlement of the dispute followed. (Ibid.) The departure of the shipment led on November 12th to the reopening of Talara and the issue of an export licence to Lobitos. (Item 187781 in F0371/3276.)

2. See Note 2, p. 222.

3. Cable No. 275 from Rennie to Foreign Secretary, October 16th, 1918, Item 173919 in F0371/3276, reports this meeting. The Government claimed that to interrupt the Congress debate and force decision too quickly would appear to be yielding to company pressure; hence, there might be a brief delay until such time as pressure seemed less immediate. (Rennie Despatch No. 131, December 9th, 1918, Item 12934 in F0371/3893). The final debate began on November 19th, and its outward fury was accompanied by a series of private meetings at which the deputies were swung in favour of arbitration by the Government - i.e. were persuaded not to vote the Government's Bill through (Ibid.). The final Bill sending the issue to arbitration was 'drafted by the company's legal adviser here' (Ibid.).

Then followed a grotesque make-believe debate, in which members of Congress distinguished themselves in flights of xenophobic rhetoric, at the end of which they met on December 4th and, completely out of the blue, moved and passed through both houses, without debate, a bill passing the question to arbitration.[1] There the case rested, safely out of sight and awaiting a moment when fruitful dealing between company and government might again become possible.

From the company's point of view, the question had again become important by 1920, when potential challengers of IPC supremacy began to appear on the horizon. Of particular concern to the company were Leguía's negotiations with a Royal Dutch Shell representative in early 1920. Shell, it appeared, had helped finance Leguía's campaign for the Presidency in 1919 in the expectation of obtaining a concession covering the whole of Peru; Leguía was now unwilling to grant this, but was offering unspecified areas of the north coast.[2] IPC, with their titles still unconfirmed, sent a top executive to Lima to make counter-proposals to Leguía; the representative (McQueen) received support from the US Embassy[3], which had already received general instructions from Washington to block any large oil concessions to British firms.[4] Leguía

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1. F0371/3276/201926. Leader, December 7th, 1918, p. 1.
2. Cable from W.H. Smith to Secretary of State, March 15th, 1920,D.F. 823.6363/22. Also Confidential enclosure in Despatch No. 264 from Carlton Jackson (US Trade Commissioner in Lima) to Bureau of Foreign and Domestic Commerce, August 5th, 1920, D.F. 823.6363/32, M746 Roll 25 Frame 0557.
3. Cable from W.H. Smith to Secretary of State, April 5th, 1920, and reply dated April 12th, 1920. D.F.823.6363/23.
4. Cable from State Department to W.H. Smith, dated February 10th, 1920, D.F.823.6363/17a. This was in line with the general policy of US diplomatic support for Standard Oil against Royal Dutch Shell throughout the world at that time; see O'Connor, The Empire of Oil. For the general political climate of high drama surrounding oil diplomacy in the 1920's see Denny, We Fight for Oil.

resurrected Pardo's negotiating stance of 1915. The US Chargé reported:[1]

> The President again brought up the question of financial assistance to the country, I believe this is the bait held out to him by the British interests. ... In my judgement President feels that Peru is much pressed for capital and that his success depends on securing financial aid and therefore he is looking in several places for this aid. Whoever can come to the financial assistance of Peru at this time will gain a great commercial advantage.

The game of offer and counter-offer escalated through the first half of 1920, with Leguía neatly playing off the two sides.[2] The IPC went so far as to offer $10 million dollars in exchange for an oil monopoly covering the whole country (similar to that earlier proposed by Shell). Leguía however was deterred by the political deifficulties, 'as there are many small holders of so-called petroleum lands among the Peruvians.'[3] A limited agreement settling the La Brea-Pariñas

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1. Cable Smith to Secretary of State, March 15th, 1920, D.F. 823.6363/22.
2. Pinelo, pp. 46-52. As of early 1921 the British oil firms were endeavouring to arrange for Leguía a £600,000 8% loan secured on the Guano Revenues, to meet the expenses of the Centenary. (Cable No. 71, Grant Duff to Foreign Secretary, April 5th, 1921, Item A2658 in FO371/5608 p. 42. Also Memo P.D. Stats 142, from Petroleum Department to Foreign Office, May 10th, 1921, Item A3273 in Ibid, p. 73). No further information is available from Foreign Office sources on this particular project. It is interesting, however, that in May 1921 £720,620 of Peruvian Gold Bonds secured on the opium and salt revenues were successfully floated in London, the first successful foreign loan since 1909. The main bank involved in this issue, the Anglo-South American Bank, was at the same time actively participating in the British oil firms' negotiations with Leguía. It does not seem that the British firms obtained any tangible benefits in return, if indeed they were behind this loan, since from mid-1921 Leguía was committed to settling with the IPC.
3. Despatch No. 864 from James H. Roth (US Vice-Consul) to US Secretary of State, August 3rd, 1920, D.F. 823.6363/29. IPC also sought to improve its position by effusive praise for the new Peruvian President. 'The Government of President Leguía', McQueen told the Toronto Globe in an interview of May 22nd, 1920, 'has done much to promote prosperity and strengthened international relations ... President Leguía has surrounded himself with an extremely able Cabinet, and no administrator has enjoyed the confidence of the people to such a degree ...' (Interview reprinted in Leader, August 8th, 1920, p. 3).

issue did not emerge from these negotiations despite company hopes; the Peruvian Government was still riding a high tide of fiscal prosperity, and Leguía felt able to demand terms which deterred not only IPC but also Shell.[1] In mid-1920 IPC relations with Leguía abruptly worsened; Montavon, the Lima manager, began a bitter anti-Leguía campaign, and by mid-1921 US Military Intelligence was receiving rumours of oil money being provided to support the abortive Iquitos revolt against Leguía in August of that year.[2] The details of the manoeuvring during 1921 remain obscure, since none of the participants left any account of the process. One thing, however, is clear.

In 1921, a fiscal crisis similar to that of 1915 struck the Government. The booming foreign markets of 1919 and early 1920 had pushed revenues to record heights - £p6.3 million in 1919, £p8.4 million in 1920. 1921 revenues were back to £p7.8 million and those of 1922 were only just over £p7 million.[3] Government expectations, however, had been pushed up by the boom, and inescapable political obligations had been incurred by the new Leguía regime at the height of the prosperity of 1919-20. Expenditure was £p6.6 million in 1919, £p8.9 million in 1920, and remained at £p8.8 million in 1921 and 1922.[4]

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1. Pinelo, pp. 49-50: 'Leguía wanted a £ 25.000.000 loan, and he wanted Standard Oil of New Jersey to finance "the civic and general improvements" which he had planned for Peru ... The executives of Standard Oil well understood their predicament - the Peruvian Congress authorised the president to settle the La Brea y Pariñas controversy by international arbitration, but as of 1919 it was up to Leguía to initiate this action. He was not willing to do so unless Standard Oil was willing to underwrite his public works program. The company rejected Leguía's proposal ...' The proposed loan was to have been guaranteed by the £ 1 million annual revenues derived from IPC - i.e. was a precursor of the Petroleum Loan.
2. Despatch No. 695 from William E. Gonzales (US Ambassador in Lima) to Secretary of State, September 26th, 1921, D.F.823.00/405; M746 Roll 4.
3. Extracto Estadístico 1935 p. 280.
4. Ibid., p. 279.

The Government thus faced deficits of roughly £p 1 million in 1921 and £p 1.8 million in 1922. The chaotic state of public finances was compounded by the determination of Leguía to celebrate the Centenary of Independence, in mid-1921, with all the pomp of Imperial Rome, despite the looming economic crisis. The celebrations bankrupted the Treasury and left the government desperate for emergency finance. As if by magic, the IPC case began to move again. An arbitration protocol, which had been under desultory negotiation until mid-1921[1], was suddenly agreed and signed, including a special provision permitting the parties to the dispute to settle the issue by secret negotiation. Six months later the final deal was closed: Leguía would put the original Pardo compromise into effect, with minor modifications in the company's favour, and the IPC would pay the Government $ 1 million in cash to cancel past claims. This agreement was incorporated as the Tribunal Award of April 1922.

What, then, had all the bargaining, sanctions, blackmail, diplomacy, and propaganda been about? Not, it is clear, the precise terms of the final Agreement, so much as the price which the company would pay under the counter (so to speak) for a deal, and the desire of the Government to accept the price offered. Naturally enough, the parties approached closest to a settlement when the Government was desperate for cash and the company had cash to offer. The possibility of agreement receded when Government finances improved in 1916-20, and when the company's ability to pay up was destroyed by British intervention and Peruvian politicians in early 1916. Why had the Government

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1. Papers relating to this negotiation are in FO371/5609, paginated from 46 to 129.

not simply expropriated the company in 1918, as it clearly could have done? Because to do so would have definitively closed an option for the future which the Government wished to keep open, namely the possibility of foreign loans and assistance, to bolster up public finances in emergency, and further negotiations to line the pockets of Government negotiators.

One final important question remains: why did Government settle for such a poor deal on the revenues to be expected from the company, when a better deal was certainly feasible? The key to an answer is the point suggested earlier in this chapter: that the specific long-term tax provisions written into the Agreement were not as important in Government calculations as the immediate cash benefits to be expected from a settlement. This was a result of the time horizon within which Governments calculated. In Peru, no President and his dependents could feel certain of their future beyond the end of the Presidential term, which was five years. Pardo in late 1915 faced a term which was to end in 1919 with unpredictable elections, in which he himself was barred from standing.[1] He had, in other words, a time-horizon of some four years within which to calculate the effects of an agreement for the Government. If we assume that no considerations other than Government benefits entered his calculations, they would have looked roughly as follows in late 1915, when he was prepared to swap the IPC Agreement for a loan of £ 15 million. To make the calculation, we assume that Pardo confronts two options, firstly the deal proposed in December 1915, and second

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1. Presidential re-election was constitutionally banned in Peru until Leguía, unwilling to step down in 1924, had a constitutional amendment passed in 1923 allowing him to stand again.

the application of full taxation to the IPC, yielding a revenue increase of £p125,000 annually.[1] Assume the Government has a four-year time horizon and a discount rate of 10%.

The present value of the net benefits obtained from the two options, as perceived by the Government, would be as shown in Table VI.2. Option 1 (the proposed compromise) gives the Government net benefits roughly four times greater than Option 2 (application of full taxation). A third possible option, expropriation, whose short-run costs and benefits are very problematic, is ruled out by other factors. The model of a purely selfish government thus easily explains the decision of 1915, and leaves considerable leeway for other issues (such as the long-run damage to the economy implied by the proposal) to have entered government calculations in a subsidiary (heavily-discounted) role.

What then of Leguía in late 1921? At that time Leguía could anticipate the end of his term in 1924, giving him a time horizon (on the assumption above) of three years. In addition to the £ 1 million cash which the Agreement brought in to the Treasury, it is clear that the Agreement of 1922 was a major factor in Leguía's success in floating a £ 2.5 million Petroleum Loan in New York in July 1922.[2] Taking these elements into account, the two main options

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1. This of course assumes that the IPC continued to hold 41,600 claims. See note 1, p. 208.
2. The enabling legislation for this loan was passed through Congress on November 11th, 1921, at an advanced stage of Leguía's negotiations on the IPC question. The project revived an earlier attempt by Leguía to obtain money direct from the IPC (Note 1 , p. 236 above). This time the loan was floated through a New York banking group (Guaranty Trust and Blyth, Witter) and the entire issue was bought up on the day of issue 'owing to the increased public confidence in the capacity and seriousness of the Peruvian Government' (Leader, July 19th, 1922, p. 1.); the IPC itself may well have been the buyer. The £ 2.5 million was used not for any developmental purpose, but as a source of finance for the wasteful and non-productive Centenary celebrations of 1921.

TABLE VI.2

Policy Options Faced by Pardo in 1915

Option 1: the December, 1915 Compromise Proposal.

		000 US Dollars
(i) Benefits:	Immediate Loan revenue	15,000
	Increased IPC tax revenue[a]	100
	Total	15,100
(ii) Costs:	Loan service payments[b]	5,230
(iii) Net benefits		9,870

a. Present value of £p5,723 for four years, converted to dollars at $5 = £p1, and discounted at 10%. (£p5,723 represents the difference between previous IPC tax payments of £p30, and proposed taxation under the compromise: £p3 per claim worked (900 claims) and £p0.0.75 per idle claim (40,700 claims).

b. Assuming interest and amortisation are 10% of the amount of the loan annually - i.e. $1.5 million p.a. Payments for four years discounted at 10%.

Option 2: Application of the Full Tax Laws.

	000 US Dollars
(i) Benefits: Increased revenue[c]	2,174
(ii) Costs: Assume zero	0
(iii) Net benefits:	2,174

c. Increase of £p124,712 obtained by taxing 41,604 additional claims at £p3 per claim, converted to dollars at 5. Four years' revenues, discounted at 10%.

confronted by Leguía (again ignoring expropriation) would be as shown in Table VI.3. Once again, the 'selfish government' model explains the choice made by Leguía, although giving a lower margin than that enjoyed by Pardo. The net benefits of Option 1 prove to be £ 730,000 greater than those of Option 2.

Furthermore it should be noted that several other factors also encouraged Leguía to opt for the Agreement. In the first place, the assumption that imposition of the law on an unwilling IPC would have been costless is clearly quite unrealistic, in the light of the events of 1916-18. In the second place, Leguía could anticipate a rapid increase of exports, and hence revenues, in the event of a quick settlement of the dispute; whereas the alternative would quite possibly have entailed short-run losses on this account. In the third place, there were political (and probably personal) benefits to Leguía himself from an act which improved his government's already-warm relations with foreign capitalists. Given the climate of the time, it is most improbable that the President and his advisers emerged from the negotiations without personal benefit.[1]

This, then, is the history of how a foreign firm obtained, through negotiation with Government and by due legal process, a charter to extract super-profits at the expense of a host economy. The Peruvian Government knew what it was granting, and bargained effectively within

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1. Alberto Salomón, the Minister of Foreign Affairs and Minister of Finance (simultaneously - an interesting point) at the time of the negotiations in 1921, was later said to be an agent of the IPC (Despatch No. 73, C.H. Bentinck (British Minister in Lima) to Foreign Secretary, April 24th, 1930, Item A4124 in FO371/14252, p. 223.) Various papers in the Foreign Office file on the 1922 arbitration arrangements indicate that Salomón was personally involved in the promotion of the IPC case, and that the company regarded his presence in the Cabinet as essential to their success. See, for example, a minute on Item A5687 (draft cable from Foreign Office to Russell, the British Ambassador in Berne, dated August 10th, 1921, in FO371/5609) stating that 'Messrs Piesse are getting very anxious as there are rumours that the Peruvian Minister of Foreign Affairs is going out of office and this ought to be settled before he does.'

TABLE VI.3

Policy Options Faced by Leguía in 1921

Option 1: the 1922 Compromise Agreement

		000 US Dollars
(i) Benefits:	Immediate cash payment	1,000
	Increased revenues[a]	67
	Petroleum Loan	2,500
	Total	3,567
(ii) Costs:	Loan service payments[b]	1,513
(iii) Net benefits		2,054

a. Calculations similar to those in Table VI.2 for 1915 Option 1, except that the tax on idle claims is here £p0.1.00 and the exchange rate is $3.61 = £p1 (the 1921 average).

b. Regular service payments of $500,000 p.a., plus costs of issuing the loan ($145,000). Payments for three years discounted at 10%.

Option 2: Application of the 1922 Petroleum Law

		000 US Dollars
(i) Benefits:	Increased mining tax[c]	45
	Royalties, based on 1920 output[d]	1,304
	Total	1,349
(ii) Costs:	Assume zero	0
(iii) Net benefits		1,349

c. Increase of £p4,531 p.a., on the basis of £p0.0.50 per claim on 1,000 worked claims, and £p1 per claim on 40,614 idle claims, minus £p30 existing taxation. Three years' revenues discounted at 10%. Conversion to dollars at 3.61.

d. 1920 would have been the last year for which production statistics would be available to the negotiators. Royalties here calculated on the basis of an output of 264,000 tons of crude valued at £p5 per ton, giving revenue of £p132,000 p.a. Converted at 3.61, and discounted at 10% for three years.

the goals it set itself. The pattern was continued through the 1920's over the question of petroleum pricing, to which the remainder of this chapter is devoted.

Petroleum Price Policy

IPC's profitability rested not only upon monopoly control of Negritos and favourable taxation terms, but also upon the company's position in the Peruvian domestic market. In Appendix C are set out figures on the quantities of the four main petroleum products supplied by the two companies active in domestic sales.

The IPC was the dominant supplier in this market. During the ten years 1919 to 1928, the IPC provided 98% of domestically produced fuel oil, 76% of the kerosene, 92% of the gasoline and gasoil, and virtually all the lubricants. This, combined with a long-standing price-fixing agreement with Piaggio[1], gave the company effective control of the prices ruling in the Peruvian market, so long as those prices were not subject to Government regulation. In this comfortable monopolistic environment, the IPC succeeded throughout the period considered in maintaining prices at levels quite unconnected with the real cost structure of their Peruvian operations. The ruling prices in the Lima market are set out in Table VI.4; the main exceptions to these prices were sales under special contracts such as that with Cerro de Pasco Copper Corporation, and the Peruvian Corporation. The effect of those contracts would involve only marginal adjustments to the macro calculations made

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1. B.C.I.M. No. 24, p. 38 indicates that this agreement dated back at least to 1904.

TABLE VI.4

Prices of Petroleum Products, 1918-1934: Peru and the USA Compared.

Year	Gasoline Wholesale price, per gallon			Kerosene Wholesale price, per gallon		
	Lima		USA	Lima		USA
	Soles	US ¢	US ¢	Soles	US ¢	US ¢
1918	0.70	37	n.a.			
1919	0.70	34	24			
1920	0.68	31	28	0.39	18	n.a.
1921	0.68	25	24	0.39	14	n.a.
1922	0.66	25	23	0.52	15	n.a.
1923	n.a.	n.a.	19	n.a.	n.a.	n.a.
1924	0.65	26	17	0.48	20	13
1925	0.67	27	17	0.48	19	13
1926	0.57	21	17	0.48	18	16
1927	0.57	21	15	0.49	18	14
1928	0.57	23	15	0.49	19	14
1929	0.57	23	15	n.a.	n.a.	14
1930	0.52	18	12	n.a.	n.a.	13
1931	0.47	13	10	0.45	13	12
1932	0.42	9	10	0.41	9	11
1933	0.42	8	9	0.41	18	10
1934	0.42	10	10	n.a.	n.a.	10

Year	Fuel Oil Wholesale Price, per barrel		
	Lima		USA
	Soles	US ¢	US ¢
1920	5.3	243	n.a.
1921	5.3	191	n.a.
1922	5.3	210	n.a.
1923	n.a.	n.a.	n.a.
1924	5.3	218	138
1925	5.3	215	98
1926	5.3	197	89
1927	5.3	198	89
1928	4.8	189	78
1929	n.a.	n.a.	72
1930	n.a.	n.a.	68
1931	6.8	189	61
1932	6.8	145	59
1933	6.8	128	66
1934	n.a.	n.a.	79

(Sources on next page).

Sources: (a) Gasoline. Lima prices in soles extracted from the official statistics of the mining industry. B.C.I.M. Nos. 98, p. 69 (1918 price); 100, p. 64 (1919); 103, p. 60 (1920); 106, p. 57 (1921); 107, p. 57 (1922); 124, p. 284 (1925-34). B.O.M.P. No. 9, p. 61 (1924). Where prices are given per ton in the statistics, the conversion factor used is 357 gallons per ton, on the basis of a conversion table in B.C.I.M. No. 111, p. 228.
US figures are Tank Wagon Price, net of tax, average of '50 representative cities', prepared by the American Petroleum Institute, and reproduced in Fleming, Gasoline Prices and Competition, p. 89.

(b) Kerosene. 1920-1924 from same sources as gasoline. Subsequent sources for the Lima price series: B.O.M.P. Nos. 15, p. 55 (1925); 21, p. 78 (1926); 27, p. 33 (1927); 33, p. 36 (1928); and B.C.I.M. No. 111, p. 228 (1931-33). Conversion factor: 333 gallons per ton. US prices are Tank Wagon Price, net of tax, average of six US cities, from Petroleum Facts and Figures, 5th ed., 1937, p. 162.

(c) Fuel Oil. Lima prices from same sources as kerosene. 1920-28 are 'fuel oil' price; 1931-33 is 'Bunker C'. US Prices: Bunker C, wholesale in California in bulk, from Petroleum Facts and Figures 1937 p. 164. These prices appear to correspond roughly to Oklahoma ex-refinery prices, but are rather lower than prices ruling on the East Coast of the USA.
Conversion factor: 6.6 barrels per ton (B.C.I.M. No. 111, p. 228).

(d) Dollar exchange rate: Lima prices converted to dollars using annual average exchange rates, given in Extracto Estadistico 1935, pp. 38-39.

here. It is immediately evident that throughout the period considered here prices were maintained above equivalent prices in the USA, suggesting that Peruvian prices were set only slightly below the CIF-plus-tariff cost of competing imports, in order to assure IPC's control of the market.[1] These prices bore no relation whatever to the cost of production. The cost to IPC of refining a gallon of gasoline was estimated in 1929 to be Soles 0.10,[2] and the cost of the crude to produce that gallon could not have exceeded Soles 0.15 even under extreme assumptions.[3] Allowing Soles 0.05 for transport costs to Lima from the refinery, the maximum possible cost per gallon of gasoline would have been Soles 0.30, or 53% of the wholesale price in Lima.[4] On this basis it may be estimated that the profit margin (rent) accruing to IPC from its monopoly position was

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1. A study of gasoline prices written in 1930 claimed that Lima prices in 1929 were above CIF prices. (Gurney, W.M., 'Summary of Events Relating to the Passing by Congress of the Petroleum Monopoly and National Refinery Bill'; enclosure in Despatch No. 38, C.H. Bentinck (British Minister) to Foreign Secretary, March 8th, 1930, Item A2500 in FO371/14252, pp. 171-177.) Gurney took as his US price a figure of 8¢ per gallon, considerably below the figure given in Table VI.4. Adding 50% to this to cover freight etc., he arrived at a CIF estimate below the Soles 0.57 Lima price (12¢ US as against 23¢). Using the figures in Table VI.4, it will be seen that at least 50% has to be added to the average US price for 1929 in order to equal the Lima price; this 50%, of course, would include not only freight but also tariffs levied on gasoline by Peru. Gurney claimed that freight costs from the USA would be a maximum of Soles 0.10 (US 4¢) per gallon; this would give a CIF price in 1929, from Table VI.4, of 19¢, leaving 4¢ to be accounted for by tariffs. This would seem quite a plausible figure.
2. Ibid.
3. At £p5 per ton, the selling price of crude, crude cost Soles 0.158 per gallon, allowing 317 gallons per ton (B.C.I.M. No. 111 p. 228). Apart from very small refining losses, this cost would be distributed among the saleable products into which the crude was separated. Hence the cost of the crude to produce a gallon of any one of those products would be equal (roughly) tp the cost of a gallon of crude itself.
4. Gurney's figure for the IPC's clear pfofit was Soles 0.27 per gallon. (Ibid.)

half the wholesale price. Similar calculations could be applied to kerosene and fuel oil.

The extremely low returned value displayed by IPC during the 1920's was a function of this pricing policy. The gross income from domestic sales proved sufficient in practice to cover the entire consolidated Peruvian costs of the company's production for both local and export markets, which indicates the existence of considerable leeway for price reductions to local consumers, without risk of serious danger to company profits. Such reductions could have provided the most significant forward-linkage effects from the Peruvian oil industry, providing a great measure of effective protection for various industrial sectors in a world where international oil prices were oligopolistically fixed.

The Peruvian Government in the 1920's, however, elected not to impose any serious restriction on prices.[1] This is interesting both because obvious scope existed for such restriction, and because from various other sectors of the economy there were periodic pressures

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1. There was one interesting exception to this policy, in February 1920, at the time when the Leguía Government was fighting inflationary price rises. By a law of August 1917, the price of petroleum in Lima had been tied to Pennsylvania (US) well head price of crude, and equivalent prices for other products. At that time crude was $2.60 per barrel, equivalent roughly to £p3 per ton. This price was maintained in Lima until 1920 despite a steady upward drift in Pennsylvania prices. By 1920, Pennsylvania prices reached £p5 per ton, and IPC in January raised their prices in Lima to £p4 per ton. The Government reaction was a decree fixing the Lima price at £p2.5.00, and ordering that any excess over this price be charged to the IPC as additional export duty. (Leader, February 5th, 1920, p. 3). The IPC, with diplomatic assistance from Britain and Canada, resisted. (Enclosures in Memo of March 15th, 1920 from Colonial Office to Foreign Office, Item A1374 in FO371/4545; and instructions to Lima Legation in Cypher Cable No. 17, March 25th, 1920, in Ibid.) The figures given in TableVI.4 indicate that this essay in direct price control did not last long.

for price reduction.[1] Why was Government unresponsive to these pressures? The answer is the same as for the 1922 Agreement: the Government was more interested in obtaining short-term finance from the IPC than in conducting regulation in a fashion calculated to promote Peru's development. The key weapon which the Government had at its disposal was the threat to exclude IPC entirely from the lucrative local market, by granting a government monopoly over the petroleum industry in the form of a concession to another firm. The first echoes of this threat were heard in 1920 in connection with the Royal Dutch Shell bid for a national concession.[2] From the mid-1920's, the tactic was used with increasing frequency. Leguía would initiate steps towards the establishment of a petroleum monopoly (on several occasions he went so far as to name concessionaires and take bids for the construction of a new national refinery). He would then state his demands to the IPC, which after negotiation would pay money to the Government. The monopoly scheme would be 'temporarily' withdrawn, to reappear the next time the treasury ran short of cash. The history of the process will only be briefly summarised here.

In 1925, a British subject named H.V. Holden[3] arrived in Lima,

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1. E.g. a 1922 article (Leader, January 4th, 1922, p. 3) complained about gasoline 'which sells in the capital at approximately 50 cents, US currency, and is still more expensive in provincial towns, in spite of the fact that gasoline consumed is a local product.'
2. See above, p. 234. Shell in fact had applied only for control of those parts of Peru not already held by others (Despatch No. 264, Carlton Jackson, US Trade Commissioner in Lima, to US Department of Commerce, dated August 5th, 1920, enclosure in D.F. 823.6363/32). Leguía, however, indicated to the IPC that a full monopoly was the topic of discussion, thereby causing great alarm. (Cable dated March 15th, 1920, Smith to State Department, D.F. 823.6363/22.)
3. Holden was already known in London as an undischarged bankrupt (See Memo by H.A. Caccia, February 18th, 1930, Item A1279 in F0371/14252, pp. 119-121.)

interested in a possible railway concession, and made the acquaintance of Leguía's son Juan. In late 1926 Holden signed with the Government a contract granting him a petroleum monopoly, on condition that he obtain finance and build a national refinery, and that Congress approve the deal.[1] Capital of £p800,000 was to be raised in London, and the company would undertake to deliver the Government a guaranteed income of £p100,000 annually in exchange for a monopoly of the local market. In order to guarantee supplies of crude for the refinery, the Government would collect royalties from Lobitos and Zorritos in kind; there might also be compulsory purchases of crude from all three main companies.[2] Juan Leguía promptly departed abroad in search of finance[3], and in early 1927 Bethlehem Steel Corporation offered to build the refinery.[4] A £p10,000 deposit was made by Holden,[5] and the project was sent to Congress for approval. The pressure on IPC was increased by a Government announcement that export duties on oil would henceforth be collected at an exchange rate of 240 pence to the Peruvian pound

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1. The text of the contract is in Despatch No. 632, Miles Poindexter to Secretary of State, December 14th, 1926, D.F. 823.6363/93, M746 Roll 25 Frames 888-898.
2. Cables from Pombo (the IPC's Lima Manager) to Smith (IPC President) in Toronto, enclosed in letter of December 4th, 1926, from White Weld and Co. to US State Department, D.F. 823.6363/90. The IPC expressed overdramatised fears that their tankers and plant in Lima would be confiscated.
3. Cable dated November 11th, 1926, from Lima Legation to Secretary of State, D.F. 823.6363/88.
4. Cable from Peruvian Ambassador in Washington to his government in Lima, enclosed in D.F. 823.6363/102, M746 Roll 25 Frame 920. This offer indicates the ease with which up-to-date refinery technology was obtainable at that time.
5. Gurney, 'Summary of Events', op. cit., p. 171.

(i.e. at par) instead of at current exchange (the Peruvian currency was then at a 20% discount in exchange markets).[1] The IPC protested that this was an effective increase in the rate of duty, which was ruled out by the 1922 Agreement. After long negotiation Leguía withdrew the export-duty bill and agreed not to press the monopoly, if the oil companies (i.e. IPC) would assist the Government's attempts to support the flagging exchange rate, to the tune of £p30,000 a month. IPC agreed. When the monopoly bill came up for debate in Congress in September, the Government neatly converted it into a new 10-centavo per gallon tax on retail gasoline prices.[2] Holden was kept around to conduct periodic show-negotiations (thereby keeping the monopoly idea alive); but late 1927 and 1928 were good years, fiscally speaking, because of the Government's success in floating £ 85 million of National Loan bonds abroad. By late 1928, however, stringency was once more closing in, and Holden's project began to advance again. The IPC, alarmed, decided to outflank the monopoly scheme by cornering all supplies of crude available in Peru, thereby leaving no source of supply for a possible competing refinery. The key to this was control of the royalty oil supplied to the Government by Piaggio and Lobitos. In April 1929, IPC signed a contract with Leguía under which the Government bound itself to sell all royalty oil to the IPC refinery at Talara for the next ten years. In exchange for this promise, the IPC made a 'donation' of £ 600,000 cash to the Government (refundable in part if the contract were breached), plus an advance of £ 250,000 on future royalty-oil sales.[3]

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1. Papers on this incident are in FO371/12018, paginated 51ff.
2. Leader, September 13th, 1927, p. 1 and November 15th, 1927, p. 1.
3. A copy of this contract, dated April 23rd, 1929, is enclosed in Gurney, 'A Summary of Events', op. cit., pp. 178-182.

The fiscal situation continued to worsen and 'in September and October [1929] Holden was again asked by the President to submit a scheme regarding the petroleum refinery'.[1] Holden revived his 1926 proposals, again in partnership with Juan Leguía. Excitement was increased when a representative of the French firm Le Creuset, which was interested in obtaining a construction contract for the refinery, formed an alliance with Leguía's brother Roberto and began bidding against Holden. Shortly afterwards the two groups merged, with Government encouragement.[2]

Realising that their 1929 contract provided insufficient protection against the possibility that a national refinery might import its requirements, IPC again settled for a deal with Leguía. In December 1929, 'the Government's finances being of the worst, the IPC advanced the Government £ 1 million against the promise of an agreement respecting the granting of the franchise of the Port of Callao for a period of 25 years'.[3]

Leguía had now raised £ 1,850,000 in donations and loans in the course of nine months, in a period when this emergency finance was crucial to his political survival (among other things, the money helped to finance his re-election in mid-1929). His options, furthermore, remained open; he had given the IPC only the promise of monopoly control of the Callao oil facilities - not a signed contract. In February 1930 he promulgated a law establishing a national petroleum

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1. Ibid., pp. 171-2. Emphasis added.
2. Ibid.
3. Ibid.

'monopoly and refinery[1], and began collecting bids. The British Minister commented[2]

> As the President's main object is to raise money at all costs, a compromise may eventually result with the IPC for them to take over the monopoly and refineries at a price.

Such indeed was Leguía's aim, although he was prepared also to solicit bids from the British.[3] IPC now decided to make an all-out bid for the monopoly concession.[4] With Salomón, the 1922 negotiator, back in the Ministry of Finance, IPC began to negotiate with the Government, using as a 'front' the Graham Engineering Company of New York. The terms offered were very much along the lines sought by Leguía and Salomón.[5] Grahams would make an advance of up to £ 20 million to the Government, and substantial private payments to Juan Leguía. Grahams showed the State Department[6]

> a carbon of a letter supposed to have been sent to Juan Leguía offering him 10% of the gross sum which should be used in the erection of the petroleum refinery of the Peruvian company and 2% of any money advanced as a loan

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1. Leader, February 25th, 1930, p. 15.
2. C.H. Bentinck, Despatch No. 29, February 14th, 1930, Item A1971 in F0371/14252, p. 26.
3. The Foreign Office and Mines Department circularised Lobitos, Anglo-Persian Oil and Shell Oil in April 1930 offering them diplomatic support in any bid to obtain the Peruvian monopoly. None of these firms were interested (it was 1930, after all). (Item A2548 in F0371/14252, minute by E.F. Thompson; and Memo by Caccia, April 22nd, 1930, Item A2844 in Ibid.)
4. Letter, Mines Department to Foreign Office, May 5th , 1930, Item A3185 in Ibid. It appears that IPC had been seeking to obtain the monopoly in their negotiations from late 1927 on, but that Leguia had obliged them first to negotiate on peripheral issues such as royalty oil. See Internal State Department Memo by Stinson, October 19th, 1931, D.F.823.6363/140.
5. 'Memorandum of Conversation between Mr. Schoenfeld ... and Warren C. Graham,' September, 1930, D.F.823.6363/125.
6. Ibid.

> to the Peruvian Government in connection with this scheme. He was likewise to receive 2½% of the net profits during the life of the contract (32 years) in return for his activity in maintaining satisfactory relations with the Peruvian authorities.

Holden, it appeared, was to receive $ 20,000 cash.[1] Salomón returned from the USA with this deal in his pocket on August 22nd, 1930. The same day Sánchez Cerro, having abruptly put forward the date of his revolt by a week, initiated the overthrow of the Leguía government.[2] The monopoly scheme proceeded no further, although Sánchez Cerro lost no time in adopting the familiar protection - money approach to the regulation of the IPC.[3]

Throughout the bargaining process just outlined, there was a constant feature of great interest in relation to the price question. The Leguía Government, although possessing an extremely effective weapon - the monopoly scheme - for pressuring the IPC and attacking the company's price policy, elected instead to use that weapon as a means of blackmailing money out of the company for the benefit of the Government. On the basis of the figures for 1928, it can be calculated that a reduction of Soles 0.20 per gallon in the price of gasoline would have saved gasoline consumers £p264,000 ($ 1,055,000) annually. Still more important, because of the industrial use of fuel oil,

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1. Ibid.
2. Report from Gurney dated October 2nd, 1930, Item A7164 in FO371/14252. Graham proceeded to accuse the British of having financed the Arequipa revolt in order to forestall the monopoly agreement. (See Schoenfeld's 'Memo of Conversation', op. cit.; also Naval Intelligence report enclosed in letter from Admiralty to Foreign Office, November 8th, 1930, Item A7307 in FO371/14252).
3. Sánchez Cerro's relations with IPC are discussed by Pinelo, pp. 62-65.

would have been a reduction of, say Soles 1.50 per barrel in the price of fuel oil, implying an annual saving of £p175,500 ($ 702, 000) for consumers. None of this, however, entered the Government's bargaining aims.

Summary

For an underdeveloped, primary product country which has rejected (or has been diverted from) the option of autarkic development, the essential economic problem which confronts the government and people of that country is that of obtaining the best possible terms for their integration into the international economy. The problem, in theory, is solved by a process of bargaining in which the benefits accruing to the country from (a) export development, and (b) foreign direct investment, are maximised by a responsible, nationalist government. In this chapter it has been suggested that such a model of government is not always applicable in reality, and specifically that the government of Peru during the 1920's failed to measure up to the standards which a development theorist would demand. This was so not so much because Peru's rulers were ineffective bargainers, as because their selection of bargaining objectives and strategy was based on sectoral interests and excessively short-run considerations of public (and private) finance. The results of possessing a government of this type, in terms of the development of the national economy, are dealt with in other chapters.

CHAPTER 7.

Evolution of the Non-Export Sectors, 1919-1930

Thus far in this study, attention has focussed upon the export sectors. Consequently, a number of issues which concern the relationship between the export economy and the non-export sectors have been left hanging. In this chapter, those issues are taken up for examination. The most important is the possibility that the entry of foreign capital to Peru, while displacing Peruvian capitalists from certain export sectors, may have contributed to more rapid development in other sectors. It might be suggested that the denationalisation of export sectors would release Peruvian resources for use elsewhere in the economy, thus raising Peru's aggregate investment capacity while encouraging the development of productive non-export activities such as manufacturing. The displacement of domestic capital and entrepreneurship from export sectors would then be a step towards a more diversified and integrated national development process. In this chapter, therefore, it will be asked whether the domestic elite whose role as export producers was in decline in the 1920's, were performing a more dynamic role in other sectors. Most of the discussion concerns the capital city, Lima, where the greater part of the non-export cash economy was located, and where any significant trends on a nation-wide scale would have been visible.

'Inter-sectoral Links.

The discussion of the exporting elite in Chapter 3 indicated that the Peruvian capitalist was responsive to economic opportunities and accustomed to shift resources from one activity to another, in order to take advantage of profitable investment openings. Discussion there concentrated, however, upon resource transfers between export sectors, rather than upon transfers from exporting to non-exporting sectors. The same pattern, however, is found in the latter case. Exporting sectors did not exist in isolation from the rest of the Peruvian economy, and it was common for capitalists whose main economic base was in export production to have also some interests in other sectors - both to take advantage of profit opportunities there, and to diversify their portfolio as partial insurance against risk. On the other hand, capitalists whose main sphere of operation was in the non-export economy were often to be found placing part of their capital in export sectors, for similar reasons. At the end of the First World War boom the movement of capital from Lima into the sugar sector was particularly pronounced, as Chapter 3 noted.

Before looking more closely at the nature of the channels connecting exporting and non-exporting sectors, the Lima-based capitalists (men whose economic operations took place mainly in the context of the local market) deserve some introduction. These men came from widely-diverse origins. Some were from old-established elite families who had taken up residence in the capital (often retaining considerable landholdings in the provinces) and turned their attention to business. Some were lower-level professionals who had made their way up by luck

or ability. A considerable number were immigrants who had arrived in the late nineteenth century - especially Italians. The active business climate of the 1890's and 1900's had enabled all of these to build up for themselves substantial interests in banking, insurance, manufacturing, and public utilities.

From the 1890's on, a group of half-a-dozen operators played a key role in the organisation of the Lima economy. The centre of this group until his death in 1919 was the Cuban-born José Payán, who began by building up the Banco del Perú y Londres into the country's key financial institution and then moved on to create a Stock Exchange, a giant public-utilities company, various manufacturing enterprises and an insurance company; and to promote a vast range of financial and commercial legislation.[1] Other members of the Payán group - most of whom retained their connection with the Banco del Perú y Londres - remained active in the 1920's; Pedro D. Gallagher, Pablo La Rosa, and Mariano Ignacio Prado y Ugarteche being the most prominent. Men of this type were in demand in any new venture not merely (or necessarily even) for the amounts of personal capital which they could contribute, but because of their ability to mobilise funds from the banks and other financial institutions which they dominated, and for their skills and experience on boards of directors. Any new enterprise launched in Lima benefited from having interlocking directorships with the financial system; indeed, many of the major new enterprises

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1. Camprubi Alcazar, José Payán y Reyna. See also Leader, June 21st, 1919, p. 8; and April 22nd, 1920, p. 4.

launched received much of their impulse from one or another of the financial institutions of the Capital.

The relationship between this capable urban group and the export-sectors elite was a crucial element in the development of non-export sectors. There was no question of the two groups being sharply separate, either socially or economically. Rather, they were meshed together in a web of interlocking directorships which provided a channel through which capital generated in export sectors could be combined with urban entrepreneurial skills for the mutual benefit of the two groups. To give some indication of the existence of this pattern in the 1920's, a survey of 39 leading joint-stock enterprises of the period has been conducted, with results which appear in Table VII.1. All available information was brought together on the identity of leading participants in these ventures between 1919 and 1930. In most cases this information took the form of lists of the directors of the firms; in one case (the Frigorífico) all investors putting up more than £p5,000 for the venture have been included. The information is not complete, and no attempt has been made to calculate what proportion of the Peruvian elite is represented. However, the sample is large enough to have significance: 98 Peruvian capitalists with large interests apart from the enterprises surveyed, of whom 37 were primarily export producers, appear in the lists. The 37 identified export figures were all leading operators in their sectors.

The 98 large capitalists who participated in these joint-stock

TABLE VII.1

Results of a Survey of Interlocking Directorships and Shareholdings, 1919-1930.

Economic Activity	Number of enterprises surveyed	Origins of leading participants				
		Export producers	Part-exporters	Lima capitalists	Foreign firms	Other
Manufacturing	8	11	-	25	4	23
Banking	5	16	5	29	7	11
Insurance	7	11	4	34	6	30
Urbanisation	7	5	-	13	2	4
Sugar joint-stock	9	19	-	18	1	19
Utilities/ transport	3	-	1	12	2	9
TOTALS	39	62	10	131	22	96
Number of Individuals		37	6	55	14	87

Sources: Compiled from a card index, based upon the bibliographic material covered in the course of the study.

Notes: In the table, each individual participant, once identified, is classified by his main sphere of economic activity, where known. 'Export producers' are owners of major export enterprises separate from the joint-stock firms surveyed. 'Part-exporters' are capitalists with interests spread across various sectors, but including participation in export production. Lima capitalists are leading merchants, businessmen and industrialists in their own right. Representatives of foreign firms are generally looking after the interests of their company in cases of participation by the company (i.e. are not acting as individual capitalists themselves). The category 'other' comprises professional men, capitalists whose activities are limited to the firm surveyed, and figures whose minor economic status made them impossible to identify or classify accurately.

companies held a total of 208 directorships or large shareholdings in the sectors surveyed, in addition to which all of them were dominant figures in other enterprises. In all except eight of the 39 firms, both non-exporting and exporting elites participated. Table VII.1 shows 43 cases of participation by export or part-export figures in manufacturing, banking, insurance, and urbanisation; and 18 cases of non-export figures participating in the sugar export sector (almost all of these dated from 1919-1920). A study based on more complete data would undoubtedly reveal many more cases of intersectoral links between the exporting and non-exporting groups. The channels, therefore, were open for a transfer of capital and entrepreneurship out of the export sectors which were being denationalised or were in decline, into other activities oriented to the local market. What, then, happened to these activities during the 1920's?

Manufacturing.

Of the non-export sectors which might have benefited from a diversion of Peruvian resources out of export industries, the most obvious is manufacturing. The manufacturing sector in Peru had entered upon a process of rapid expansion under local control in the 1890's, and this expansion was sustained up until the period of the First World War. The process was one of import substitution, led by sectors such as textiles, soap and candles, tobacco, leather goods, clothing and foodstuffs. There was also substantial progress

in the capital-goods sector, especially the engineering industry which began with the establishment of railway workshops in the 1860's and 1870's, and subsequently expanded to service the sugar and mining export sectors, and the growing public-utilities sector in Lima. Capital and entrepreneurship came from various local sources: export producers using their surplus capital to diversify; leading figures in the banking and financial world; wartime profiteers; and foreign immigrants, who in Peru as elsewhere in Latin America were prominent in commerce and industry.[1]

A major swing of Peruvian investment and entrepreneurial energy away from exports towards manufacturing would thus have resulted in an acceleration of an already-established expansionary trend. The evidence on the 1920's, however, indicates the opposite: this was the decade in which the expansion of manufacturing, after thirty years of progress, bogged down. Table VII.2 presents figures on the number of factory-type enterprises active in manufacturing industry, as revealed by the periodic censuses of that sector. These figures suggest that the number of plants roughly doubled between 1902 and 1918, but that between 1918 and 1933 there was no significant further increase. Most of the expansion of 1902-1918, it may be suspected,

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1. The detailed early history of Peruvian manufacturing has been surveyed in two working papers by the present author: 'Early History of Peruvian Manufacturing' (1972) and 'Manufacturing Industry in the 1920's' (1973). A forthcoming paper by R. Thorp and I.G. Bertram will include this material. Published studies are limited to Rippy, 'The Dawn of Manufacturing in Peru', in Pacific Historical Review, 1946; Tarnawiecki, 'La Industria Manufacturera en el Siglo XX' in Paz Soldán, Visión del Perú en el Siglo XX, Vol. 1; and some material in Chaplin, The Peruvian Industrial Labor Force.

TABLE VII.2

Number of Factories Active in Manufacturing, 1902-1933

	1902	1905	1918	1923	1933
Total Manufacturing	170	195	408	392	403
Total excluding beverages	156	181	294	309	309

Source: Bertram, 'Manufacturing Industry in the 1920's, based on Garland, Reseña Industrial del Perú 1902 and 1905; Jimenez, 'Estadística Industrial del Perú' in B.C.I.M. No. 105; Dunn, Peru; and Hohagen, 'Las Industrias en el Perú' in B.C.I.M. No. 116.

Notes: The total figures above are for all manufacturing activities except processing of primary commodities for export - that is, the figures exclude oil refineries, smelters, sugar mills, cottonseed oil mills, and cotton gins. Rice mills are also excluded.

Beverages (soft drinks, wines, liquors, and beer) are excluded from the second row in the interests of realism in the trends, since these industries displayed extremely rapid numerical expansion between 1902 and 1918 in the soft-drinks and wine-producing subsectors. This expansion was partly genuine - a mushroom growth of small-town bottling plants, small-scale enterprises with primitive technology - and partly a function of serious ommissions in the 1902 and 1905 censuses with regard to the wine industry.

took place in the years prior to 1914; the impression gained from qualitative sources is that the 1910's and 1920's were a period in which Peruvian interest swung away from, rather than towards, manufacturing. Policies designed to promote local industry were relegated to low priority or even reversed during the war years - particularly in relation to the tariff system. Commentaries on the Peruvian economy ceased to give much attention to manufacturing, and by the 1920's foreign observers were referring to the dormant condition of manufacturing as evidence of the non-entrepreneurial character of the local elite.

Table VII.3 confirms that, at a macro-economic level, there was no great progress towards import substitution revealed by the data on composition of Peruvian imports. Consumer goods, textiles, and cereals accounted for just over half of total imports throughout the period 1915-1929. Import substitution on a large scale took place only in fuel, as Peruvian oil replaced imported coal, and the drop in this category was offset by percentage increases in the categories 'transport equipment', 'construction materials' and 'capital goods' (the last heavily weighted by equipment for mineral export sectors and Leguía's public works).

Table VII.4 traces the evolution of the country's largest manufacturing industry, cotton textiles, and again finds that the 1920's were a period of little progress in terms of installed capacity, employment or output. The number of looms installed in cotton mills

TABLE VII.3

Percentage Composition of Peruvian Imports, 1915-1929

Import Category	---- Five-year average percentage shares ----		
	1915-1919	1920-1924	1925-1929
Textiles	13	13	11
Wheat and Flour	7	9	9
Other Consumer Goods	32	33	31
Industrial Materials	18	13	14
Fuel	7	4	1
Construction Material	8	9	10
Transport Equipment	4	5	8
Capital Goods	11	13	16
Other	-	1	-
TOTAL	100	100	100

Source: Thorp and Bertram, forthcoming.

TABLE VII.4

Evolution of the Cotton Textile Industry, 1902-1933

	1902	1905	1910	1918	1933
Number of plants	7	7	7	10	11
Number of looms	1,015	1,305	1,770	3,049	3,807[a]
Employment	850	1,000	n.a.	3,100	3,050

	1918	1924	1930
Production, 1918 = 100	100	92	99

a. 1931

Sources: As for Table VII.2 with 1910 figures from Martin, Peru of the Twentieth Century, and output index from Thorp and Bertram, forthcoming.

increased 74% from 1902 to 1910, and 72% from 1910 to 1918, but from 1918 to 1931 (a longer period) the increase was only 25%, while total employment fell and output remained stationary.

Although at the aggregate level manufacturing gives an impression of stagnation, there were in fact some important developments in the sector during the 1920's - but not developments of a kind which would indicate a large-scale transfer of Peruvian energies into the sector. Where progress was made, it was led in general not by capitalists displaced from export sectors, but by foreign firms and Lima capitalists. Table VII.5 lists some salient features of the nine most important new manufacturing enterprises which made their appearance in the 1920's, and represented a total investment of between £p1.5 million and £p2 million during the decade. Of these nine projects, four were developed by Peruvians, four by foreign firms, and one jointly. Nearly half the capital put into new manufacturing ventures came from foreign firms; and the most successful ventures (the cement plant and the freezing works) were both taken over at an early stage by the U.S.-owned Foundation Company, which integrated them into its general construction activities in Peru.

The participation of Peruvian capitalists drawn from the export sectors was insignificant in relation to the scale of the resources controlled by exporting groups. Only three projects - the glass works, the marble factory, and the meat works - drew directly on the resources of capitalists such as Proaño, Fernandini, the Aspíllagas, Albizuri and Poppe; and the total amount invested by this

TABLE VII.5

Nine Main New Manufacturing Ventures of the 1920's

Name of firm	Activity	Original initiative	Developed by	Status as of 1930	Capital £p000
Amazon Industrial Co.	Canning	Joint US-Peruvian (Non-export)	Joint US-Peruvian (Non-export)	Joint US-Peruvian (Non-export)	8
Molino Excelsior	Flourmill	Cogorno family (Lima)	Cogorno (Lima)	Peruvian (Non-export)	n.a.
Lima Chemical Co.	Chemicals	Milne & Co. (British)	Milne & Co. (British)	Failed	50
Cía de Tejidos de Sullana	Cotton textiles	Lima capitalists	Lima capitalists	Peruvian (Non-export)	n.a.
Cía Peruana de Marmoles	Marble factory	Export capitalists	Export capitalists	Peruvian (Export group)	50
Cía Manufacturera de Botellas de Vidrio	Bottles	Export figures	Foundation Co. (U.S.)	U.S. control	150
Cía Peruana de Cementos Portland	Cement	Peruvian (Non-export)	Foundation Co. (U.S.)	U.S. dominated joint venture	500
Frigorífico Nacional	Meat freezing	Joint US-Peruvian (Non-export)	Foundation Co. (U.S.) Peruvian minority shareholders (Export & Non-export)	U.S. control, Peruvian minority shareholders (Export & Non-export)	500
Tobacco Monopoly	Cigarettes	Government	Government	Government	100

Source: 'Manufacturing Industry in the 1920's'.

group cannot have exceeded £p150,000 over the decade - at most, 10% of the capital invested in new ventures, and only a fraction of the resources of such men (Fernandini's annual income alone was double this figure). The canning plant, the Cogorno flour-mill, the Sullana cotton mill, and the cigarette factory, were all financed and organised by non-export groups (although they may have raised some of their finance from the banking system, and thereby drawn indirectly upon resources generated by export sectors).

In addition to the new enterprises listed in TableVII.5there was perhaps a further £p2.5 million invested during the 1920's in the maintenance and expansion of existing enterprises.[1] Of this sum, over half was accounted for by re-equipment and consolidation in the cotton textile industry, mostly under the aegis of the foreign firms Casa Grace and Duncan Fox.[2] Most of the remainder was invested by the existing group of Lima-based industrialists in their various enterprises - particularly the Santa Catalina woollen mill. In only one case could evidence be found of significant investment in the expansion of an existing manufacturing enterprise by a capitalist who was transferring resources away from an export sector. The man responsible, Agustín Arias, was one of the half-dozen most

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1. West Coast Leader, 'Special Industrial Supplement', May 13th, 1930, p. 1.
2. 'Manufacturing Industry in the 1920's', p. 15.

active Peruvian entrepreneurs of the 1920's, with widely-diversified interests financed initially by his success as a mine-owner in the Central Sierra. He could not, however, be described as a man displaced from an export sector; on the contrary, Arias was one of the few Peruvians whose export-sector enterprises were expanding in the 1920's.[1]

Indeed, the three export-based figures who made most impression (though not, as has been shown, a dominant impression) in manufacturing enterprise in the 1920's were men of this kind. Arias, Fernandini, and Proaño were leading mine-owners who had come to terms with the existence of Cerro, and whose mining enterprises were both profitable and expanding in the 1920's. Far from indicating a reallocation of resources by capitalists displaced by foreign capital, their activities in Lima during the 1920's were more akin to the activities of the sugar and silver capitalists of the 1890's: men with surplus capital generated in export sectors, with a secure economic base and an interest in diversifying their local investments. Their numbers, however, were few, and their enthusiasm for manufacturing very small relative either to their resources or to the enthusiasm of previous generations of export capitalists.

Manufacturing, in summary, displayed little overall growth in the 1920's, and the main supply of initiative and finance, insofar

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1. In 1921 Arias bought up the Compañía Arturo Field y La Estrella, Peru's leading biscuit and confectionary firm, and proceeded to invest £p120,000 in expansion and improvements. (Leader, November 9th, 1921, p. 1.) Arias had begun by buying and selling mine properties in the Central Sierra, and then gone on to become the sole supplier of lime for the Cerro smelters. He owned important silver mines in Castrovirreyna, and speculated in mines in the north (see Chapter 3).

as these were available to manufacturing, came from foreign firms and non-export groups.

The Capital Market

Despite the experience of manufacturing, the capacity of the Peruvian economy to mobilise capital resources for investment was still considerable, at least in the early 1920's. The best available indicators of this are the statistics of the Lima Stock Exchange and the banks. Table VII.6 presents five-yearly figures drawn from the annual reports of the Stock Exchange from 1900 to 1935. The Exchange was established by Payán in 1896, and played a central role in the mobilisation of capital for the development projects of the 1890's and 1900's.[1] By 1900, within five years of its establishment, 55 enterprises were quoted. The merger of the leading utilities firms to form Empresas Eléctricas Asociadas accounts for the drop from 1905 to 1910; but the number of new enterprises coming to the exchange was obviously falling. In the 1920's a strong downward trend set in as companies withdrew from the open capital market. However, the figures on subscribed capital issues quoted on the Exchange indicate that up to the mid-1920's capital continued to be mobilised by means of issues of stocks and bonds; at least £p6.3 million was raised by this means between 1920 and 1925. Rather little of this amount was taken by new issues of equity (only £p1.6 million), and most of this was absorbed

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1. Basadre, Historia, p. 3188.

TABLE VII.6

Statistics of the Lima Stock Exchange, 1900-1935

Year	Number of firms quoted	Value of Issues Quoted on the Exchange, £p millic		
		Equity	Bonds	Total
1900	55	n.a.	n.a.	n.a.
1905	57	n.a.	n.a.	n.a.
1910	47	6.5[a]	6.5[a]	13.0[a]
1915	42	7.8	5.6	13.4
1920	51	10.9	6.8	17.7
1925	46	12.5	11.5	24.0
1930	41	12.6	10.9	23.5
1935	31	9.8	12.9	22.7

a. 1911

Source: Bolsa Comercial de Lima, Memoria, issues for the years shown.

by the banking sector rather than directly by new productive enterprises.

In the second half of the 1920's both equity and bond issues were completely stagnant, in keeping with much of the rest of the economy. This picture of considerable mobilisation of capital in the first half of the decade, ceasing after 1925, is confirmed by the banking statistics in Table VII.7. From 1919 to 1925 bank loans doubled, and outstanding mortgages rose by 155%. After 1925, the rise in bank loans ceased, and mortgage lending (although continuing) proceeded at a much-reduced pace.

If these considerable sums of capital were being mobilised in the early 1920's through the formal capital market, yet no productive sector of the economy displayed dynamic patterns of investment and growth, it is obvious enough that some other sector of the economy must have been attracting resources. The nature of profitable local opportunities in the early 1920's is immediately evident when one turns to the process of urban change which was transforming Lima. Insofar as Peruvian capital and entrepreneurship were being mobilised and locally-invested at that time, they were going into real-estate speculation.

The Urbanization Boom

The development of the city of Lima had proceeded since the time of the Colony at a leisurely pace, although occasional programmes for the modernisation of the city were put into practice

TABLE VII.7

Lending by the Banking System, 1919-1930

Year	Amounts outstanding at Year-end £p million		Percentage Increase During Year	
	Loans	Mortgages	Loans	Mortgages
1919	7.8	1.1	24	10
1920	11.4	1.2	46	9
1921	10.6	1.2	-7	0
1922	10.8	1.4	2	17
1923	10.6	1.7	-2	21
1924	13.6	2.1	28	23
1925	16.5	2.8	21	33
1926	16.3	3.2	-1	14
1927	17.1	3.5	5	9
1928	16.8	4.1	-2	17
1929	18.0	4.7	7	15
1930	13.2	5.2	-27	11

Source: Extracto Estadístico 1934-1935, pp. 66 and 71.

- the demolition of the Spanish city wall by Meiggs, and the construction of Avenida La Colmena under Piérola in the 1890's were examples. The twentieth century, however, brought a change in the structure of city life in Lima. Where originally the elite had resided in the old city centre, with the poorer classes around the outskirts, now a trend towards suburban living set in, encouraged by the tramway companies which had built lines out to Chorrillos, Barranco, Miraflores and other small satellite settlements to the south. In the late 1910's and early 1920's the inversion of the urban ecology of Lima reached a dramatic culmination, in a flood of new urbanisation, or rather suburbanisation, in the area to the south of the old centre.[1] Land which had been under sugar, cotton and food crops began to vanish under new luxury villas and broad avenues. The boom in automobile transport encouraged the trend to suburban living for the upper classes - and created a need for ever more sealed roads. The costs of providing much of the infrastructure for this social process - streets, water supply, sewage - fell on the Municipality and the Government.

The export boom of the First World War period translated itself in 1919-1920 into not only a massive consumption spree as wartime shortages were lifted, but also a building spree as the capitalist class, flush with money, spent huge sums on prestige housing. The beneficiaries were building firms, producers of construction materials, and real-estate owners. The process

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1. For a history of the growth of Lima, see Barbagelata, 'Desarrollo Urbano de Lima (Apuntes Históricos)' in Bromley and Barbagelata, Evolución Urbana de la Ciudad de Lima.

was organised by 'urbanisation companies', real-estate agencies which bought up land in the area between Lima and the sea, installed some facilities, and sold the land in subdivisions, sometimes with houses built. Beginning about 1917, the process rose to a peak in 1925-26,[1] and thereafter fell off for reasons discussed below. About 30 companies sprang up to take advantage of the opportunities offering.[2] Many of these companies, a Leguiista survey later confessed,[3]

> were simply speculative enterprises dealing in rural land which, after being subdivided on a map, and without any improvements having been carried out, was offered for sale at high prices.

The Leguía Government was directly involved in the process in two capacities: as provider of infrastructure, and as participant. The access route to many of the new areas - Santa Beatriz, Miraflores, Chorrillos, San Isidro - was Avenida Leguía, a five-mile dual-carriageway concrete highway built through largely-unoccupied land to link the city centre with the rapidly-expanding upper-class satellite of Miraflores.[4] The avenue, originally planned by the Benavides and Pardo Governments, was completed in 1922, at a cost

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1. Partido Democrático-Reformista, Lima 1919-1930, p. 27.
2. For a list which includes many of the urbanisation enterprises of the 1920-1940 period, see Bromley and Barbagelata, pp. 129-130. The figure of 30 is from Lima 1919-1930, p. 27.
3. Lima 1919-1930, p. 27.
4. The development of high-class housing in what is now the centre of Miraflores, at the junction of Avenidas Pardo and Leguía, was begun during the war boom years by the Compañía Urbanizadora de 'Surquillo', organised by Tomás Marzano, a wealthy silver-mine owner. (Perú en su Centenario, pp. 130-132.)

of £p150,000[1], and was one of the Leguía regime's main prestige projects. Other avenues followed. A 1923 report noted:[2]

> In the capital and its surrounding suburbs scores of new residential areas have been opened up and the framework of a modern system of boulevardes is practically completed. The Avenidas Leguía, Magdalena, Progreso, Miramar and Ejército, with an extension of between thirty and forty miles are the groundwork of the greater Lima of the future.

The first area opened up by Avenida Leguía was Santa Beatriz, the site of the Lima racecourse, which was taken over and 'urbanised' by the Government. In mid-1923 Leguía reported with satisfaction that[3]

> /the/ works, once completed, will constitute a model for the future expansion of the capital .... The demand has been such that, today, no lots remain for sale, and all social classes, even those of moderate resources, are there congregated. In this class of work, which the Government intends to stimulate day by day, the housing problem ... is finding a partial solution.

In common with private developers, the Government had good grounds for satisfaction. Santa Beatriz, where lots were sold at reduced rates for reasons of political popularity, netted the Government a £p200,000 profit on an investment of £p200,000.[4] Private developers

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1. Barbagelata, p. 105. After the overthrow of Leguía the avenue was renamed 'Avenida Arequipa'.
2. Leader, January 1st, 1924, p. 1.
3. Extract from Leguía's Annual Message to Congress, reprinted in Leader, August 7th, 1923, Supplement, p.3.
4. Lima 1919-1930, p. 29. The gestation period of the project was not more than two years.

were realising profits considerably above this level. Between 1921 and 1925, according to the Foundation Company (which was deeply involved in the urban improvement of Lima), property values in general rose by over 100%, and 'property values of territory adjacent to the city have increased more than 500%'.[1] Small wonder that the Foundation Company, in association with various members of the Anglo-American community in Lima, proceeded to set up a company to urbanise San Isidro, the area around the new Country Club.[2]

In addition to the changing location of urban residence of the upper class, the expansion of Lima was impelled by the beginning of the rapid rural-urban migration which has continued ever since. The first wave of in-migrants were the provincial capitalists, attracted by the life-style of the capital and reacting also to the realities imposed by the increasing centralisation of the functions of Government. The latter development also brought a rapid growth in the number of functionaries employed by the central Government, and a fall in provincial employment, as Peruvian public finance was centralised and its importance increased. Thirdly, a growing swarm of petty traders and other minor services-employed labourers descended on the capital, occupying the central-city area left vacant by the departing upper classes. The pattern of growth of the city is illustrated by the figures in Table VII.8,

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1. Leader, September 1st, 1925, p. 20, reporting an interview with Mr. Doty of the Foundation Company.
2. The Compañía Urbanizadora del Country Club was set up in 1925, to develop and sell off 700,000 square metres of land around the country club. The land, at that time, was expected to fetch £p1 per metre. (Leader, October 27th, 1925, Supplement p. 2; and February 16th, 1926, Supplement p. 2.)

TABLE VII.8

Population of Lima and Surrounding Areas, 1908-1940

Urban area	Population			
	1908	1920	1931	1940
Lima centre[a]	140,884	173,007	372,016	402,976
Callao	n.a.	46,704	61,876	69,406
Miraflores	1,476	5,464	24,142	45,315
Barranco	5,824	9,730	13,984	18,625
Magdalena del Mar	251	2,047	7,812	16,057
San Isidro	-	-	1,867	8,779
Bellavista	-	1,853	5,187	8,273
Chorrillos	5,201	6,575	7,293	6,896
San Miguel	-	269	1,671	3,949
La Punta	n.a.	1,229	1,869	3,389
Magdalena Vieja	599	1,625	2,333	5,747
TOTAL	154,235[b]	248,503	500,050	589,711

a. Districts of Lima, La Victoria, and Rímac.
b. Excluding Callao-La Punta.

Increase in Total Population, by Period

Period	Increase	Percentage increase
1908-1920	46,335[c]	32[c]
1920-1931	251,547	101
1931-1940	89,661	18

c. Excluding Callao-La Punta.

Source: Barbagelata, 'Desarrollo Urbano de Lima (Apuntes Históricos)', in Bromley and Barbagelata, Evolución Urbana de la Ciudad de Lima, pp.117-118.

giving the results of the four censuses of Lima and surroundings taken between 1908 and 1940. There it can be seen that the 1920's were the decade of fastest growth in the period 1900-1940; the total population of Lima-Callao doubled in eleven years, implying annual average growth of 7.5%.

The companies which sprang up to service this growth were enterprises of considerable scale. Of the four which were publicly quoted on the Exchange as of 1925, three - Cocharcas, San Isidro, and Chacra Colorado - had capital of between £p95,000 and £p100,000 ($400,000 approximately) each.[1] The company set up to build the Country Club and sell off surrounding land had capital of £p115,000 as of 1927,[2] and a board which included several of the leading entrepreneurs of Lima. Other examples were the companies El Progreso (£p50,000 capital)[3], Breña (£p30,000)[4], Jesús María (£p16,000)[5], Magdalena (capital unknown, but the board included Santiago Acuña of the Banco del Perú y Londres and J.E. Marrou of a major Lima merchant firm)[6], and Miramar (£p17,000).[7] These nine firms alone, out of the thirty reported, aggregated a subscribed capital in the vicinity of £p600,000 ($2.4 million).

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1. Bolsa Comercial de Lima, Memoria 1926, Anexo 1.
2. Leader, December 13th, 1927, p.1.
3. El Peruano, December 2nd, 1924, p. 543.
4. Ibid, February 4th, 1924, p. 3.
5. Ibid.
6. Banco del Perú y Londres, Reseña Histórica, p. 31.
7. Bolsa Comercial de Lima, Memoria 1926, Anexo 1.

In all, it would appear probable that well over £p1 million was invested in urbanising companies during the years 1920-1926, and the total sums spent in land purchases and sales, and the construction of houses on this land, would have come to many times that amount.

In 1922 the US Commercial Attache, commenting on the fact that the major manufacturing project in the air at that time - the cement plant - involved foreign rather than local capital, was noting that 'local capital in Lima is being largely directed to real estate'.[1]

In addition to the outward spread of Lima, there was also the beginning of upward spread in the centre as large multi-storey office buildings were put up by the leading banking and business firms, (including the Archbishop of Lima, Emilio Lisson). The main beneficiaries were two US construction firms, the Foundation Company and Fred T. Ley and Company, who captured the biggest contracts. The major projects included the Archbishop's new palace and a six-storey office building owned by the Church;[2] new offices for the Ministry of Development (£p100,000)[3]; a new Congress building[4]; new offices for the newspaper 'El Comercio'[5]; a new building for the Club Nacional on Plaza San Martín costing £p170,000[6]; new offices for the Banco Internacional[7], the Banco Italiano, the Banco de Reserva, the Banco

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1. W.E. Dunn in Leader, May 31st, 1922, p. 14.
2. Leader, October 25th, 1922, p. 1; and December 16th, 1924, p. 1.
3. Leader, October 13th, 1925, p. 1.
4. Leader, October 14th, 1924, p. 1.
5. Leader, September 16th, 1924, p. 18.
6. Leader, June 4th, 1929, p. 3.
7. Leader, June 21st, 1927, p. 27.

Popular[1]; various major insurance companies; Cerro de Pasco Copper Corporation[2]; and the Gran Hotel Bolívar.[3] Several millions of Libras were thus invested in commercial buildings during the decade, and local and foreign construction firms thrived.

The building boom was not without backward linkages of importance, especially in relation to the cement industry (controlled, as noted earlier, by the Foundation Company, one of the leading construction firms), and the plaster industry, which enjoyed a boom in the mid-1920's.[4] It represented, however, a rather unstable base on which to rest the national economy.

The speculative boom in real estate presented an even greater problem of instability. While new money was pouring into urban land, prices kept on rising and profits remained high. These profits, however, relied on a continuing flow of cash from other economic sectors

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1. Leader, July 29th, 1930, Supplement p. 4.
2. Leader, August 8th, 1930, p. 1.
3. The Hotel Bolívar on Plaza San Martín was one of the largest promotional enterprises undertaken by Peruvian entrepreneurs during the 1920's, and was a major factor in raising the Wiesse brothers to a position of eminence among the entrepreneurs of the capital. The hotel was erected on land donated by the Government to a syndicate formed by the Wiesse brothers in May 1924. The syndicate members subscribed a capital of £p300,000 ($1.2 million) to finance construction. Leading members of the company were Luis Albizuri (a leading cotton-ginning and cottonseed-oil figure); Manuel V. Gabaldoni (connected with the Banco Italiano); Juan Peschiera (whose family were among the partners in the Infantas-Caudivilla sugar mill); Victor Priaño (a large Lima drapery-shop owner, with interests in Compañías Unidas de Seguros); Severino Marcionelli and Agustín Arias (both leading mine-owners in the Central Sierra). (Leader, May 13th, 1924, p. 1.)
4. For lists of plaster-making factories active in Lima in the mid-1920's see B.O.M.P. No. 10, pp. 100ff; and No. 22, pp. 33ff.

into the land market, which in turn relied on continuing high earnings in other economic sectors. The end of the cotton boom in 1925 spelt the death of the real-estate boom, as the funds accruing to export-sector entrepreneurs contracted sharply, and as the first great impulse of migration into Lima slowed. Profits in real estate contracted sharply, land prices ceased to rise and may even have fallen somewhat, and various urbanisation companies found themselves with their capital tied up in unsaleable land.[1]

The end of the urbanisation boom is indicated also by the slowing-down of bank lending after 1925, shown in Table VII.7 above. Since urbanisation had been the only economic activity into which Peruvian capital had been pouring with any great enthusiasm in the early 1920's, it remains to be seen what was done with the available investible surplus thereafter. In a closed economy, it might well have been diverted to investment in other local

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1. A well-documented case of the deterioration of the economic position of these companies is provided by the Compañía Urbanizadora del Country Club, formed with high hopes in 1925, as noted above. By 1929, only 50 of the 178 lots offered had been sold, and no more than a couple of houses had been built on the area of the urbanization. (Leader, February 26th, 1929, p. 18). An aerial photograph of San Isidro at this time shows the Country Club standing forlornly in the midst of a wilderness of subdivided, empty land. (Leader, March 19th, 1929, p. 1.) The company had run into economic difficulties in 1927 as the market deteriorated, and the land sales which had been expected to pay for the £p180,000 cost of the Country Club buildings failed to materialise (Leader, September 6th, 1927, p. 1 and December 13th, 1927, p. 1.) By 1929 the 'outside price' which the company hoped to raise on the property was £p120,000, roughly equal to the capital originally subscribed in 1925. (Leader, December 10th, 1929, Supplement, p. 1.) In 1930 the company was trying to persuade the Jockey Club to build a new racecourse on the land; all hope of selling subdivisions had by that time been abandoned. (Leader, July 15th, 1930, p. 1.)

activities; but since there is no evidence whatever of dynamic local investment activity by Peruvian entrepreneurs in the second half of the decade, it would appear that either all the investible surplus was switched into consumption expenditure during the mid-late 1920's, or that it was leaving the economy through some form of leakage. Although imports of consumer goods continued at a high level through the 1920's, there is no evidence whatsoever of a structural swing away from investment goods towards consumer goods in the composition of imports.[1] This leaves leakages as the most obvious possibility.

Capital Flight

Although the import and export of capital by foreign firms active in Peru has always attracted a great deal of comment from economists, the possibility that domestic entrepreneurs may have engaged in substantial foreign investment on their own account does not seem to have attracted much interest. This may be because of the strength of the belief that Peru is a capital-scarce economy, and that therefore there should be adequate employment for all available domestically controlled capital resources within the economy. A number of contemporary commentaries suggest, however, that the entry of large sums of foreign capital into Peru during the

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1. Cf Table VII.3.

period from 1914 to 1930 was accompanied by a considerable outflow of Peruvian-owned funds, attracted away by the expectation of higher (discounted) earnings abroad, and accelerated whenever export recessions reduced Peruvian confidence in the future of the Peruvian-owned sectors. The severe slump of the exchange rate which accompanied recession in export markets during 1921 brought the issue to the fore:[1]

> The causes of exchange dislocation in 1921, attributed principally to adverse foreign-trade conditions (according to official statistics, the value of imports in that year slightly exceeded that of exports ...) probably embraced such factors as voluntary remittances abroad. In other words there was, at least in the opinion of local writers, a flight of capital, or at least an outward movement of capital towards Europe and the United States, independent of commercial obligations. This was attributable partly to the distrust of the central bank project ... but more probably to a feeling that profitable opportunities for the employment of funds in Peru would be considerably less in the future, whereas there was considerable speculative interest in foreign investments. The industrial inactivity in Peru liberated a supply of capital which could be converted into some depreciated European currencies at a large apparent advantage.

Throughout the 1920's, as was indicated in Chapter 2, the exchange rate was under continual downward pressure, to a degree which puzzled foreign observers even after allowance had been made for profit remittances by foreign firms, service on the foreign debt, and other invisible outward flows of funds. In 1925, McQueen commented[2]:

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1. McQueen, Peruvian Public Finance, pp. 106-107.
2. Ibid., pp. 114-115.

> Taking the visible statistics of foreign trade as a basis for an estimate of Peru's balance of payments, it would seem that under the normal condition of a large excess of exports (over imports) there should be no lack of foreign drafts and that consequently there should be no difficulty about the maintenance of exchange parity.... There still appears to be an ample margin of exports over imports, even allowing for the fact that such commodities as petroleum, copper and silver do not produce an equivalent volume of bills of exchange. Conversely, the greater part of the material imported by the foreign enterprises which produce and export these commodities is paid for abroad and does not cause a local demand for foreign drafts. With due consideration of the service of the external public debt, the remittances of the Peruvian Corporation, and the shipments sent abroad by foreign enterprises and individuals, it seems likely that there is still a favourable balance subject to the call of Peru. That this hypothetical balance may exist and still fail to cause an active appreciation in the exchange value of the Peruvian pound is probably attributable to the availability within the country of additional credit created by the Reserve Bank ... and to what might be called the psychological factor ...

Another foreign official, William Wilson Cumberland, also remarked on the presence of a considerable unexplained factor in the balance of payments. Appointed in 1922 to conduct a thorough overhaul of the Peruvian Customs, Cumberland undertook the construction of balance-of-payments estimates for the first half of 1922; his figures are reproduced in Table VII.9. After making allowance for undervaluation of imports, all identifiable payments abroad, and errors in the published figures due to use of inappropriate exchange rates,[1] he concluded that the balance of payments was in approximate equilibrium:[2]

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1. Until 1922, export earnings were converted at par for official purposes.
2. Cumberland, 'Economic Position of Peru in the Middle of the Year 1922' in Despatch No. 877, F.A. Sterling to U.S. Secretary of State, September 12th, 1922, D.F. 823.51/269.

TABLE VII.9

Cumberland's Estimate of the Balance of Payments, January-June 1922

Thousands of Libras

Credit Items:		
Excess of exports over imports	4,106	
Government deposits abroad	30	
Diplomatic missions in Peru	50	
Income from foreign investments	50	
Total	4,236	
Debit Items:		
10% upward adjustment of imports		478
Parcel post imports		450
Peruvian diplomatic service abroad		75
Service on foreign debt		125
Repatriated profits:		
Foreign shares in Banco del Perú y Londres and Compañía Recaudadora		30
Peruvian Corporation		300
Empresa del Muelle y Darsena		50
Foreign banks		50
Foreign commercial houses		100
Foreign mining companies		400
Petroleum companies		1,500
Foreign-owned sugar and cotton estates[a]		300
Interest on Empresas Electricas bonds		100
Expenditure of Peruvians living abroad		150
Remittances of foreigners in Peru		100
Fire and Life re-insurance with foreign firms		100
	4,236	4,308
Balancing item	72	
	4,308	4,308

a. Includes profits on sugar and cotton handled by foreign firms.

Source: Cumberland, 'Economic Position of Peru', p. 6.

> If the figures ... are accurate ... there is little valid reason why the Peruvian pound should be at so great a discount .... Even if the estimates of receipts and expenditures involving financial operations with other countries are somewhat inaccurate, it is submitted that they cannot be so far amiss as to indicate a heavy balance of payments, whether in favour of or against Peru.

Far from standing at par (£4.86) during this period, however, the Libra remained below £3.60 for the first half of the year, rising only when the cotton crop came on the market in mid-year, and even then barely topping £4.00. Even on Cumberland's figures, there was evidently a negative invisible/item of some significance which he had failed to include. The size of this ommission becomes much greater when it is realised that Cumberland failed to include two important positive items in the balance of payments: foreign direct investment (his item 'income from foreign investment' represents dividends paid to Peruvians, not new capital inflow), and the net change in foreign-exchange reserves. New foreign direct investment was proceeding at a high level in 1922, with the completion of the new Cerro smelter at Oroya, a heavy investment programme by the IPC at Talara, and various foreign-currency payments such as the £1 million paid to the Government by IPC for the 1922 Agreement. The use of the Government's large reserves of gold and dollars, built up during the period of exchange control in 1918-1919, was also a major factor in 1922. The new Reserve Bank set up in that year embarked immediately on the task of[1]

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1. McQueen, Peruvian Public Finance, pp. 111-112.

> disposing of a part of its foreign reserves by the sale of bills of exchange in Lima, with the double purpose of steadying the /exchange/ market and of reducing the /paper money/ circulation .... Following out this policy, the Reserve Bank sold a total of drafts representing £2,092,604 .... The result of the experiment was such as to make it seem injudicious to subject the resources of the bank to the strain of arbitrary market leadership.

Cumberland's figures, thus modified, imply a favourable apparent balance of payments of at least £p1 million for the first half of 1922; yet the exchange rate continued to signal a heavy deficit, suggesting an 'errors and ommissions' item in excess of £p2 million ($8 million) annually, equivalent to over 10% of 1922 export earnings.

Pressure on the exchange rate was eased during 1923-25 by the effects of the cotton boom and the beginning of heavy foreign borrowing, but the rate never approached par, let alone the gold import point, and a renewed collapse in 1926 brought widespread rumours of 'speculation' against the currency.[1] McQueen again noted the role of capital flight in accentuating the crisis:[2]

> The currency system of Peru ... is especially weak from a psychological standpoint. If confidence in the stability of the usual level of values is lost, it is difficult to regain, and there is a tendency towards a 'flight' from the local money. More funds are sent abroad by local capitalists, or are converted into foreign-money accounts in the local banks ...

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1. E.g. article in La Prensa (Lima) May 2nd, 1926, reprinted in Leader, May 4th, 1926, p. 30.
2. McQueen, C.A., 'Causes of the Exchange Slump in Peru', in Leader, November 30th, 1926, p. 19.

Although the discussion of such 'flight' was generally cast in terms of 'speculation', there was never any mention of funds being returned as speculators took subsequent profits; the impression is strongly that these funds which left Peru throughout the period, and whose influence became particularly felt whenever the export economy sagged, were long-term exports of capital. By mid-1930 the British Commercial Secretary was reporting[1]

> I am assured by bankers that practically no speculation exists in Peru, the funds available are too small. The export of capital is now negligible, there is no longer any capital left to export, and no regulations can prevent such persons as wish to export money from doing so.

Insofar as Peru was a capital-scarce economy at the end of the 1920's, thus, a substantial part of that scarcity was due to export of capital, to which should be added also the decrease in the amount of surplus accruing to domestic entrepreneurs from their activities in Peru, as already outlined.

The hypothesis that Peruvian entrepreneurs thought in terms of the eventual export of their profits during the 1920's provides an explanation also for another feature of the decade which otherwise is a paradox. This was a general, virtually unanimous, consensus among the elite as to the desirability of preventing depreciation of the currency, if necessary by massive Government intervention.

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1. W.M. Gurney, Despatch of August 1930 to Foreign Office, Item A6279 in FO371/14252.

This consensus remained unbroken even at times when certain groups within the elite clearly stood to gain from depreciation. Agricultural export groups, for example, whose markets were deteriorating through the second half of the decade, were firm in their opposition to depreciation despite the higher local-currency incomes such a process might have gained for them. In 1929 the Sociedad Nacional Agraria clearly expressed the policy of agricultural exporting groups[1]: 'it is to be desired that the stability of the exchange rate will be maintained at all costs'. The manufacturing lobby was equally adamant; a 1927 press statement demanded measures to return the currency to 'a reasonable level'[2]. This general objective was used in support of the manufacturers' demand for stringent import controls, quotas and tariffs, and it may be that the SNI (the manufacturers organisation) considered outright protection more important than devaluation as a mechanism for promoting industry. It contributed materially, however, to cementing the general consensus on the exchange rate. This consensus, in turn, provided the background to the massive Government borrowing of the years 1925-28, which was at least partly motivated by an explicit desire to defend the currency (understandable in a debtor Government). The expenditure of the money which these loans brought in was haphazard and extremely wasteful. By the orthodox standards of the time (which required, among other things, that public works financed by loans would repay

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1. Sociedad Nacional Agraria, Memoria 1927-1928, pp. 13-14. Karno, 'Leguía and the Modernisation of Peru', p. 238 also reports the alarm which the 1930 devaluation of the sol caused among sugar exporters.
2. Advertisement placed by the Sociedad Nacional de Industrias in Leader, May 31st, 1927, Supplement.

their cost) the Government's policy was clearly 'unsound'; yet very few voices were raised in criticism of Leguía's loans during the 1920's.

Summary and Concluding Discussion

The pattern sketched in this chapter has not been an encouraging one. The denationalisation of export sectors does not seem to have been accompanied by a flowering of Peruvian enterprise in other sectors of the economy except for urban real-estate. By the late 1920's even this was a declining activity, and the amounts of capital being mobilised within Peru were declining. The evidence provides no support for a model which predicts that capital displaced from employment in export sectors will be largely redeployed elsewhere in the national economy. Such a model implies two assumptions, neither of which holds in the case of Peru in the 1920's: firstly, that the economy is closed, so that capital displaced from one sector must be employed elsewhere within the system; and secondly, that the savings propensity of domestic capitalists does not fall when they are displaced. If these two assumptions held, then a constant supply of domestic capital would remain available within the national system, and an exogenous inflow of capital from abroad would raise total investment. If they do not hold, however, the entry of new foreign capital may result simply in countervailing flight of domestic capital, and a fall in the amounts which local capitalists are prepared to save and invest (since the average return on capital will tend to be depressed by capital inflow).[1]

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1. Cf Griffin, 'Foreign Capital, Domestic Savings, and Economic Development' in B.O.U.I.E.S. May 1970, and subsequent debate in the same journal.

The failure of Peru to achieve self-sustaining development in the 1920's, however, goes further than this. In particular, it is necessary to look again at the dynamic effects of denationalisation of key sectors; and at the effects of Government policy. Both of these elements are vital to any explanation of the failure of activities such as manufacturing to attract interest among the Peruvian capitalist group during the 1920's.

The export sectors, as has been indicated, affected the remainder of the economy in two direct ways: as generators of demand, and as a source of investible surplus. The contribution which an export sector makes in these areas is largely a function of its payments to local factors - that is, of its returned value. The trend in the composition of Peru's exports during the 1910's and 1920's, as was shown in Chapter 2, was away from products with high returned value (wool, sugar, cotton) towards products controlled by foreign firms, and with much lower levels of returned value. This changing composition of exports had the effect of nullifying much of the growth of total export volume and value, and this was true particularly of the period 1920-1930. The exact level of the net balance-of-payments contribution of exports cannot be determined, but reasonable estimates are possible, on the basis of the known returned-value figures for the largest foreign firms, and of estimates for Peruvian-owned sectors. Appendix G sets out the calculations for the period 1916-1934, on the assumption that the sectors which remained under predominantly Peruvian control - sugar, cotton, wool, rubber, etc. - had returned value of 85%, on average.[1] The results appear in Table

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1. Thoburn, in 'Exports and Economic Growth', found returned value of similar magnitude for the native-owned part of the tin industry in Malaysia, and also for the partly-foreign rubber sector, in the 1960's.

VII.10, and are graphed in Figure VII.1. It can be seen that between 1916 and 1929 (ignoring fluctuations) the index of total dollar export earnings rose 68%, but that the index of returned value (i.e. of the foreign exchange available to Peru from exports after production costs had been met) rose only 15%, or an average of 1% per year. This slowing-down of the rate of growth of Peruvian incomes (and demand) generated by the export sectors marked a sharp break from the sustained growth of the preceding thirty years, and removed the possibility that exports might have acted as an 'engine of growth' during the 1920's. The growth rate of returned value on average, indeed, was below the growth of Peru's population, and even more below the rate of growth of the population within the cash market economy concentrated in Lima and the coast. There were occasional surges of demand generated by good years for cotton in 1923 and 1927, but on the whole the former dynamising role of exports had vanished. This loss of the former contribution of export sectors to the growth of demand in the local market must have been an important limitation on the possibilities for manufacturing expansion in the 1920's; and the temporary boost to local demand provided by the Government's foreign-loan programme in 1925-1929 did not suffice to offset that loss.

Quite apart from this, it should be noted that the years following the First World War witnessed a conjunction of forces peculiarly unfavourable to a rapid industrialisation process. The massive wartime boom in agricultural prices had inflated the profit

TABLE VII.10

Indexes of Dollar Export Earnings and Dollar Returned Value, 1916-1934.

Year	Total Export Earnings 1916=100	Total Returned Value 1916=100	Returned Value as a Percentage of Export Earnings
1916	100	100	69
1917	114	118	71
1918	121	109	62
1919	163	167	70
1920	215	245	78
1921	101	115	78
1922	114	115	69
1923	123	122	68
1924	128	120	65
1925	109	98	62
1926	111	104	64
1927	145	122	58
1928	156	120	53
1929	168	115	47
1930	104	85	57
1931	69	65	65
1932	48	42	61
1933	60	51	58
1934	88	67	53

Source: Appendix G.

FIGURE VII.1

Total Export Earnings and Returned Value from Exports, 1916-1934: £ millions



expectations of Peruvian capitalists (and thereby may have lowered their marginal savings propensity); and had attracted all spare capital into the cotton and sugar industries. By the time the boom collapsed, in 1920, much of the capital which the war had generated had become embodied in land and plant, and could not readily be reallocated when profitability fell in those sectors. In addition, the profitability of manufacturing in Peru was closely related to the exchange rate and the level of protection. The sharp appreciation of exchange which the war boom had caused in 1918-1919 had substantially lowered import prices and cut profits in local industry in those two years; and the level of protection provided by tariffs, which had been sufficient in the 1890's and 1900's to materially encourage manufacturing, suffered a dramatic collapse during the First World War from which it did not recover until the late 1930's. Import duties in Peru at that time were fixed in specific, not ad valorem, terms, and their real incidence was therefore subject to erosion by price inflation. The period of the war was marked by sharp increases of the prices, not only of Peru's imports, but also of local materials, while the Government failed to carry out any corresponding upward adjustment of the specific import duties. As a result, in the five years 1915-1919 the incidence of tariffs ad valorem was halved (See Table VII.11). The implications of this for the profitability of manufacturing were obscured for some years by war shortages, but from 1919 on, as the international economy recovered, the profit prospects for local industries were poor. The move towards renewed protection, through the

TABLE VII.11

Ad Valorem Incidence of Basic Tariff plus Surcharges

Year	Total Government income from 'Aduanas' £p000	Value of total imports £p000	Incidence of tariffs plus surcharges %
1915	701	3,096	22.6
1916	1,050	8,683	12.1
1917	1,185	13,503	8.8
1918	1,007	9,705	10.4
1919	1,166	12,204	9.6
1920	1,808	18,358	9.8
1921	1,884	16,669	11.3
1922	1,577	10,592	14.9
1923	2,230	13,176	16.9
1924	2,967	16,743	17.7
1925	3,007	17,075	17.6
1926	3,235	18,250	17.7
1927	3,251	18,469	17.6
1928	3,442	16,848	20.4
1929	3,886	18,247	21.3
1930	2,920	13,328	21.9
1931	1,800	9,794	18.4
1932	1,483	7,206	20.6
1933	1,647	10,744	15.3
1934	2,565	17,125	15.0
1935	3,051	18,107	16.8

Sources: Column 1 from Extracto Estadístico 1934-35, Table 197, p. 280, column headed 'Aduanas'.
Column 2 from Estadística del Comercio Especial.
Column 3 is Column 1 as a percentage of Column 2.

addition of various tariff surcharges, was long-delayed and halting in its advance, so that in the 1920's Peru experienced its lowest level of industrial protection since the mid-nineteenth century.

Local entrepreneurs may have been thereby deterred from heavy investment in manufacturing; but there is no sign that they were desperately perturbed by the lack of protection. A strong protectionist lobby became evident only in the late 1920's; prior to that time, Peruvian capitalists do not seem to have felt that they lacked alternative opportunities for their capital, and had to create such opportunities by means of industrial protection. This reflected not only changes on the supply side of the capital market, as a result of the changes outlined above in the export economy; but also the existence of other outlets for local capital - in particular, in real estate, in the luxury consumption which became a feature of Lima in the 1920's, and in export of capital to New York and London. The rapidly-increasing role of foreign capital in the Peruvian economy encouraged Peruvian faith in the strength of the U.S. and British economies, and interest in investing there, at the same time as it reduced the supply of locally-generated capital in local hands and brought to an end the expansion of interbal demand. Neither individual Peruvian capitalists, however, nor the Peruvian Government, saw anything to worry them in this process, and their record in the 1920's was one of willing cooperation with the foreign firms and withdrawal by the elite from the innovative, entrepreneurial role in which they had formerly provided the drive for Peru's economic development.

CHAPTER 8

Conclusions

In Chapter 1 it was suggested that an explanation of the persistence of 'underdevelopment' in Peru was to be found in one or other of two broad categories of explanatory models. On the one hand were models which appealed to economic unresponsiveness, cultural checks, and severe factor scarcities to explain the failure of self-sustaining growth to take root, the dominant role of foreign capital in many sectors, and the slowness of historical evolution away from the condition of a primary-product export economy. On the other hand were models which began from the assumption that 'normal' patterns of economic responsiveness existed, and that the evolution of the underdeveloped economy was therefore to be explained in terms of the impact of market forces on the economy.

The chapters which followed indicated clearly that the first category of explanation would not apply to the historical experience of Peru. It is, thus, apparent that the key to Peru's unsatisfactory long-run development performance must be sought in terms of the impact of market forces on the economy; and particularly, international market forces, since the economy was structurally dominated by the export sectors.

Various hypotheses offered by 'enclave' and 'dependency' writers were tested against the experience of Peru during the 1920's, and the evidence obtained appears to justify the following general conclusions:

(i) The experience of the 1890's indicates the possibility of a viable model of export-led growth in Peru. In that decade substantial progress was made in finance, capital markets, and manufacturing, on the basis of domestic capital accumulated from export activities. There is no reason to believe that the performance of the Peruvian elite during the 1890's and 1900's could not have been duplicated in later decades, had the economic conditions which confronted them been similar. The origins of the 1890's growth process lay in the period following the 1879-1881 war with Chile, when Peru was effectively cut off from the international economy (which gives some confirmation to Frank's general claim that such isolation can be beneficial for development); but the process really took wing with the reintegration of the economy into overseas export markets. For the first one or two decades, that reintegration was clearly a positive force in the country's development.

(ii) The arrival of large amounts of US direct investment in Peru in the early twentieth century was brought about, not by any absolute scarcity of capital, technology, or entrepreneurship within the Peruvian economy, but by the differing economic calculations of foreign firms as against local entrepreneurs, reflecting the advantages possessed by international firms. Several of the leading economic sectors came into foreign hands, and remained there, because foreign firms were prepared to place a higher capitalised value on certain assets than that assigned to them by Peruvians; and because foreign firms were able to benefit from various barriers to entry. The oil industry became foreign-controlled at an early stage both because foreign interest was

aroused early by US experience, and because in the 1880's the Peruvian owner of the main oilfield considered sale of his assets for a lump sum preferable to development. The copper-mine owners of Cerro de Pasco later made a similar calculation. Since in both cases it was clear that, in the absence of foreign capital, Peruvian enterprises would sooner or later have undertaken the development of the assets, it is unclear that the economy (as distinct from individual entrepreneurs) benefited from the process of denationalisation.

(iii) Closer analysis of the actual operations of the two leading foreign firms in Chapters 4 and 5 indicated that their contribution to the development of the Peruvian economy during the period up to the mid-1930's was negligible or negative. That is, the national economy would have done equally well or better had the mineral export sectors remained in the hands of domestic capitalists, even if all other facets of the international market situation remained unchanged. This is not, however, the same as saying that the earlier national development process would necessarily have been sustained at a high level in the absence of foreign direct investment, since other elements of the international situation were also exercising a growing influence on Peruvian capitalists' decisions - particularly the possibility of placing capital abroad.

(iv) the displacement of the domestic entrepreneurial elite from entrepreneurial activity appeared to be a real feature of the period. The sale or lease of assets to foreign firms provided various Peruvian entrepreneurs with spare time and capital, but there is little sign of

this being put to developmental use in the 1920's. Where men such as Fernandini were to be observed investing locally it was never remotely in proportion to their real resources. By the late 1920's it was common to find the native elite described as non-entrepreneurial, lazy, or culturally backward - in strong contrast to their performance around the turn of the century.

(v) The capitalists who were involved in the sale or lease of assets to foreigners, and subsequent displacement from entrepreneurial activity, were virtually never thus displaced against their will (the Proaño case provides an exception to prove the rule). Unless it is considered that they thereafter ceased to act as rational economic agents, it could be anticipated that they would subsequently invest their resources where opportunity offered. The area of attractive opportunities in the Peruvian economy, however, was narrowing sharply during the 1920's. The agricultural export sectors, which had attracted considerable new capital up to 1920, were generally in decline through the period, with the brief exception of cotton from 1922 to 1924. The manufacturing sector, its more important enterprises by now dominated by foreign capital in any case, was suffering from falling profitability. The only sector in the 1920's to offer major new investment outlets was urban development, which was the most significant area of economic enterprise in the early 1920's. The end of the urban boom about 1925 removed also this area of profit opportunities. This is, of course, not to say that the economy's need, as a whole, for heavy investment of all available resources was not great, nor that the opportunities for important development projects were not plentiful. The difficulty in

channelling capital and entrepreneurship into such activities appears to have been simply that the available return was below the private opportunity cost of these resources, determined by the profit expectations of the Peruvian capitalist group (these expectations, it could well be argued, were artificially stimulated by the high profits which could be seen accruing to foreign firms in export activities; and also by the experiences of native capitalists during the wartime export boom).

(vi) The fact that the Peruvian economy in the 1920's was an open system, with a free foreign-exchange market and a Government prepared to intervene drastically to maintain the exchange rate by heavy sales of dollars, meant that investment opportunities abroad played an important role in determining the opportunity cost of capital, as perceived by the Peruvian entrepreneur. The evidence of large-scale capital flight from Peru suggests that there was in fact a capital surplus in Peru, in the sense that, at the prevailing market rate of interest or profit, the absorptive capacity of the Peruvian economy was lower than the amount of capital available. This low absorptive capacity was greatly aggravated by foreign control of the most dynamic export sectors of the 1920's, which prevented any massive flow of Peruvian investment into those sectors.

(vii) The known and accessible deposits of oil, copper, silver and vanadium were few in number and subject to a growing degree of oligopolistic control by foreign firms and a very few favoured Peruvian enterprises. The resource endowment of these and other export sectors could be expanded only by new discoveries in accessible regions (of

which none remained to be made by the 1900's) or by major infrastructural projects, to bring the deposits of the interior into touch with export opportunities and/or to expand the area of irrigated agricultural land.

One key problem resulting from this scarce supply of natural resources was that the firms controlling the main mineral deposits were able to obtain quasi-rents on the basis of their monopolistic or oligopolistic position. This element of monopoly in certain export sectors was of more importance than the more familiar problems of 'enclaves'.

(viii) Given a fixed supply of land factors, investment of local capital in those sectors controlled by Peruvian firms could be pushed to the point where the marginal return on capital fell below the cut-off level[1]; but thereafter local savings were allocated elsewhere - to investment in non-export sectors; to investment abroad; or to consumption. The central argument of Chapter 7 is that by the 1920's the spread of foreign control over the land factors vital to several export sectors had significantly reduced the absorptive capacity of the export economy for local capital, while a number of elements, some connected with this first process and some separate, combined to reduce the number of attractive investment openings in non-export sectors. Local savings were therefore diverted increasingly towards capital flight and consumption, and a process of decay of the economy's development capacity set in

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1. Stevens, Chapter 4; and Adler, Absorptive Capacity: the Concept and its Determination.

(ix) The evidence presented in Chapter 6 on the performance of the Peruvian Government as a bargaining and regulating agent indicates that policy-formation in Peru was based less upon the requirements of national development than upon the demands of very limited minority group interests. Government policy was clearly not optimal, but neither was it accidental or based upon misunderstanding. Government policy was rational according to the rules of the political game, in which Government was expected to favour certain groups against others, and was also able to operate as a profit-maximising body itself. The result was that the regulation of foreign firms in Peru was lenient in the extreme, to the detriment of the prospects for national development.

(x) Economic stagnation set in, however, only in the second half of the 1880-1930 cycle. The first half of the cycle, as was noted above, provides a case study of the developmental capacity of Peruvian entrepreneurs, in a context of expanding investment horizons, to mobilise resources and invest them effectively in an integrated development process. The second half of the cycle shows the other side of the coin - reactions to a context of shrinking investment horizons. The contraction of investment opportunities on two fronts (the export sectors which became closed to Peruvian enterprise, and the non-export sectors whose demand was squeezed by a variety of factors.) resulted in a diversion of resources away from development of the Peruvian economy. Merhav has postulated a pattern closely corresponding to this:[1]

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1. Merhav, Technological Dependence, Monopoly, and Growth p. 158.

> The capitalist class, facing shrinking investment opportunities, may have recourse to capital flight, and may settle down to low-level equilibrium. It ... may assume the role of comprador in relation to foreign capital ... Economic stagnation will then be parallelled by social and political atrophy ...

The Peruvian economy was on a downward path (from a development point of view) well before the onset of the full-scale world depression of 1929; and it is simplistic to attribute the failure of the country's development process merely to that external collapse of markets for export products. The failure rested rather in a complex set of factors, including the earlier decline of certain specific international commodity markets (especially sugar, and to some extent cotton); the effects of a major increase in the proportion of the national economy controlled by foreign capital; the scarcity of land factors, aggravated by monopolistic or oligopolistic patterns of control over those factors; a political system geared to the interests of groups committed to the open-economy model; and the possibility of access to international capital markets for Peruvian capital.

(xi) In summary, the familiar static 'gains from trade' undoubtedly occurred in the case of Peru's integration into the international economy; but from a dynamic viewpoint the long-run outcome was not favourable. The gains from trade were increasingly captured by foreign capital as the most successful parts of the local economy became denationalised. One effect of operating in an open system was to draw Peruvian capital out of the Peruvian economy to seek investment opportunities abroad. The advantages possessed by international firms enabled them to outbid Peruvian firms in the market for assets, and subsequently to

buy off opposition, including that of the Government. The overall result of these processes was to increase the internal rigidity of the Peruvian economy from the turn of the century on, and to decrease the supply of entrepreneurship coming forward for employment in the development of the national economy. Analytically, the problem resolves into a conflict between the private welfare calculations of local capitalists and the social welfare of the country as a whole. This problem was characteristic not only of the private sector, but equally of the Government, which bargained and regulated using criteria which were not related to the development needs of the economy.

There is, throughout the discussion in this study, a continual element of apparent contradiction which should be confronted at this point. The analysis has rested upon implicit or explicit counterfactual comparisons between the state of the Peruvian economy as it appeared in the 1920's on the one hand, and a hypothetical economy run solely by the national bourgeoisie on the other. This comparison performs an important analytical function in highlighting the degree to which the resources needed for development were available within the Peruvian economy, and in indicating some of the reasons why those resources were not more effectively used in practice. It is, however, important to distinguish between the conclusion that the net effect of FDI in Peruvian export sectors was negative, and the claim that merely removing FDI and leaving national capitalists to do the job would be a sufficient condition for integrated national development. The capacity of the native elite to undertake this task was not in doubt, but their willingness to do so would have depended on the

concrete opportunities with which they found themselves confronted. In the absence of correct government policies, the long-run effects of Peru's integration into the international system might still have been unsatisfactory even in the absence of foreign direct investment.

Peru's neighbour, Bolivia, provides an outstanding case study of such a situation. There, the tin industry evolved under the dominance of three Bolivian-based entrepreneurs (Patiño, Aramayo and Hochschild) without foreign-based international firms establishing a position of much importance in the industry. Throughout the twentieth century tin has been Bolivia's chief export, and the industry upon which an integrated national development process should have been based. Yet during the fifty years of control of the industry by native entrepreneurs, the underdevelopment of Bolivia was not seriously altered. In effect Patiño, beginning from a domestic base, built his enterprise up to the level of international significance, and then himself began to operate as an international firm, moving his headquarters abroad and transferring large sums of capital out of the Bolivian economy.[1] In this, he was only doing on a grander and more obvious scale what Peruvian entrepreneurs were also doing when they sent their capital abroad.

A chance failure by foreign capital to invest in Peru, thus, would not in fact have been a sufficient condition for an integrated process of national capitalist development; there would also have had to be a set of factors offsetting the desirability of capital flight, and removing the possibility (or desirability) of national capitalists transforming themselves into international firms and removing sections of

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1. Klein, 'The Creation of the Patiño Tin Empire'.

their enterprise from the control of their (native) host economy. In practical terms, it is difficult or impossible to visualise an historically-plausible process which might have brought this about in Peru in the 1920's. The analysis in this study therefore does not qualify as an exercise in 'could-have-been' or 'should-have-been'. It constitutes merely an attempt to explain certain aspects of the Peruvian economy in terms of its historical evolution.

Clearly, throughout the discussion, the role of government policy has been crucial. The main problems faced by Peruvian development were such as to be susceptible to correction or amelioration by firmly-applied policy measures. For example, the fact that foreign direct investment in export sectors failed to provide benefits for Peru cannot be taken as evidence that foreign capital necessarily damages a host economy. Given an effective regulating government, many of the problems disappear or become less important. What the analysis here suggests is that a country which becomes integrated into the international system without having previously installed an effective regulating State apparatus, may well suffer rather than gain from such integration - and once the integration has taken place, a number of powerful factors combine to preserve the non-regulating State: in Leguía's case, the availability of foreign loans to keep his government afloat.

In conclusion, a note of caution is in order. The evidence presented in this study provides considerable support for certain of the hypotheses of the 'dependency' school, and it has been suggested that the key to Peruvian development failure in the first half of the present century lies in such models. Nevertheless, it should be borne in mind

that a number of special features, unique to Peru in the period under discussion, contributed powerfully to the patterns described. Whether this case study is capable of generalisation, to apply to other Latin American economies or different time periods, remains a question for further empirical research.

APPENDIX B*

Estimation of Returned Value from the Oil Industry

The purpose of this appendix is to describe the derivation of estimates of the three components of returned value set out in the equation

$$B = G + W + L + H$$

That is, figures, are required on the wage bill, payments to Government, and miscellaneous local costs. For raw data we are totally dependent on the published statistics of the industry; no use has been made of company archives.[1] Fortunately, the two bodies responsible at various times for the collection of statistics - the Cuerpo de Ingenieros de Minas (1906-1922 and 1932-1939) and the Dirección de Minas y Petróleo (1924-1931) - went about the task with great zeal, with the result that it is possible to construct reasonably accurate series for the items sought.

1. The Wage and Salary Bill

For this, figures were available directly in the statistics from 1916 on, based upon the total payments reported in each company's 'planillas de pago' (daily wage sheets) although company-by-company breakdowns were not always given. Prior to 1916, only the number of employees was given, with vague indications of the level of average

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1. The IPC left virtually no archival material in Peru, and none at all of relevance to the period considered here. Some Lobitos Oilfields papers are held by Milne and Co in Lima, but limitations of time prevented a search of the archive for material to corroborate the published statistics.

* Note that there is no Appendix A.

TABLE B4 CONTINUED

2. Lobitos Oilfields Limited

Year	Wages and salaries	Export duties	Import duties	Mining tax	Gasoline tax	Royalty payments	Miscellaneous specific costs	Sub-total	Miscellaneous 10% addition	TOTAL
1906	10	-	6	3	-	-	1	20	2	22
1907	11	-	7	3	-	-	1	22	2	24
1908	12	-	6	3	-	-	1	22	2	24
1909	13	-	6	3	-	-	1	23	2	25
1910	13	-	5	3	-	-	1	22	2	24
1911	14	-	8	3	-	-	1	26	3	29
1912	16	-	8	3	-	-	1	28	3	31
1913	21	-	8	3	-	-	2	34	3	37
1914	28	-	6	3	-	-	2	39	4	43
1915	37	-	4	3	-	-	3	47	5	52
1916	47	-	9	3	-	-	4	63	6	69
1917	43	9	11	3	-	-	3	69	7	76
1918	36	18	8	3	-	-	3	68	7	75
1919	66	28	10	3	-	-	5	112	11	123
1920	91	24	8	3	-	-	7	133	13	146
1921	117	13	10	3	-	-	10	153	15	168
1922	115	34	18	3	-	-	10	180	18	198
1923	165	42	16	3	-	45	14	285	29	314
1924	237	50	29	3	-	63	20	402	40	442
1925	302	75	22	3	-	80	29	511	51	562
1926	351	92	32	3	-	95	34	607	61	668
1927	214	99	35	4	-	134	20	506	51	557
1928	160	86	42	4	4	112	16	424	42	466
1929	195	113	20	4	4	117	19	472	47	519
1930	167	145	16	4	3	75	16	426	43	469
1931	119	180	11	4	3	86	14	417	42	459
1932	258	160	14	4	3	91	26	556	56	612
1933	266	197	20	4	2	54	30	573	57	630
1934	308	204	30	4	2	92	36	676	68	744
1935	303	215	25	4	2	119	42	710	71	781
1936	295		27	4	3	149	41			

TABLE B4 CONTINUED

3. Piaggio S.A.

Year	Wages and salaries	Payments to Government	Miscellaneous specific costs	Sub-total	Miscellaneous 10% addition	Total local costs	Estimated profit[a]	Total returned value
1906	10	1	1	12	1	13		
1907	10	1	1	12	1	13		
1908	10	1	1	12	1	13		
1909	10	1	1	12	1	13		
1910	10	1	1	12	1	13		
1911	10	1	1	12	1	13		
1912	10	1	1	12	1	13		
1913	10	1	1	12	1	13		
1914	10	1	1	12	1	13		
1915	10	2	1	13	1	14		
1916	8	2	1	11	1	12	51	63
1917	14	2	1	17	2	19	88	107
1918	14	2	1	17	2	19	67	86
1919	18	2	2	22	2	24	86	110
1920	16	2	1	19	2	21	72	93
1921	17	3	2	22	2	24	88	112
1922	17	3	1	21	2	23	96	119
1923	16	4	1	21	2	23	88	111
1924	23	3	2	28	3	31	55	86
1925	27	4	2	33	3	36	24	60
1926	25	4	2	31	3	34	26	60
1927	22	3	2	27	3	30	37	67
1928	36	2	2	40	4	44	26	70
1929	25	2	1	28	3	31	124	155
1930	21	2	2	25	3	28	119	147
1931	14	3	2	19	2	21	117	138
1932	19	3	1	23	2	25	71	96
1933	18	3	1	22	2	24	89	113
1934	17	2	1	20	2	22	72	94
1935	17	2	2	21	2	23		
1936	18	2	2	22	2	24		

a. Profits estimate obtained very crudely by subtracting total local costs and estimated imports from gross earnings.

wages, from which a provisional set of figures has here been assembled.

The planillas, however, show only the basic payments to regularly-employed labour, excluding overtime payments and employment of contract labour. For various years in the 1920's (1920-1925) the Dirección de Minas y Petróleo, on the basis of enquiries into these two aspects, included in their figures a 20% addition to planilla wages, which was stated to cover adequately the questions of overtime and contract work.[1] In the figures given here, this 20% upward adjustment to total wages has been carried through to other years.

The calculation of salaries presents somewhat different problems, since the definition of who constituted the white-collar labour force was not constant. Prior to 1926 salaries were seldom mentioned in the statistics, and in the three years when data was provided - 1906, 1914, and 1921 - the figures are merely for the administrative office staff of the three companies. In the early years of the century, the office staff of the foreign companies was mostly foreign itself, as was pointed out in the 1906 statistics.[2] The issue is not of great importance, since the office staff made up only a very small proportion of the workforce, and for simplicity projected series for their salary bill have been obtained as follows:[3]

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1. B.O.M.P. No. 15, p. 63.
2. B.C.I.M. No. 50, p. 132.
3. The salary estimates are based upon the wages payable to the higher level of skilled labour (including foremen).

1906-1912, say 30 'empleados' @ £p20 monthly
1913-1915, say 50 'empleados' @ £p22 "
1916-1920, say 50 @ £p25 "
1921-1925, say 60 @ £p27 "

From 1926 on, 'empleados' appear regularly in the statistics, but under a different definition which appears to include, in addition to administrative staff, various categories which formerly were classed as skilled labour: foremen, engineers, refinery technicians, etc. Their total salary bill has been reported as given in the statistics.

In Table B1 appear the total figures for the industry; firm-by-firm estimates are in the company tables given at the end of this Appendix.

2. Payments to Government Sector

Under this heading come a number of duties and taxes to which the oil industry was subject. The main elements were duties paid on imports and exports; mining tax paid on the surface area of concessions held; royalties; and taxes paid on the companies' own consumption of gasoline from 1927. Of these, the easiest is export duties, since for this figures can be taken from the figures on Customhouse receipts under this heading for the posts of Talara, Lobitos, Cabo Blanco, and Zorritos, from 1916 (the year in which export duties first became effective) through to 1936. Figures for the total receipts from export duties were assembled in certain of the volumes of official statistics, along with other taxes paid, and for certain years in the 1920's a company-by-company breakdown was given. Where the breakdown was not

TABLE B1

Estimates of the Wage and Salary Bill, 1906-1936.

Thousands of Libras.

Year	Wages		Salaries		Totals	
	Number employed	Amount paid	Number of empleados[d]	Amount paid	Number employed	Amount paid
1906	801	78	30	7	831	85
1907	1,000[a]	78	30	7	1,030	85
1908	970[a]	78	30	7	1,000	85
1909	n.a.	78	30	7	n.a.	85
1910	n.a.	78	30	7	n.a.	85
1911	n.a.	78	30	7	n.a.	85
1912	1,040[a]	84	30	8	1,070	92
1913	1,650[a]	102	50	13	1,700	115
1914	1,450	132	50	13	1,500	145
1915	2,700	174	50	13	3,200	187
1916	2,749	208	50	15	2,799	223
1917	2,237	190	50	15	2,287	205
1918	1,520[a]	164	50	15	1,570	179
1919	2,678	300	50	15	2,728[b]	315
1920	4,000[b]	400	50	15	4,050	415
1921	4,360	470	60	20	4,420	490
1922	4,989	460	60	20	5,049	480
1923	5,577	530	60	20	5,637	550
1924	6,437	620	60	20	6,497	640
1925	8,695	820	60	20	8,755	840
1926	7,909[c]	750	2,092[c]	227[c]	10,001	977
1927	6,702	670	2,019	222	8,721	892
1928	5,831	600	2,053	230	7,884	830
1929	5,087	580	1,726	199	6,813	779
1930	4,568	470	1,839	204	6,407	674
1931	3,279	300	1,139	178	4,418	478
1932	4,103	690	652	263	4,755	953
1933	4,302	700	632	217	4,934	917
1934	5,130	740	675	286	5,805	1,026
1935	5,314	780	660	301	5,974	1,081
1936	5,402[b]	780	665	312	6,067[b]	1,092

a. Figures drawn from a table showing total mining employment in the Departments of Tumbes and Piura. This table appears to be drawn from a different source from the other, direct reports of oil labour.

b. Includes contract labour.

c. In this year the definition of an 'empleado' used by the statistics changed. It is clear that a large group of workers were shifted across from the 'wage labour' to the 'salaried labour' column; it is also possible (though no evidence on this could be found) that some group not formerly reported became included in the statistics, though it is not clear which group would be involved. The general trend shown by the total employment series, however, is consistent with other evidence: a sharp rise in employment during the early and mid 1920's, as the IPC built up its operations to a high pitch, followed by a period of consolidation and labour replacement after 1926.

d. Rough estimates up to 1925. See text.

Sources: B.C.I.M. Nos. 50, pp. 132-3; 67, p. 44; 76, p. 73; 80, p. 91; 81, p. 94; 82, pp. 39 and 112; 83, p. 50; 86, pp. 55-6; 95, pp. 50 and 114; 98, pp. 173-6; 100, p. 76; 103, pp. 62-71; 106, pp. 59-68; 107, pp. 73-83; 111, pp. 244-7; 112, p. 172; 117, p. 303; 119, pp. 172-3.

B.O.M.P. Nos. 9, pp. 69-91; 15, pp. 63-90; 21, p. 87; 27, p. 38; 33, pp. 63-4; 38, p. 89; 39 pp. 176-81.

available, company data has been derived directly from the port statistics. The results, along with figures on import duties, appear in Table B2.

The import duties paid by the companies from 1920 on were summarised in the 1938 statistics,[1] on the basis of a methodology developed in the early 1920's.[2] The technique adopted was to take total import duties from the port of Talara (through which imports for both IPC and Lobitos passed, statistically speaking) and divide them 80-20 between the two companies. Zorritos did not function as an importing port, since the Callao-based owner preferred to bring in his imports through Callao and re-ship them north; figures were therefore estimated by the statisticians for Piaggio S.A. during most of the 1920's, which (being too low to materially affect the results) have here been projected by assumption, for years before and after those covered by published statistics.

For years prior to 1920, approximate estimates of import duties from IPC and Lobitos have been assembled from the customhouse statistics of Talara and Paita. The Talara customhouse began to operate as a statistically-independent entity only in 1918-1919, before which date all goods entering Talara were registered by the authorities at Paita, further south. The bureaucratic shift from one port to the other was not, apparently, done in a single movement, but took place gradually over the years 1918-1921. Thus, for years before 1918 it is necessary to extract estimates from the Paita

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1. B.C.I.M. No. 124, pp. 292-293.
2. The assumptions and estimates involved are set out in B.O.M.P. No. 9, p. 64.

statistics; and from 1918 to 1921 weighted estimates incorporating Paita and Talara are required. On the basis of 1922 and 1923 (normal years for oil company imports), it was estimated that normal local trade passing through Paita at that time, after oil company imports had ceased to affect the Paita statistics, were about 65% the level of oil company imports, as shown by the Talara figures. Therefore, for years prior to 1918, the oil companies have been assumed to have paid 60% of the total duties collected by the Paita customhouse. From 1919 to 1920 it has been assumed that the oil companies' imports represented 60% of the total imports registered by the two customhouses, Talara and Paita; subtraction of the Talara figures then gave an estimate of oil company imports through Paita. The percentage of Paita imports which this represented was applied to the Paita import duty receipts, and the results appear as the figures in Table B2.

The third component of payments to Government was royalties, fixed at a rate of 10% of gross output by the Petroleum Law of 1922. Figures for these were derived directly from tables in two of the statistical volumes.[1]

The fourth component, mining tax, was never a major burden for the companies. Lobitos and Piaggio paid £p3 per claim held up to 1922, and thereafter were subject to a sliding-scale related to degree of development of claims. Since the areas held by these companies were relatively small, only a few thousand pounds annually were involved.

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1. B.C.I.M. No. 111, pp. 244-7; and No. 124, pp. 292-3.

TABLE B2

Estimated Export and Import Duties, by Company, 1906-1936

£p000

Year	Import duties				Export duties			
	IPC	Lobitos	Piaggio	Total	IPC	Lobitos	Piaggio	Total
1906	26	6	1	33				
1907	27	7	1	35				
1908	26	6	1	33				
1909	25	6	1	32				
1910	22	5	1	28				
1911	32	8	1	41				
1912	31	8	1	40				
1913	30	8	1	39				
1914	23	6	1	30				
1915	16	4	2	22				
1916	38	9	2	49	14	-	-	14
1917	43	11	2	56	30	9	-	39
1918	30	8	2	40	54	18	-	72
1919	39	10	2	51	81	28	-	109
1920	34	8	2	44	91	24	-	115
1921	40	10	2	52	94	13	1	108
1922	70	18	2	90	145	34	1	180
1923	65	16	2	83	156	42	2	200
1924	114	29	2	145	221	50	1	272
1925	86	22	2	111	254	75	1	330
1926	127	32	2	162	324	92	1	417
1927	139	35	2	177	307	99	-	406
1928	166	42	2	210	354	86	-	440
1929	79	20	2	101	417	113	-	530
1930	62	16	2	80	451	145	-	596
1931	43	11	2	56	509	180	1	690
1932	56	14	2	72	485	160	1	646
1933	78	20	2	100	1,028	197	1	1,226
1934	119	30	2	151	1,316	204	-	1,520
1935	100	25	2	127	1,239	215	-	1,454
1936	110	27	2	139				1,439

Sources: Totals from 1920 on from B.C.I.M. No. 124, pp. 292-294. Earlier totals, and company data, calculated from port-by-port foreign trade statistics in Extracto Estadístico.

Note: Totals may not all add exactly, due to rounding.

IPC, with a huge concession (41,600 claims) evaded taxation successfully until 1922, and then made a special deal with the Government fixing mining tax at a low level.

Finally, in 1927 a consumption tax on gasoline was instituted, payable by all consumers including the oil companies, who used gasoline in company automobiles and lorries. The amount involved was, again, small, and figures are available directly for only 1932-1936. The other years have been filled in by rough projection.

3. Miscellaneous

Under this heading come two sets of items. In the first place, an attempt has been made to account for certain minor expenditures on the oilfields workforce, and secondly an estimate has been included to cover purchases of local material inputs by the companies.

Payments under the first heading comprise items such as the free schools and hospitals provided for employees by the companies, and various social-security payments dictated by law. The estimating method used, in the absence of direct information on most of these, has been to construct projections using as a base the years 1932 and 1933, the only ones for which figures exist.[1] The percentage incidence of each payment on the total wage and salary bill has been calculated for those years, and similar percentages have then been applied to the wage and salary figures for other years. The detailed

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1. B.C.I.M. No. 111, pp. 244-247.

TABLE B3

Various Items of Miscellaneous Expenditure, Estimated, £p000

Year	Services supplied by companies: schools, hospitals, etc. 8% of wage/salary bill	Laws 4919 and 5119: 1% of wages/salaries (claims and benefits)	Law 1378 0.5% of wages/salaries (industrial accidents)	Law 7515 0.2% of wages and salaries (May 1st)	Laws 7505 and 7735 (holidays) 1.6% of wages/salaries	TOTAL
1906	7					7
1907	7					7
1908	7					7
1909	7					7
1910	7					7
1911	7					7
1912	7					7
1913	9		1			10
1914	12		1			13
1915	15		1			16
1916	18		1			19
1917	16		1			17
1918	14		1			15
1919	25		2			27
1920	33		2			35
1921	39		2			41
1922	38		2			40
1923	44		3			47
1924	51		3			54
1925	67	8	4			79
1926	78	10	5			93
1927	71	9	4			84
1928	66	8	4			78
1929	62	8	4			74
1930	54	7	3			64
1931	60	5	2	1		68
1932	76	10	5	2		93
1933	73	9	5	2	15	104
1934	82	10	5	2	16	115
1935	87	11	5	2	17	122
1936	88	11	5	2	17	123

Sources: Percentages from B.C.I.M. No. 111, pp. 244-247. Wage and salary data from Table B1.

data appear in Table B3.

The second component of the miscellaneous category posed a real problem, since no evidence whatever has come to light indicating any purchases of local goods and services by the companies. Nevertheless, it was considered prudent to make allowance for the probability of various payments to local factors by the companies: the services of local lawyers and engineers from time to time; bribes paid to politicians and administrators (apart from the spectacular official bribes which have been included in the figures on 'payments to Government'); possibly limited payments to local shipping companies for carrying consignments of company goods; and rentals paid on various sites - e.g. company offices in Lima. To allow for these, and possible minor purchases of local material, a blanket 10% addition has been made to the total local expenditures identified so far under all headings, as a contingencies margin. This margin virtually guarantees that the final returned-value figures represent a comfortable over-estimate.

The figures brought together in Table B4 summarise all the data company by company, and give the final figures used in the main text.

TABLE B4

Components of Returned Value by Company, £p000

1. International Petroleum Company

Year	Wages and Salaries	Export duties	Import duties	Mining tax	Gasoline tax[a]	Special payments to Government[c]	Miscellaneous specific costs[b]	Sub-total	Miscellaneous 10% addition	TOTAL
1906	65	-	26	-	-	-	5	96	10	106
1907	64	-	27	-	-	-	5	96	10	106
1908	63	-	26	-	-	-	5	94	9	103
1909	62	-	25	-	-	-	5	92	9	101
1910	62	-	22	-	-	-	5	89	9	98
1911	62	-	32	-	-	-	5	99	10	109
1912	66	-	31	-	-	-	5	102	10	112
1913	84	-	30	-	-	-	8	122	12	134
1914	107	-	23	-	-	-	10	140	14	154
1915	140	-	16	-	-	-	12	168	17	185
1916	168	14	38	-	-	-	14	234	23	257
1917	148	30	43	-	-	-	13	234	23	257
1918	129	54	30	-	-	-	11	224	22	246
1919	231	81	39	-	-	-	19	370	37	407
1920	308	91	34	-	-	-	27	460	46	506
1921	356	94	40	-	-	-	30	520	52	572
1922	348	145	70	7	-	265	30	865	60[e]	925
1923	369	156	65	7	-	-	32	629	62	691
1924	380	221	114	7	-	-	32	754	75	829
1925	511	154	86	7	-	-	49	807	81	888
1926	601	324	127	7	-	-	57	1,116	112	1,228
1927	656	307	139	7	-	-	62	1,171	117	1,288
1928	634	354	166	7	15	-	60	1,236	124	1,360
1929	559	417	79	7	16	150	54	1,282	113[e]	1,395
1930	486	451	62	7	12	-	46	1,064	106	1,170
1931	345	509	43	7	11	-	34	949	95	1,044
1932	676	485	56	7	11	-	65	1,300	130	1,430
1933	633	1,028	78	7	13	-	71	1,830	183	2,013
1934	701	1,316	119	7	12	-	79	2,234	223	2,457
1935	761	1,239	100	7	11	-	87	2,205	221	2,426
1936	779		110	7	17	-	88			

a. Total multiplied by IPC share of total benefits of total output in each year. b. Schools, hospitals, social-security benefits, etc.
c. Cash payments made in exchange for settlement of disputes in 1922 and 1929. Does not include any personal payments to Government personnel in connection with these agreements, nor advances made against future tax liabilities. e. In years where local costs are artificially inflated by special payments, the 10% allowance has been calculated on total costs minus the special payment.

TABLE E5

Results of Returned-Value Analysis of the Oil Companies

£p000

Year	IPC			Iobitos			Piaggio			Industry totals		
	Local costs	Total sales	Local costs as a % of sales	Local costs	Total exports	Local costs as a % of exports	Local costs	Total sales	Local costs as a % of sales	Local costs	Total sales	Local costs as a % of sales
1916	257	1,459	18	69	103	67	63	69	91	389	1,631	24
1917	257	1,201	21	76	180	42	107	115	93	440	1,496	29
1918	246	1,469	17	75	230	33	86	106	81	407	1,805	23
1919	407	2,364	17	123	348	35	110	132	83	640	2,844	23
1920	506	1,923	26	146	198	74	93	115	81	745	2,236	33
1921	572	4,253	13	168	304	55	112	134	84	852	4,691	18
1922	925	5,672	16	198	537	37	119	137	87	1,242	6,346	20
1923	691	4,530	15	314	603	52	111	126	88	1,116	5,259	21
1924	829	6,127	14	442	743	59	86	100	86	1,357	6,970	19
1925	888	5,783	15	562	1,073	52	60	77	78	1,510	6,933	22
1926	1,228	7,280	17	668	1,204	55	60	77	78	1,956	8,561	23
1927	1,288	10,014	13	557	1,461	38	67	85	79	1,912	11,560	17
1928	1,360	11,505	12	466	1,326	35	70	83	84	1,896	12,914	15
1929	1,395	12,630	11	519	1,745	30	155	168	92	2,069	14,543	14
1930	1,170	7,073	17	469	1,388	34	147	160	92	1,786	8,621	21
1931	1,044	5,653	18	459	1,045	44	138	153	90	1,641	6,851	24
1932	1,430	7,332	20	612	1,557	39	96	110	87	2,138	8,999	24
1933	2,013	9,513	21	630	1,195	53	113	131	86	2,756	10,839	25
1934	2,457	12,242	20	744	1,402	53	94	112	84	3,295	13,756	24
Totals	18,963	118,023	16	7,297	16,642	44	1,887	2,190	86	28,147	136,855	21

Sources: Returned value series from Table B4. Sales revenue is the sum of exports and local sales (see Appendix C).

APPENDIX C

Income to the Oil Companies from Sales within Peru

Our object in this appendix is to produce estimates of the F.O.B. value of petroleum products despatched from the oil ports for consumption within Peru. This will be equivalent to the income derived by the companies from domestic sales, net of distribution and handling costs outside the oilfields. The ideal situation for our purposes would be to possess a full series of figures showing the F.O.B. value of 'cabotaje' (coasting-trade) petroleum passing through the various Customs posts. However, the publication of 'cabotaje' data in Peru was sporadic in the first half of this century, and no original (unpublished) documents appear to have survived in official archives. Table C1 below assembles the slender material available on the reported or declared value of coastal trade through the oil ports of Talara, Lobitos, Cabo Blanco and Zorritos.

TABLE C1

Outward cabotaje through the oil ports, by value, various years, £p000

Year	Talara	Zorritos	Lobitos and Cabo Blanco	TOTAL
1913	101	66	4	171
1927	883	132	-	1,015
1928	851	123	24	998
1929	891	169	9	1,069
1932	776	108	7	891
1933	1,139	126	6	1,271
1934	1,329	113	12	1,454
1935	1,603	108	5	1,716
1937	1,987	65	4	2,056
1938	2,141	44	-	2,185

Sources: For 1913, Estadística del Comercio Especial, 1913
For other years, Extracto Estadístico, 1927 p. 220
1928 p. 222
1929-30 p. 265
1931-33 p. 162
1934-35 p. 188
1936-37 p. 165-6
1938 p. 171

We also have, from the annual official mining statistics, figures for rather more years showing the tonnage of various petroleum products shipped out from the oil ports of Talara and Zorritos to other ports in Peru. These figures are set out in Table C2 below.

TABLE C2

Shipments of petroleum products from Talara and Zorritos to Peruvian ports, 1915-1933

Metric Tons

Year	Fuel Oil	Kerosene	Gasoline	Gasoil	Lubri-cants	Grease	Other	TOTAL
1915	39,367	3,939	1,580	a	239	b	74	45,200
1916	57,611	3,451	2,014	a	243	b	137	63,455
1917	67,888	5,492	3,433	a	201	b	140	77,153
1918	73,415	4,340	3,016	893	303	b	199	82,129
1919	90,390	4,117	4,586	1,818	310	b	29	101,250
1920	97,029	6,180	9,698	3,202	674	b	48	116,831
1921	134,759	5,641	7,500	890	800	b	89	149,670
1922	89,925	6,250	8,129	1,137	843	b	36	106,320
1923	136,708	5,988	9,931	1,729	1,000	b	148	155,504
1924	139,291	6,507	15,338	2,176	1,206	b	26	164,544
1925	189,838	7,239	22,314	1,924	1,286	42	22	222,665
1926	142,578	5,435	25,133	2,030	1,819	11	7	177,013
1927	162,914	6,931	32,302	1,855	2,275	115	76	206,467
1928	178,440	9,133	36,291	2,177	3,163	83	517	229,804
1929	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1930	191,199	12,178	36,291	730	3,000	166	-	243,564
1931	177,361	10,900	35,923	88	3,163	184	324	227,751
1932	149,139	11,089	28,541	71	3,597	146	246	192,828
1933	141,959	12,052	35,429	-	2,915	165	331	192,851
1934	172,202	15,694	41,702	c	2,978	254	1,111	233,941

a. Included in gasoline
b. Included in lubricants
c. Included in Other

Sources: B.C.I.M. Nos: 86, p. 55
95, pp. 113-4
98, pp. 79-80
100, pp. 73-4
103, p. 77
106, p. 74
107, pp. 71-2
111, p. 205
112, p. 165
B.O.M.P. Nos: 9, pp. 50-4
15, pp. 41 ff
21, pp. 67 ff
27, p. 25
33, pp. 35-6

By applying values for the individual products to these volume figures, we can obtain estimates of the value of domestic sales. This procedure necessarily ignores certain aspects of reality, particularly the movement of stocks in the consuming centres, on which we have no information; and re-export of some of these products after they had passed through another port. However, as orders of magnitude they will suffice.

Income to the Oil Companies from sales in Peru

The next task therefore is to obtain price data for these products. This is by no means easy, since the figures for individual years are scattered through the published annual statistics, and are presented on bases which vary from year to year. Prices of three types were reported in the statistics. In the first place, for each year a set of 'valorización' prices was calculated for use as shadow prices in the valuation of output for statistical purposes.[1] These prices represented the wholesale value of each product in bulk, net of containers, taxes, etc. In the case of products sold almost entirely within Peru - gasoline, gasoil, kerosene, and lubricants - the 'valorización' prices appear to represent Lima wholesale prices, adjusted to remove items such as cost of containers. In the case of export products - crude oil and naphtha - the 'valorización' was supposed to provide an estimate of prices in export markets. Secondly, in a number of years during the period the actual wholesale prices charged for specific products by

1. For some comments on Peruvian valuation techniques of Macera, Estadísticas Históricas del Perú: Sector Minero (Precios), pp. i-x.

the two companies - IPC and Piaggio - were reported, usually in the form of price per gallon or per crate. (Gasoline, gasoil and kerosene were commonly sold at that time in crates of 10 gallons, containing two five-gallon cans. Both crates and cans were manufactured at the oilfields[1] from imported materials.) Thirdly, in two years (1916 and 1918) direct information on values FOB the oil ports is available.

Because they display the greatest consistency of coverage, the valorización prices will be used as the basis of calculations here for all years up to 1928, when they cease. Thereafter, quoted wholesale prices are used. For specific products, adjustments are then made to allow for cost of containers and conversion from CIF to FOB values. The product-by-product results are shown in Table C3. Adjustments have been designed to produce a lower-bound set of estimates of the income to the oil companies, which in turn means that estimates derived later of the profits earned on local sales are also lower-bound. The results are accordingly biassed if anything in favour of the IPC in the subsequent evaluation. The adjustments made are as follows:

1) Gasoline. For this product, the bulk price has been taken as final - i.e. the value of containers is ignored. This has been done because no information is available on what proportion of gasoline sold in Peru was in cans, as distinct from drums or bulk. The 1922 price statistics indicate that gasoline in containers cost up to 70%

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1. In 1917 the Talara can-making plant had a capacity of 10,000 cans daily; Zorritos capacity was much lower. (B.C.I.M. No. 96, p. 97.)

more per gallon than gasoline in bulk[1]; the result of excluding containers from the gasoline sales figures is thus to provide a figure for sales income which is definitely a low minimum. In view of the exclusion of containers, it has not been felt necessary to make any subtraction from the results to allow for conversion to FOB prices; a 1918 report[2] indicated that at that time transport costs for a crate of gasoline from Talara to Lima were 20 centavos (equivalent to 7.14 soles per ton, or 3% of the bulk prices shown in Table C3).

2) Kerosene. Since virtually all kerosene was sold in cans, an adjustment has been made to the value of sales to allow for the margin over bulk value accounted for by containers. This adjustment is based upon the fragmentary evidence available regarding the percentage size of this margin from time to time. A subtraction of 5% is then made to convert to FOB values; this is a generous estimate, representing more like 10% of bulk values.

3) Fuel Oil. Evidence on what adjustment is necessary to bring the Lima prices onto an FOB basis is unclear, since the 1916 statistics, the only ones to give an FOB figure[3], leave some doubt as to the actual wholesale price. Zorritos fuel oil is there given a quote corresponding to the value of crude oil (fuel oil is a residual product derived from the refining of crude), with FOB value stated to be 40-60% lower. The valorización price for the year, on the other hand, is equal to the FOB price (£p1.8.00 per ton). A deduction of 15% from

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1. B.C.I.M. No. 107, p. 62.
2. B.C.I.M. No. 98, p. 70.
3. B.C.I.M. No. 86, pp. 46-7.

the valorización prices has been considered ample (even excessive) for present purposes.

4) Gasoil. Again, allowance is made for the value of containers over and above the bulk price, on the basis of occasional information in the statistics. A 10% subtraction from the full CIF price is made for conversion to FOB (again, this is if anything an over-estimate).

5) Lubricating Oil. Although this product was generally sold in containers, no attempt has been made here to allow for these. A 10% subtraction is made from bulk prices to obtain FOB price.

6) Other. The various minor products, such as grease, pitch, bitumen, etc., have been put together, both because their values tend to be fairly similar (all are heavy residual refinery products) and because their quantitative significance is minimal. A general bulk price is estimated, and 10% subtracted to obtain FOB price. It will be noted that the Zorritos cabotaje statistics clearly fail to match with the reported total figures for these products; no attempt has however been made to correct those figures for this table.

The figures in Table C3 permit a separate estimate of IPC's income from local sales only up to 1928, in which year the regular reporting of shipments from Zorritos in detail ceased. Thereafter, we are dependent upon the published figures for total value of coastal trade, which although somewhat incomplete, do seem to provide a good basis for estimation of the value of sales by Piaggio (= shipments out of Zorritos) (note the good fit between our estimates and the Zorritos cabotaje value totals for 1927-28). For the years 1929-34,

TABLE C3

Income from Local Sales of Petroleum Products

1. Gasoline

Year	Bulk price £p per ton	Total tons shipped to Peruvian market	Value of total sales £p000	Shipped from Zorritos tons	Shipped from Talara tons	Value of IPC sales £p000
1915	17.81	1,580	28.1			
1916	21.00	2,014	42.3			
1917	21.00	3,433	72.1	2,325	1,108	23.3
1918	25.40	3,016	76.1	1,993	1,023	26.0
1919	25.34	4,586	116.2	2,513	2,073	52.5
1920	24.18	9,698	234.5	2,606	7,092	171.5
1921	24.18	7,500	181.4	2,696	4,804	116.2
1922	23.62	8,129	192.0	2,669	5,460	129.0
1923	(23.40)	9,931	232.4	(2,210)	7,721	180.7
1924	23.20	15,338	355.8	1,750	13,588	315.2
1925	23.20	22,314	517.7	1,085	21,229	492.5
1926	20.35	25,133	511.5	1,257	23,876	485.9
1927	20.35	32,302	657.3	2,296	30,006	610.6
1928	20.35	36,291	738.5	1,646	34,645	705.0
1929	20.35	(36,291)	738.5			
1930	18.56	36,291	673.6			
1931	16.78	35,923	602.8			
1932	14.99	28,541	427.8			
1933	14.99	35,429	531.1			
1934	14.99	41,702	625.1			

All figures in brackets are interpolations.

Sources: Prices from B.C.I.M. Nos. 83, p. 37 (1915 price); 86, pp. 46-47 (1916); 95, p. 103 (1917); 98, p. 69 (1918); 100, p. 64 (1919); 103, p. 60 (1920); 106, p. 57 (1921); 107, p. 57 (1922); 124, p. 284 (1925-34); and B.O.M.P. No. 9, p. 61 (1924). Where necessary, per gallon prices are converted to per ton prices at 357 gallons per ton, on the basis of a conversion table provided in B.C.I.M. No. 111, p. 228.
Tonnages figures from Table C2 above.
Zorritos tonnages to 1922 are refinery output figures minus exports, obtained from: B.C.I.M. Nos. 98, p. 66; 100, p. 62; 103, p. 58; 106, p. 56; 107, p. 61. Figures for 1924 to 1928 are reported outward cabotaje, from B.O.M.P. Nos. 9, p. 50; 15, p. 41; 21, p. 67; 27, p. 25; 33, p. 35. Conversions from cubic metres, where necessary, made at the rate of 1.37 cubic metres per ton, on the basis of equivalent prices given in B.C.I.M. No. 98, p. 69.
Value figures and Talara tonnages obtained by calculation from other data presented.

TABLE C3 CONTINUED

2. Kerosene

Year	Bulk price £p per ton	% added for containers	Amount added for container £p/ton	Full CIF price £p/ton	5% subtraction	FOB price £p/ton	Total tons shipped	Value of total sales £p000	Zorritos shipments tons	Talara shipments tons	Value of IPC sales £p000
1915	22.10	-[a]	-	22.10	1.10	21.00	3,939	82.7			
1916	12.20	77	9.39	21.50	1.08	20.42	3,451	70.5		3,594	93.4
1917	10.40	163	16.95	27.35	1.37	25.98	5,492	142.7	813	3,527	162.8
1918	16.08	196	31.52	48.60	2.43	46.17	4,340	196.3	1,444	2,673	85.3
1919	16.80	(100)	16.80	33.60	1.68	31.92	4,117	131.4	1,505	4,675	85.4
1920	12.82	(50)	6.41	19.23	0.96	18.27	6,180	112.5	1,879	3,762	68.7
1921	12.82	(50)	6.41	19.23	0.96	18.27	5,641	103.1	1,813	4,437	105.5
1922	17.50	43	7.53	25.03	1.25	23.78	6,250	148.6	(1,969)	4,019	89.5
1923	(16.75)	(40)	6.70	23.45	1.17	22.28	5,988	133.4	2,124	4,383	89.3
1924	16.00	34	5.44	21.44	1.07	20.37	6,507	132.5	2,171	5,068	101.7
1925	16.00	32	5.12	21.12	1.06	20.06	7,239	145.2	2,032	3,403	68.3
1926	16.00	32	5.12	21.12	1.06	20.06	5,435	109.0	1,530	5,401	109.4
1927	16.40	(30)	4.92	21.32	1.07	20.25	6,931	140.4	1,822	7,311	148.0
1928	16.40	(30)	4.92	21.32	1.07	20.25	9,133	185.0			
1929	(15.93)	(25)	3.98	19.91	1.00	18.91	(10,656)	201.5			
1930	(15.46)	(25)	3.87	19.33	0.97	18.36	12,178	223.6			
1931	14.99	(25)	3.75	18.74	0.94	17.80	10,900	194.1			
1932	13.65	(25)	3.41	17.06	0.85	16.21	11,089	179.7			
1933	13.65	(25)	3.41	17.06	0.85	16.21	12,052	195.3			
1934				(17.00)	0.85	16.15	15,694	253.5			

All figures in brackets are interpolations.
a. The valorización price in this year may include container; hence no addition made.

Sources: Prices: as for gasoline until 1924; thereafter B.O.M.P. Nos. 15, p. 55 (1925); 21, p. 78 (1926); 27, p. 33 (1927); 33, p. 36 (1928); and B.C.I.M. No. 111, p. 228. Conversion factor when needed, 333 gallons per ton.

Container margins estimated from IPC wholesale kerosene prices, quoted per crate of ten gallons, compared with bulk prices. Note that the very high container prices 1916 to 1919 were a result of wartime shortages of tinplate for cans.

Tonnage figure from Table C2 above.
Zorritos shipments from same source as gasoline. Conversion factor when needed 1.3 cubic metres per ton.

TABLE C3 CONTINUED

3. Fuel Oil

Year	Bulk price £p per ton	15% subtraction £p/ton	FOB bulk price £p/ton	Total shipments tons	Value of total sales £p000	Zorritos shipments tons	Talara shipments tons	Value of IPC sales £p000
1915	2.00	0.30	1.70	39,367	66.9			
1916	2.00	0.30	1.70	57,611	97.9			
1917	2.00	0.30	1.70	67,888	115.4	8,685	59,203	100.6
1918	3.00	0.45	2.55	73,415	187.2	8,063	65,352	166.6
1919	3.00	0.45	2.55	90,390	230.5	8,555	81,835	208.7
1920	3.50	0.53	2.97	97,029	288.7	8,681	88,348	262.4
1921	3.50	0.53	2.97	134,759	400.9	8,979	125,780	373.6
1922	3.20	0.48	2.72	89,925	244.6	8,841	81,084	220.5
1923	(3.20)	0.48	2.72	136,708	371.8	(4,845)	131,863	358.7
1924	3.20	0.48	2.72	139,291	378.9	849	138,442	376.6
1925	3.50	0.53	2.97	189,838	564.8	113	189,725	563.5
1926	3.50	0.53	2.97	142,578	424.2	406	142,172	422.3
1927	3.50	0,53	2.97	162,914	484.7	1,822	161,092	478.4
1928	3.20	0.48	2.72	178,440	485.4	884	177,556	483.0
1929	(3.50)	0.53	2.97	(184,820)	549.8			
1930	(3.50)	0.53	2.97	191,199	568.8			
1931	4.00	0.60	3.40	177,361	603.0			
1932	4.00	0.60	3.40	149,139	507.1			
1933	4.00	0.60	3.40	141,959	482.7			
1934	4.00	0.60	3.40	172,202	585.5			

All figures in brackets are interpolations.

Sources: Prices as for kerosene. Note that the 1922 and 1924 valorización price, £p3.2.00, was lower than the quoted IPC Lima price, £p3.5.00, for reasons which are not explained in the official statistics. The lower figures are used here, producing some under-valuation.

Tonnages from Table C2 above.

Zorritos tonnages from same sources as kerosene. Conversion factor 1.146 cubic metres per ton.

TABLE C3 CONTINUED

4. Gasoil

Year	Bulk price £p per ton	% addition for container	Addition for container £p/ton	Full CIF price £p/ton	10% subtraction £p/ton	FOB price	Total shipments tons	Value of total sales £p000	Zorritos shipments tons	Talara shipments tons	Value of IPC sales £p000
1915	-[a]	-	-	-	-	-	-	-	-	-	-
1916	-[a]	-	-	-	-	-	-	-	-	-	-
1917	-[a]	-	-	-	-	-	-	-	-	-	-
1918	14.50	102	14.79	29.29	2.93	26.46	893	23.6	-	893	23.6
1919	14.30	(85)	12.16	26.46	2.65	29.11	1,818	52.9	-	1,818	52.9
1920	11.97	(70)	8.38	20.35	2.04	18.32	3,202	58.7	-	3,202	58.7
1921	11.97	(70)	8.38	20.35	2.04	18.32	890	16.3	-	890	16.3
1922	15.88	64	10.16	26.04	2.60	23.44	1,137	26.7	-	1,137	26.7
1923	(18.40)	(38)	6.99	25.39	2.54	22.85	1,729	39.5	-	1,729	39.5
1924	20.40	12	2.45	22.85	2.29	20.57	2,176	44.8	-	2,176	44.8
1925	20.40	9	1.84	22.24	2.22	20.02	1,924	38.5	-	1,924	38.5
1926	20.40	4	0.82	21.22	2.12	19.10	2,030	38.8	-	2,030	38.8
1927	20.40	(4)	0.82	21.22	2.12	19.10	1,855	35.4	57	1,798	34.3
1928	20.40	(4)	0.82	21.22	2.12	19.10	2,177	41.6	-	2,177	41.6
1929	(20.40)	(4)	0.82	21.22	2.12	19.10	(1,454)	27.8	-	1,454	27.8
1930	(20.40)	(4)	0.82	21.22	2.12	19.10	730	13.9	-	730	13.9
1931	(20.40)	(4)	0.82	21.22	2.12	19.10	88	1.7	-	88	1.7
1932	(20.40)	(4)	0.82	21.22	2.12	19.10	71	1.4	-	71	1.4
1933	(20.40)	(4)	0.82	21.22	2.12	19.10	-	-	-	-	-
1934	(20.40)	(4)	0.82	21.22	2.12	19.10	-	-	-	-	-

All figures in brackets are interpolations

a. Up to 1918, gasoil was included with gasoline in the statistics.

Sources: Prices as for kerosene. Conversion factor when necessary, 317 gallons per ton.
Container estimates same sources as kerosene.
Tonnage figures and Zorritos shipments: same sources as kerosene.

TABLE C3 CONTINUED

5. Lubricating Oil

Year	Bulk price £p per ton	10% subtraction	FOB prices £p/ton	Total shipments tons	Value of total sales £p000	Zorritos shipments tons	Talara shipments tons	Value of IPC sales £p000
1915	33.00	3.30	29.70	239	7.1	-		
1916	36.00	3.60	32.40	243	7.9	-		
1917	33.00	3.30	29.70	201	5.7	-		
1918	32.47	3.25	29.22	303	8.9	-	303	8.9
1919	32.00	3.20	28.80	310	8.9	2	308	8.9
1920	33.17	3.32	29.85	674	20.1	3	671	20.0
1921	33.17	3.32	29.85	800	23.9	3	797	23.8
1922	35.29	3.53	31.76	843	26.8	8	835	26.5
1923	(34.80)	3.48	31.32	1,000	31.3	(4)	996	31.2
1924	34.30	3.43	30.87	1,206	37.2	-	1,206	37.2
1925	34.30	3.43	30.87	1,286	39.7	10	1,276	39.4
1926	34.30	3.43	30.87	1,819	56.2	7	1,812	55.9
1927	40.00	4.00	36.00	2,275	81.9	5	2,270	81.7
1928	(40.00)	4.00	36.00	3,163	113.9	8	3,155	113.6
1929	(40.00)	4.00	36.00	(3,082)	111.0			
1930	(40.00)	4.00	36.00	3,000	108.0			
1931	45.60	4.56	41.04	3,163	129.8			
1932	48.50	4.85	43.65	3,597	157.0			
1933	51.30	5.13	46.17	2,915	134.6			
1934	(51.30)	5.13	46.17	2,978	137.5			

All figures in brackets are interpolations.

Sources: As for kerosene. Conversion factors: 285 gallons per ton; 1.1 cubic metres per ton.

TABLE C3 CONTINUED

6. Other: Tar, pitch, grease, bitumen, etc.

Year	Bulk price £p/ton	10% subtraction	FOB price £p/ton	Total shipments tons	Value of total sales £p000	Zorritos shipments tons	Talara shipments tons	Value of IPC sales £p000
1915	15	1.5	13.5	74	1.0			
1916	16	1.6	14.4	137	2.0			
1917	16	1.6	14.4	140	2.0	65	75	1.1
1918	16	1.6	14.4	199	2.9	25	174	2.5
1919	15	1.5	13.5	30	0.4	30	-	-
1920	15	1.5	13.5	48	0.6	59	-	-
1921	14	1.4	12.6	89	1.1	22	67	8.4
1922	20	2.0	18.0	36	0.6	52	-	-
1923	(23)	2.3	20.7	148	3.1	(33)	115	2.4
1924	25	2.5	22.5	26	0.6	14	12	-
1925	25	2.5	22.5	64[a]	1.4	21	43	1.0
1926	20	2.0	18.0	18	0.3	20	-	-
1927	20	2.0	18.0	191	3.4	20	171	3.1
1928	20	2.0	18.0	600	10.8	25	575	1.0
1929	(20)	2.0	18.0	(594)	10.7			
1930	(20)	2.0	18.0	(587)	10.6			
1931	(20)	2.0	18.0	508	9.1			
1932	(20)	2.0	18.0	392	7.1			
1933	(20)	2.0	18.0	496	8.9			
1934	(20)	2.0	18.0	1,365	24.6			

Figures in brackets are interpolations. The 1929-1930 interpolation for total tonnages is not uniform, but based on estimates of items ommitted from the statistics in those years.

Sources: As for kerosene. It will be noted that in several cases there are clear conflicts between the Zorritos shipments data and the totals. Conversion factor: a general factor of 1.29 cubic metres per ton used.

therefore, estimates have been obtained by subtracting the reported value of Piaggio shipments from our estimated totals. This procedure was preferred to using the reported Talara values because of the absence of any information as to the basis on which the latter were prepared. The data for calculation of these years is in Table C4.

Finally, Table C5 assembles all the data on income to the two companies.

TABLE C4

Estimation of IPC Income from Local Sales, 1929-1934

Year	Total value of local sales £p000	Reported value of total shipments out of Zorritos £p000	IPC Income estimated by subtraction £p000	IPC Income as estimated earlier £p000
1927	1,403	132	1,271	1,286
1928	1,575	123	1,452	1,448
1929	1,639	169	1,471	
1930	1,599	(160)[a]	1,439	
1931	1,541	(154)[a]	1,387	
1932	1,280	108	1,172	
1933	1,353	126	1,227	
1934	1,626	113	1,514	

Totals may not add exactly due to rounding of figures for presentation.

a. In 1930 and 1931, Zorritos has been estimated on the basis of a constant 10% of the total.

TABLE C5

Income from Local Sales of Petroleum Products, by Company

£p000

Year	IPC Income	Piaggio Income	Total sales
1915			186
1916			221
1917	224	114	338
1918	390	105	495
1919	408	132	540
1920	598	115	713
1921	607	120	727
1922	508	131	639
1923	702	110	812
1924	863	87	950
1925	1,237	70	1,307
1926	1,071	69	1,140
1927	1,318	85	1,403
1928	1,492	83	1,575
1929	1,471	168	1,639
1930	1,439	160	1,599
1931	1,387	153	1,540
1932	1,172	108	1,280
1933	1,227	126	1,353
1934	1,514	112	1,626

Source: Assembled from Table C3.and Table C4.

APPENDIX D

Evaluation of the Net Social Benefit or Cost from Operations of the International Petroleum Company

The basic framework of the analysis, and the symbols used, are set out in the text, pages 110-23. In this appendix the data for an evaluation is assembled, discussed, and fitted to the equations.

The Treatment of Capital

The derivation of most of the data series has already been carried out in Appendixes B and C. The issue of capital has not, however, been specifically dealt with, although it is clearly crucial for the calculations. Under Alternative II assumptions, for example, the net income effect of the foreign firm is shown by the comparison between the foreign-exchange cost of servicing the foreign investment, and the opportunity cost of the local capital which would have to be diverted in order to replace that foreign capital.

$$\bar{Y} - Y = D - I - \bar{K}o \qquad \text{..... 11c (from page 121)}$$

The quantity (D-I) can be derived, as discussed below, from definite data on actual flows generated by the factual firm. $\bar{K}o$ is however a purely hypothetical quantity, purporting to show the real cost to the local economy of financing replacement. In Lall's treatment of capital costs, he distinguishes two elements: the annual 'use of capital' (U) and the opportunity cost of local capital (O). His 'adjusted capital cost' is given by the equation[1]

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1. Lall, Case Studies of India and Iran, p. 24.

$$K^* = U + O$$

For the purposes of this study, no attempt will be made to derive separate estimates of U, since no detailed information on the composition of capital stock is available, and since the firm's expenditures, whether on local supplies or inputs, cannot be broken down into capital versus current items. In place of U, therefore, the annual expenditures actually incurred on capital items will be used, year by year, without adjustment. The errors which this procedure introduces - particularly the failure to spread capital costs over the period during which the equipment is 'used up' - are to some extent compensated for by the length of the period covered by the data, from 1916 to 1934.

The opportunity cost O is denoted in the present model by the symbol $\bar{K}o$, denoting the opportunity cost of the capital used in the counterfactual firm; the question of local-capital participation in the factual firm does not arise, since it was 100% foreign-owned. Lall's calculation of O is composed of two elements in each year: the income foregone by not investing the net investment for that year elsewhere (at the accounting rate of interest); and the accumulated income gains foregone which would have resulted from the reinvestment (also at the ARI) of the opportunity costs of previous years. If Δc_t denotes the net increase in capital in the factual firm in year t, and the accounting rate of interest is denoted by i, then[1]

$$O_t = \Delta c_t i + \Delta c_{t-1} i(1+i) + \Delta c_{t-2} i(1+i)^2 + \ldots\ldots + \Delta c_0 i(1+i)^t$$

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1. This equation is equivalent in essence to those given by Lall, p. 52.

If, however, the opportunity cost of local capital is to be calculated on the assumption that all returns are entirely reinvested, it is only logical to make the same behavioural assumption with regard to the returns from the actual use made of the local capital in question; that is, the income effect attributed to the project in year t should include the compounded gains from past reinvestment of gains from the project.[1] Consequently, in the Alternative II model below, it is assumed that all net income effects accrue to savings groups (capitalists and government) and are reinvested at the accounting rate of interest. This behavioural assumption, while convenient, is open to the charge of being unrealistic, since it is improbable that all dividends and interest received on capital were in fact reinvested, at the margin. There is of course no evidence on marginal propensities to save in Peru in the 1920's, but an idea of the sensitivity of the results to changes in the assumption made on this score can be provided by a parallel set of calculations which assumes that all marginal returns on capital are consumed as they accrue, and are hence not compounded forward. In calculating the opportunity cost of local capital under this assumption, the net investment in each year is considered to be invested in an alternative project at the accounting rate of interest, and its value thereafter is maintained by reinvestment of depreciation allowances; but the net returns on the investment are considered to be consumed. This is equivalent to measuring opportunity cost as the annual returns from a capital stock equal in each year to that of the factual firm, but invested at the accounting rate of interest. It is therefore obtained by

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1. Lall does not include this adjustment in his calculations.

$$O_t = c_t i$$

where c_t is net capital stock at the beginning of year t.

Table D1 sets out the extremely patchy information to hand on the IPC's capital investment. The five-yearly figures are drawn from a study by Lewis of US investments abroad, and purport to show net fixed assets. IPC balance sheets were not available for the present study. The year-by-year figures are constructed by converting the dollar series at current exchange rates into Peruvian Libras, deflating these by the Peruvian wholesale price index, and filling in the missing years by uniform interpolation. This permits the results to be expressed in Peruvian Libras of 1925, but has the serious drawback that the trend of investment in the early 1930's is reversed, as a result of a combination of depreciation of the Libra against the dollar, and falling prices (including import prices) in Peru. The distortions thus introduced do not overturn the conclusions reached below; and since they operate if anything in favour of the foreign firm (by pushing up the capital cost assigned to the local replacement) they have been left unadjusted. This has the effect of yielding the maximum gains, or minimum cost, of the foreign firm's presence.

In Table D2 appear various hypothetical levels of $\bar{K}o$ derived using the two behavioural assumptions discussed above. Version A shows opportunity cost on the assumption that net returns are consumed, not reinvested; and Version B shows the results obtained by assuming 100% reinvestment of net returns, which are therefore compounded forward at the accounting rate of interest. The results are given for ARI's of 5%, 10%, 15%, and 20%. In the section which follows, they are incorporated into an Alternative II replacement model.

TABLE D1

Net Capital Stock at the Beginning of each Year, and Net Investment, 1915-1936

Year	Net capital at beginning of year, U.S. $ million	Column 1 in £p000 at current exchange rate	Column 2 in £p000 of 1925, with missing years filled by uniform interpolation	Net increase in capital stock during year, £p000 at 1925 prices
1915	15	3,178	6,231	382
1916			6,613	406
1917			7,019	430
1918			7,449	457
1919			7,906	485
1920	45	9,146	8,391	1,261
1921			9,652	1,450
1922			11,102	1,667
1923			12,769	1,919
1924			14,688	2,206
1925	65	16,049	16,894	331
1926			17,225	337
1927			17,562	344
1928			17,906	351
1929			18,257	357
1930	68.5	17,125	18,614	1,157
1931			19,771	1,229
1932			21,000	1,305
1933			22,305	1,387
1934			23,692	1,473
1935			25,165	1,564
1936	60	25,125	26,729	..

Source: Column 1 from Cleona Lewis, America's Stake in International Investments (Brookings Institution, Washington DC, 1938) Appendix D, p. 588.

TABLE D2

Various Hypothetical Levels for the Opportunity Cost of Local Capital ($\bar{K}o$)

£p000 at 1925 prices

Year	Version A: Reinvestment assumed zero				Version B: Reinvestment assumed 100% of earnings			
	Values of $\bar{K}o$ corresponding to accounting rate of interest of:							
	5%	10%	15%	20%	5%	10%	15%	20%
1915	312	623	935	1,246				
1916	331	661	992	1,323				
1917	351	702	1,053	1,404	331	661	992	1,323
1918	372	745	1,117	1,490	367	768	1,201	1,668
1919	395	791	1,186	1,581	407	888	1,446	2,088
1920	420	839	1,259	1,678	451	1,022	1,732	2,597
1921	483	965	1,448	1,930	497	1,173	2,064	3,213
1922	555	1,110	1,665	2,220	585	1,597	2,563	4,008
1923	638	1,277	1,915	2,554	687	1,703	3,165	5,220
1924	734	1,469	2,203	2,938	805	2,040	3,890	6,597
1925	845	1,689	2,534	3,379	941	2,436	4,761	8,301
1926	861	1,723	2,584	3,445	1,098	2,900	5,907	10,402
1927	878	1,756	2,634	3,512	1,169	3,223	6,727	12,548
1928	895	1,791	2,686	3,581	1,245	3,579	7,787	15,126
1929	913	1,826	2,739	3,651	1,325	3,972	9,006	18,219
1930	931	1,861	2,792	3,723	1,408	4,406	10,410	21,933
1931	989	1,977	2,966	3,954	1,497	4,880	12,025	26,392
1932	1,050	2,100	3,150	4,200	1,629	5,484	14,002	26,623
1933	1,115	2,231	3,346	4,461	1,772	6,155	16,287	32,193
1934	1,185	2,369	3,554	4,738	1,926	6,901	18,926	38,893
1935	1,258	2,517	3,775	5,033	2,092	7,730	21,973	56,070

Figures obtained by applying the accounting rate of interest to the net capital stock at beginning of year.

Note: The Version B series are constructed on the assumption that the counterfactual firm buys into the industry during 1915, the year before data on other flows become available. Thus net investment in 1915 is assumed equal to the capital stock at the beginning of 1916, and its opportunity cost is compounded forward from 1916.

Alternative II Replacement

The equation for Alternative II comparisons is number 11c:

$$\bar{Y} - Y = D - I - \bar{K}o$$

Having obtained various estimates for $\bar{K}o$, it remains to put together a series for (D-I), the balance-of-payments cost of repatriated profits and interest, net of new foreign financing. (D-I) is derived from equation 2:

$$B = X + S + I - M - M' - R - D \quad \ldots\ldots\ldots\ldots 2$$

$$\therefore \quad D - I = X + S - M - M' - R - B \quad \ldots\ldots\ldots\ldots 2a$$

Two of the elements in this equation can safely be ignored: M' and R. Local purchases of goods by the IPC were negligible, and the import content of such purchases (represented by M') was consequently insignificant. As for R, the total payments of foreign technical fees and royalties, such payments were not made in any separate identifiable form by the IPC, but instead are already embodied in the prices of equipment imported by the firm, and hence included in M (direct imports). In the analysis which follows, it is assumed that the Alternative II replacement firm would not have had to make foreign payments under R beyond those embodied in import prices; this is considered a realistic assumption. Equation 2a thus becomes, for practical purposes,

$$D - I = X + S - M - B \quad \ldots\ldots\ldots\ldots 2b$$

The quantities X, S and B are already known, from Appendices B and C, so that all that is now required in order to obtain (D-I) is an estimate of M, the IPC's direct imports. It is impossible to obtain an

absolutely accurate series for IPC's import bill, but acceptable estimates can be obtained from the total value of imports passing through the company's port at Talara. This involves the making of certain adjustments to the published statistics of the Customshouses at Talara and Paita. Prior to 1921, part of the imports bound for the oilfields were registered by the customshouse at Paita rather than that at Talara (it is not clear whether the goods actually entered through the port of Talara or were trans-shipped from Paita). Of this body of imports, not all was destined for the IPC itself. In the first place, the imports of Lobitos Oilfields were admitted to Peru through the same customshouses as those of the IPC, and consequently have to be subtracted from the total. Peruvian statisticians of the 1920's and early 1930's used an estimate of 20% of these imports for Lobitos, and the remaining 80% for IPC;[1] this estimate has been used here, except for the abnormal year 1921 when the IPC imported large quantities of equipment. Secondly, not all the imports destined for the IPC oilfields corresponded to first-round expenditure by the company on its operations; there were also imports destined for purchase by employees (through company stores and elsewhere), and an unknown volume of imports destined for groups unconnected with the company - local population in Talara, the police and army detachments, and so on. To allow for these non-company importers, a blanket 10% has been subtracted from the IPC share of imports (except, again, for 1921 which has been separately estimated). This arbitrary 10% is, if anything, an under-estimate (i.e. the figures

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1. For an outline of the statisticians' method, see B.O.M.P. No. 9, p. 64.

obtained for M are probably too high). This has the effect of giving a lower-bound estimate for (D-I), thereby favouring the IPC in comparison with counterfactual replacements. The data on imports are set out in Table D3.

In Table D4 an estimated series for (D-I) is derived, using equation 2b. As a percentage of the company's total sales, the profits and interest repatriated by the IPC prove to have been extremely high, generally over 60% except for a dip in 1920-1921 which largely reflects heavy reinvestment of profits in Peru. Taking (D-I) as a percentage of net capital, again the picture is one of very high profitability, with net repatriated profits ranging from 9% to 61% of capital in various years, and exceeding 20% in thirteen out of the nineteen years for which data are available.

The condition for Y to exceed $\bar{Y}$ (i.e. for the IPC to remain superior to an Alternative II replacement) is that $\bar{K}o$ should exceed (D-I). Considering the figures in Table D4, it is obvious that only under conditions of very high cost of local capital would this requirement be met. For any realistic level of the accounting rate of interest, Alternative II replacement will emerge as easily superior. The full calculation of Alternative II possibilities is undertaken in Tables D5 and D6.

Table D5 presents the compounded values of (D-I) for use in Version B calculations. In Version B, both $\bar{K}o$ and (D-I) for each year include an item representing the compounded value of the figures for preceding years. Thus, in the Alternative II case, with all wages, government payments, rentals and purchases of goods and

TABLE D3

Estimation of IPC Direct Imports, M

Year	(1) Total Imports through the Talara Customs £p000	(2) IPC Share, Estimated as 80% of total £p000	(3) M, estimated as 90% of total IPC share of Talara imports £p000
1916	437	350	315
1917	467	374	337
1918	407	326	293
1919	546	437	393
1920	752	602	542
1921	2,232	2,087[a]	2,029[b]
1922	701	561	505
1923	1,132	906	815
1924	1,302	1,042	938
1925	1,544	1,235	1,112
1926	2,445	1,956	1,760
1927	2,383	1,906	1,715
1928	1,419	1,135	1,022
1929	1,314	1,051	946
1930	919	735	662
1931	791	633	570
1932	516	413	372
1933	708	566	509
1934	1,191	953	858

Sources: Column 1 obtained from the Paita and Talara import statistics in Extracto Estadístico 1934-35, Table 76, pages 127-128 and 133. For 1916-1917, the years before the Talara customshouse was opened, total imports relevant to the oilfields are estimated to have been 60% of the Paita customshouse imports, on the basis of the discussion in Appendix C concerning import duties paid by the oil companies. For the years 1918 to 1920, when oilfield imports entered through both the Paita and Talara customshouses, the figures are obtained by taking Talara customshouse clearings and adding to them the following percentages of Paita imports: 1918, 39%; 1919, 22%; 1920, 23%. From 1921 on, only Talara reported imports are included.

Colums 2 and 3 derived from Column 1.

Notes: a. In 1921 the IPC imported large quantities of equipment as part of an investment programme, which produced a large bulge in imports for that year. Since it would be unrealistic to retain a mechanistic 80% estimate for 1921, the IPC share has instead been estimated on the assumption that the imports of Lobitos Oilfields trended smoothly from 1920 to 1922, and that the entire remaining body of 1921 imports, over and above estimated Lobitos imports, was accounted for by the IPC.

b. To deal with the same problem of the 1921 bulge, non-company imports were assumed to trend smoothly from 1920 to 1922, and the resulting estimate for 1921 was subtracted from the IPC share in Column 2.

TABLE D4

Estimation of (D - I): £p000

Year	(1) X + S	(2) B	(3) M	(4) D - I	(5) ---£p000 of 1925---- D - I	(6) X + S	(7) D-I as a % of X + S	(8) D-I as a percentage of capital
1916	1,459	257	315	887	1,232	2,026	61	19
1917	1,201	257	337	607	698	1,380	51	10
1918	1,469	246	293	930	886	1,399	63	12
1919	2,364	407	393	1,564	1,435	2,169	66	18
1920	1,923	506	542	875	742	1,630	46	9
1921	4,253	572	2,029	1,652	1,656	4,211	39	17
1922	5,672	925	505	4,242	4,513	6,034	75	41
1923	4,530	691	815	3,024	3,217	4,819	67	25
1924	6,127	829	938	4,360	4,589	6,449	71	31
1925	5,783	888	1,112	3,783	3,783	5,783	65	22
1926	7,280	1,228	1,760	4,292	4,292	7,280	59	25
1927	10,014	1,288	1,715	7,011	7,011	10,014	70	40
1928	11,505	1,360	1,022	9,123	9,621	12,111	79	54
1929	12,630	1,395	946	10,289	11,202	13,728	82	61
1930	7,073	1,170	662	5,241	5,970	8,038	74	32
1931	5,653	1,044	570	4,039	4,656	6,498	72	24
1932	7,332	1,430	372	5,530	6,598	8,729	76	31
1933	9,513	2,013	509	6,991	7,871	10,689	74	35
1934	12,242	2,457	858	8,927	9,613	13,023	73	41
			Totals 1916-34:		89,585	126,010	71	

Sources: Columns 1 and 2 from Appendix B, Table B5.
Column 3 from Table D3, Column 3.
Columns 5 and 6 are Columns 4 and 1, respectively, deflated by the wholesale price index, 1925 = 100.
Column 7 calculated from Columns 5 and 6.
Column 8 calculated using Table D1.

TABLE D5

(D-I) Including Results of Compounding Forward Previous Years at ARI (£p000 of 1925)

Year	.. Series for (D-I) with accounting rate of interest set at: ..			
	5%	10%	15%	20%
1916	1,232	1,232	1,232	1,232
1917	760	821	883	944
1918	986	1,091	1,203	1,321
1919	1,584	1,749	1,933	2,135
1920	970	1,231	1,530	1,868
1921	1,933	2,269	2,673	3,156
1922	4,886	5,352	5,931	6,644
1923	3,834	4,592	5,524	6,677
1924	5,398	6,423	7,725	9,385
1925	4,862	6,259	8,078	10,456
1926	5,614	7,394	9,799	13,056
1927	8,614	10,852	13,988	18,386
1928	11,655	14,548	18,696	24,673
1929	13,818	17,583	23,081	31,189
1930	9,277	14,110	21,311	32,194
1931	8,427	14,207	23,194	37,319
1932	9,791	17,569	28,615	46,725
1933	12,603	20,599	34,181	57,343
1934	14,975	24,401	39,061	70,554

Note: The above series are constructed on the same basis as the Version B series for $\bar{K}o$ in Table D2. To the return for each year is added the sum of the returns which would have accrued from the investment of (D-I) in each preceding year at the accounting rate of interest shown.

TABLE D6

Alternative II Replacement Under Various Assumptions: £p000 of 1925

Year	$\bar{Y} - Y$ for various estimates of $\bar{K}o$							
	ARI = 5%		ARI = 10%		ARI = 15%		ARI = 20%	
	Version A	Version B	Version A	Version B	Version A	Version B	Version A	Version B
1916	901	901	571	571	240	240	- 91	- 91
1917	347	393	- 4	53	- 355	- 318	- 706	- 724
1918	514	579	141	203	- 231	- 243	- 604	- 767
1919	1,040	1,133	644	727	249	201	- 146	- 462
1920	322	473	- 97	58	- 517	- 534	- 936	-1,345
1921	1,173	1,348	691	672	208	110	- 274	- 852
1922	3,958	4,199	3,403	3,649	2,848	2,766	2,293	1,424
1923	2,579	3,029	1,940	2,552	1,302	1,634	663	80
1924	3,855	4,457	3,120	3,987	2,386	2,964	1,651	1,084
1925	2,938	3,764	2,094	3,359	1,249	2,171	404	54
1926	3,431	4,445	2,569	4,171	1,708	3,072	847	508
1927	6,133	7,369	5,255	7,273	4,377	6,201	3,499	3,260
1928	8,726	10,330	7,830	10,576	6,935	9,690	6,040	6,454
1929	10,289	12,410	9,376	13,177	8,463	12,671	7,551	9,256
1930	5,039	7,780	4,109	9,230	3,178	9,286	2,247	5,802
1931	3,667	6,798	2,679	8,723	1,690	9,192	702	10,696
1932	5,548	8,019	4,498	11,414	3,448	12,328	2,398	14,532
1933	6,756	10,677	5,640	13,698	4,525	15,255	3,410	18,450
1934	8,428	12,883	7,244	16,671	6,059	17,088	4,875	14,484
Total	75,644	100,987	61,703	110,764	47,762	103,774	33,823	81,843
Average	3,981	5,315	3,248	5,830	2,514	5,462	1,780	4,308

Sources: Calculated from Table D4, Column 5, and Tables D2 and D5.

services equal between the factual and counterfactual firms (by assumption), the item (D-I) corresponds to the return on capital in a replacement firm, and hence accrues entirely to local capitalists. They are assumed to save and invest the entire amount, so that a growing stream of income is generated.

Table D6 presents Alternative II results for four possible levels of the accounting rate of interest, comparing the income effects obtained under Version B methods with those obtained using Version A (all net returns valued as consumption, and not discounted). The results are universally unfavourable to the foreign firm, and extremely unfavourable in certain cases. Taking the case of an accounting rate of interest of 10%, the total income losses to Peru over the nineteen years are £p62 million when returns are valued as consumption (Version A) and £p111 million if returns are treated as reinvestment (Version B). The use of an accounting rate of interest of 5% gives larger income losses under Version A but smaller losses under Version B, because of the lower weight attached in the latter to compounded costs and benefits. Only when the ARI rises to 20% do a substantial number of years work out having net gains for Peru from the IPC's presence; but those gains are heavily outweighed by later losses in both the discounted and undiscounted figures. The years in which $(\bar{Y}-Y)$ is negative with an ARI of 20% are, not surprisingly, 1916 to 1921, the period during which the company was locked in a dispute with the Government in the course of which production was deliberately cut back and profitability fell. The completion of the 1922 Agreement with the Government over the company's terms of access to Peru ushered in

immediately a period of extremely high profits for the company, and corresponding losses for Peru under Alternative II assumptions.

Alternative III Replacement with Zero Exports

In this section, a replacement firm is hypothesized which is barred from export markets but continues to supply the Peruvian internal market at the same prices as those charged by the IPC - i.e. at the price of competing imports. The equations on which the estimation is based are derived below from equations 8 and 9 (page 115 of the main text).

$$Y = (G-Go) + (H-Ho) + (W-Wo) + (C-Ko) \quad \ldots\ldots\ldots\ldots 8$$

$$Y = X + S + I - M - L - R - D - Go - Ho - Wo - Ko \ldots\ldots 9$$

To deal in a simple fashion with the problem of opportunity costs, they are here aggregated and expressed as an overall proportion 'b' of the total remuneration paid to the factors concerned. Then in equation 8,

$$Y = (1-b)(G+H+W) + (C-Ko) \quad \ldots\ldots\ldots\ldots 8b$$

Now since the IPC involved no local-capital participation, C = Ko = 0, so that

$$Y = (1-b)(G+H+W) \quad \ldots\ldots\ldots\ldots 8c$$

The income effect of the counterfactual firm, $\bar{Y}$, can be obtained in the same fashion, so that, from equation 8b,

$$\bar{Y} = (1-\bar{b})(\bar{G}+\bar{H}+\bar{W}) + (\bar{C}-\bar{K}o) \quad \ldots\ldots\ldots\ldots 8d$$

Now, the problem may be stated as follows: hypothesize that the counterfactual firm does not enter export markets, and that its total sales are therefore limited to S, earnings in the local market. This means that total sales are a proportion 'a' of IPC sales, where

$$a = \frac{S}{X+S} \qquad \ldots\ldots\ldots\ldots 13$$

Now assume that the replacement firm has the same efficiency and factor proportions as the IPC, and that the cost per unit of producing S is the same as the cost per unit of producing (X+S) - that is, assume no economies of scale, and identical product-mixes between (X+S) and S. Given these assumptions, the counterfactual firm's costs will be the same proportion 'a' of IPC costs, and investment will be a proportion 'a' of IPC investment. In this case,

$$(\bar{G}+\bar{H}+\bar{W}) = a(G+H+W)$$

$$\therefore \qquad \bar{Y} = a(1-\bar{b})(G+H+W) + (\bar{C}-\bar{K}o) \quad \text{(substituting in 8d)} \qquad \ldots\ldots\ldots\ldots 8e$$

A final simplifying assumption is that $\bar{b} = b$; in other words, the opportunity cost of non-capital factors used by the counterfactual firm is the same proportion of their remuneration as that in the IPC. Since the enterprises being compared do not really qualify as marginal in a strict sense, it is more likely to be the case that $\bar{b} > b$, since the absolute quantity of factors employed by the counterfactual firm is smaller and their redeployment would consequently have smaller negative income effects on the rest of the economy. The difference is however likely to be insignificant.

We now have (substituting in equation 8c)

$$\bar{Y} = a(1-b)(G+H+W) + (\bar{C}-\bar{K}o) \quad \ldots\ldots\ldots\ldots \text{ 8f}$$

so that

$$Y-\bar{Y} = (1-a)(1-b)(G+H+W) - (\bar{C}-\bar{K}o) \quad \text{(8c minus 8f)}$$

$$= (1-a)(1-b)(G+H+W) + \bar{K}o - \bar{C} \quad \ldots\ldots\ldots\ldots \text{ 8g}$$

$\bar{C}$, the income accruing directly to local capitalists from their participation in the counterfactual firm, may be defined as the residual remaining when all costs have been subtracted from total counterfactual sales, S. That is,

$$\bar{C} = S - a(M+L+R+G+H+W) \quad \ldots\ldots\ldots\ldots \text{ 14}$$

Substituting in 8g, we obtain

$$Y - \bar{Y} = (1-a)(1-b)(G+H+W) + \bar{K}o - S + a(M+L+R+G+H+W)$$

$$= (1-b+ab)(G+H+W) + a(M+L+R) - S + \bar{K}o \quad \ldots\ldots\ldots\ldots \text{ 15}$$

This provides the condition for the IPC to emerge as superior to the hypothesized replacement firm, given the assumption specified above, namely:

$$Y > \bar{Y} \text{ when } \bar{K}o > S - a(M+L+R) - (1-b+ab)(G+H+W) \quad \ldots\ldots\ldots\ldots \text{ 16}$$

As was noted in the Alternative II discussion, the quantities R and H are negligible in the case of the IPC in the 1920's, and can be dropped from the equations. The critical comparison is therefore between $\bar{K}o$ and the quantity $\left[\bar{S} - a(M+L) - (1-b+ab)(G+W)\right]$.

The data for estimating this latter quantity, using various assumptions for the level of b, are assembled in Table D7, and results appear in Table D8. Since the series in Table D8 represent the income

TABLE D7

Data for the Calculation of [S-a(M+L)-(1-b+ab)(G+H+W)]:£p000, current prices

Year	a (= $\frac{S}{X+S}$)	S-a(M+L)	(1-b+ab)(G+H+W) when			
			b=0	b=0.5	b=0.75	b=1.0
1916	.106	117	220	122	72	23
1917	.187	154	221	131	86	41
1918	.265	304	213	135	96	56
1919	.173	330	351	206	133	61
1920	.311	407	433	284	209	135
1921	.143	305	490	280	175	70
1922	.090	454	835	455	265	75
1923	.155	561	597	345	219	93
1924	.141	716	722	412	257	102
1925	.214	971	758	460	311	162
1926	.147	787	1,059	607	382	156
1927	.132	1,068	1,109	628	387	146
1928	.130	1,335	1,161	656	403	151
1929	.116	1,342	1,212	676	408	141
1930	.203	1,274	1,006	605	405	204
1931	.245	1,216	904	563	392	221
1932	.160	1,081	1,224	710	453	196
1933	.129	1,129	1,746	986	606	225
1934	.124	1,370	2,143	1,204	735	266

Sources: Calculations based on data from Appendices B and C.

TABLE D8

Data for Non-Exporting Replacement: Values of [S-a(M+L)-(1-b+ab)(G+H+W)]

£p000

Year	At current prices: [S-a(M+L) - (1-b+ab)(G+H+W)] when:				At 1925 prices: S - a(M+L) - (1-b+ab)(G+H+W) when:			
	(a) b = 0	(b) b = 0.5	(c) b = 0.75	(d) b = 1.0	(a) b = 0	(b) b = 0.5	(c) b = 0.75	(d) b = 1.0
1916	-103	- 5	45	94	-143	- 7	62	130
1917	- 67	23	68	113	- 77	26	78	130
1918	91	169	208	248	87	161	198	236
1919	- 21	124	197	269	- 19	114	181	247
1920	- 26	123	198	272	- 22	104	168	231
1921	-185	25	130	235	-183	25	129	233
1922	-381	- 1	189	379	-405	- 1	201	403
1923	- 36	216	342	468	- 38	230	364	498
1924	- 6	304	459	614	- 6	320	483	646
1925	213	511	660	809	213	511	660	809
1926	-272	180	405	631	-272	180	405	631
1927	- 41	440	681	922	- 41	440	681	922
1928	174	679	932	1,184	183	715	981	1,246
1929	130	666	934	1,201	141	724	1,015	1,305
1930	268	669	869	1,070	305	760	988	1,215
1931	312	653	824	995	359	751	947	1,144
1932	-143	371	628	885	-170	442	748	1,054
1933	-617	143	523	904	-693	161	588	1,016
1934	-773	166	635	1,104	-831	178	683	1,187

Source: Calculated from data in Table D4.

gains from replacement before subtraction of opportunity cost of capital, $\bar{K}o$, they are treated in the same way as (D-I) in the Alternative II calculations. For Version A calculations the series is used unaltered, while for Version B the figures are compounded forward at the accounting rate of interest. In Table D9 appear the results of compounding forward at 10% the three most likely estimates (corresponding to opportunity costs for factors other than capital averaging 50%, 75% and 100% of remuneration). To indicate the sensitivity of the results to changes in the accounting rate of interest, the series for b = 0.5 is also presented in Version B form for ARI of 5% and 15%.

The next step is to derive an estimate of $\bar{K}o$ for the counterfactual firm. Table D10 gives the net capital of the counterfactual firm, on the assumption that it is related to the IPC's actual capital in the same ratio as that between counterfactual and factual sales, namely 'a'. (Year-to-year variations are smoothed out by using a five-year average of 'a'). Table D11 then gives the values of $\bar{K}o$ corresponding to ARI of 5%, 10% and 15%, for Versions A and B. Finally, Table D12, calculated using Tables D8, D9 and D11, shows the net income effect of replacing the IPC with a non-exporting replacement, on the assumption of an ARI of 10%; and Table D13 presents a sensitivity test using ARI of 5% and 15%, assuming b = 0.5.

The results are clearcut. For any of the levels of opportunity cost which can be considered realistic, there is a net income gain from replacement of the exporting IPC by a non-exporting local replacement firm. With an ARI of 10% and the opportunity costs of

TABLE D9

1. Compounded Values of [S-a(M+L)-(1-b+ab)(G+H+W)]

£p000 of 1925

Year	---Series for ARI = 10% and various values of b:----			Series for b = 0.5 and various ARI:	
	b = 0.5	b = 0.75	b = 1.0	ARI = 5%	ARI = 15%
1916	- 7	62	130	- 7	- 7
1917	25	84	143	26	25
1918	163	213	263	162	164
1919	132	217	301	123	141
1920	135	226	315	119	152
1921	46	209	348	46	96
1922	51	302	553	23	85
1923	287	475	703	255	328
1924	406	664	922	357	468
1925	637	907	1,177	566	729
1926	370	743	1,117	265	507
1927	667	1,077	1,519	537	843
1928	1,009	1,503	1,995	839	1,245
1929	1,185	1,687	2,254	889	1,441
1930	1,266	1,828	2,289	970	1,693
1931	1,384	1,970	2,557	1,010	1,938
1932	1,214	1,968	2,722	751	1,919
1933	1,054	1,972	2,956	507	1,926
1934	1,176	2,300	3,423	550	2,232

TABLE D10

Estimation of Net Capital Stock in a Non-Exporting Replacement

£p000 at 1925 prices

Year	Five-year moving average of a	IPC net capital at beginning of year	Net capital of counterfactual firm at year beginning
1916	(.154)	6,613	1,018
1917	(.167)	7,019	1,172
1918	.208	7,449	1,549
1919	.216	7,906	1,708
1920	.196	8,391	1,645
1921	.174	9,652	1,679
1922	.168	11,102	1,865
1923	.149	12,769	1,903
1924	.149	14,688	2,189
1925	.158	16,894	2,669
1926	.153	17,225	2,635
1927	.148	17,562	2,599
1928	.146	17,906	2,614
1929	.165	18,257	3,012
1930	.171	18,614	3,183
1931	.171	19,771	3,381
1932	.172	21,000	3,612
1933	(.156)	22,305	3,480
1934	(.132)	23,692	3,127

Sources: Column 1 from Table D7, Column 1.
Column 2 from Table D1, Column 3.
Column 3 is Column 2 multiplied by Column 1.

Note: Bracketed figures in Column 2 are interpolated on the assumptions that 1916=1915=1914 and 1934=1935=1936.

TABLE D11

Estimates of $\bar{K}o$ for a Non-Exporting Replacement Firm

Year	Values of $\bar{K}o$ for various levels of the accounting rate of interest:					
	ARI = 5%		ARI = 10%		ARI = 15%	
	Version A	Version B	Version A	Version B	Version A	Version B
1916	51	51	102	102	153	153
1917	59	61	117	127	176	199
1918	77	83	155	178	232	285
1919	85	95	171	212	256	352
1920	82	97	165	226	247	395
1921	84	103	168	252	252	459
1922	93	118	187	296	280	556
1923	95	126	190	330	285	645
1924	109	146	219	391	328	785
1925	133	177	267	478	400	975
1926	132	185	264	523	395	1,116
1927	130	192	260	571	390	1,278
1928	131	202	261	644	392	1,472
1929	151	232	301	748	452	1,752
1930	159	253	318	840	477	2,041
1931	169	275	338	943	507	2,376
1932	181	300	361	1,061	542	2,767
1933	174	309	348	1,153	522	3,158
1934	156	307	313	1,233	469	3,584

TABLE D12

Alternative III Replacement with Zero Exports: £p000 of 1925

ARI assumed to be 10%

Year	$\bar{Y} - Y$ for various levels of b:					
	b = 0.5		b = 0.75		b = 1.0	
	Version A	Version B	Version A	Version B	Version A	Version B
1916	- 109	- 109	- 40	- 40	28	28
1917	- 91	- 102	- 39	- 43	13	16
1918	6	- 15	43	35	81	85
1919	- 57	- 80	10	5	76	89
1920	- 61	- 91	3	0	66	89
1921	- 143	- 206	- 39	- 43	65	96
1922	- 188	- 245	14	6	216	257
1923	40	- 43	174	145	308	373
1924	101	15	264	273	427	531
1925	244	159	393	429	542	699
1926	- 84	- 153	141	220	367	594
1927	180	96	421	506	662	948
1928	454	365	720	859	985	1,351
1929	423	437	714	939	1,004	1,506
1930	442	426	670	988	897	1,549
1931	413	441	609	1,027	806	1,614
1932	81	153	387	907	693	1,661
1933	- 187	- 99	240	819	668	1,803
1934	- 135	- 57	370	1,067	874	2,190
Total	1,329	892	5,055	8,099	8,778	15,479
Average	70	47	266	426	462	815

TABLE D13

Alternative III Replacement with Zero Exports: £p000 of 1926

Results for various ARI with b = 0.5

Year	ARI = 5%		ARI = 15%	
	Version A	Version B	Version A	Version B
1916	- 58	- 58	- 160	- 160
1917	- 33	- 35	- 150	- 174
1918	84	79	- 71	- 121
1919	29	28	- 142	- 211
1920	22	22	- 143	- 243
1921	- 59	- 57	- 227	- 363
1922	- 94	- 95	- 281	- 471
1923	135	129	- 55	- 317
1924	211	211	- 8	- 317
1925	378	389	111	- 246
1926	48	80	- 215	- 609
1927	310	345	50	- 435
1928	584	637	323	- 227
1929	573	657	272	- 311
1930	601	717	283	- 348
1931	582	735	244	- 438
1932	261	451	- 100	- 848
1933	- 13	198	- 361	- 1,232
1934	22	243	- 291	- 1,352
Total	3,583	4,676	- 921	-8,423
Average	189	246	- 48	- 443

non-capital factors assumed to average 50%, net benefits from replacement range from £p890,000 (the discounted model) to £p1,330,000 (the undiscounted model). For higher levels of 'b' (the proportion of non-capital opportunity costs) the income gains from replacement are greater; and for levels of the ARI below 10% they also increase. The sensitivity tests in Table D13 show that the effects of replacement turn negative if an ARI of 15% is applied with b assumed 0.5; and inspection of Table D8 indicates that if opportunity costs of labour and government are assumed zero, replacement will yield net losses whatever accounting rate of interest is used. Neither of these possibilities, however, could be considered realistic.

The most realistic of the simulated situations, one might suggest, is that which assumes an ARI of 10% or less, and opportunity costs b of 0.75 or more. With the total net benefits from replacement emerging as a minimum of £p5 million for 1916-1934 (Table D12, Column 3), or an annual average of £p260,000 at least, it is difficult to see how the conclusion in favour of replacement under the present set of Alternative III assumptions may be overturned. There are, however, certain issues which have to be explored further before leaving this model.

In order to obtain the above results, a number of rather restrictive assumptions were made, and it is now necessary to enquire whether relaxation of these assumptions would materially change the central conclusion drawn here, that Peru would have been no worse off replacing the IPC by an import-substituting replacement. In the first place, retaining the assumption that counterfactual technology is the same as

that of the IPC, the assumptions of constant product mix and no economies of scale will be considered.

The IPC's output was by no means homogeneous as has been assumed thus far; rather, the firm produced a wide variety of petroleum products, and divided these up among various markets. The high-bulk, lower-unit-value products such as crude petroleum and naphtha were mostly exported, along with a certain amount of gasoline and kerosene. The local market, on the other hand, consumed mostly the refined products of the Talara refinery: gasoline, kerosene, fuel oil and gasoil, together with some lubricants, and minor by-products. The reduction of sales from (X+S) to S implies not only a fall in total output, but also the virtual elimination of certain products - mainly crude and naphtha - coupled with a less-drastic reduction of output of refined products like gasoline and fuel oil. This amounts to saying that the shift from factual to counterfactual firms implies a heavy reduction in the output of crude - that is, in the drilling, pumping and piping stages of the industry - and a much less heavy reduction in the activities of the refinery. Figures are unfortunately not available to indicate whether this change in product mix would have implied increased or reduced unit costs of the remaining products, although a priori it might be supposed that unit costs would have risen somewhat, since the integrated basis of the full IPC operation would have been broken. However, relaxation of the assumption tying the counterfactual firm to IPC technology would permit adoption of a lower-level operation adjusted to the specific needs of the local market.

To the above must be added the question of whether there were significant economies of scale in the production and refining of petroleum in Peru, which would have been lost in the replacement process, particularly in the case of replacement by a number of small locally-owned firms. Once again, no definite evidence is available. Table D14 contains some rough figures on value of output per worker for IPC and the small local firm of Piaggio, together with capital-per-employee figures for IPC. It appears that up until about 1920, labour productivity in the two firms was very similar, although the IPC already at that time had total sales over fifteen times greater than Piaggio. At that time the technologies of the two firms appear to have been fairly similar, with both refineries operating with pre-World War I equipment. In the absence of capital figures on the Piaggio enterprise, it is impossible to compare capital-labour ratios between the two; nevertheless the case for substantial economies of scale at that time appears weak. During the 1920's, productivity of labour in the IPC rose, although capital per worker remained relatively steady or possibly declined. This improved productivity was certainly associated with a steep rise in output, but probably more significantly, was achieved with updated technology installed in the Talara refinery from 1921 on. The impression obtained from contemporary sources is that the latter element by itself probably suffices to explain rising productivity in the IPC, without recourse to economies of scale. Unfortunately, it is impossible to use the Piaggio enterprise in the 1920's as an accurate guide to the probable performance of counterfactual firms, because of two specific problems which afflicted the firm and which account for

TABLE D14

Productivity and Capital per worker in Two Oil Firms

Year	Output per employee: US dollars		Investment per employee
	IPC	Piaggio	IPC
1916	3,381	3,319	13,016
1917	3,718	3,633	20,459
1918	n.a.	n.a.	n.a.
1919	5,870	4,330	22,716
1920	3,360	3,498	18,658
1921	4,740	2,863	16,357
1922	6,641	3,234	17,337
1923	4,599	3,239	15,071
1924	5,949	1,632	15,584
1925	4,472	1,076	12,700
1926	4,404	1,131	10,803
1927	6,990	1,328	12,555
1928	7,948	1,322	11,799
1929	n.a.	n.a.	n.a.
1930	n.a.	n.a.	n.a.
1931	n.a.	n.a.	n.a.
1932	4,704	1,476	19,338
1933	5,342	1,656	18,748
1934	7,213	1,817	15,732

Sources: Columns 1 and 2: total sales of each company, divided by the number of employees as reported in the annual official mining statistics.

Column 3: Investment from Table D1 above, divided by number of IPC employees in each year.

its falling labour productivity and market share after 1920. The first problem was the old age of the founder-owner, Faustino G. Piaggio, who died in 1924, leaving the firm with a series of managerial crises coupled with increasingly obsolescent equipment. The second was the depletion of the richer reserves of the Zorritos field, which had never been very large, and had been worked since the 1870's. The dwindling resource base did not encourage the firm to undertake any major technological improvements, and it passed into Government control in 1938 in a very run-down condition.

Counterfactual firms with active owners, and based on the far larger Negritos oilfield, would have been likely to perform much better than did the Piaggio firm in fact after 1920, and might well have held productivity at levels very similar to those achieved by IPC in fact. The question of economies of scale thus remains open, but it seems reasonable to suppose that local enterprises of much smaller size than IPC would have remained perfectly viable; and that economies of scale are unlikely to affect the results of the earlier analysis significantly.

Alternative III Replacement with Limited Exports

This model begins with the assumption that a replacement firm has access to export markets, but obtains a lower price for its products abroad than does the IPC. If export prices drop by a proportion 'd' while local sales and all costs remain unchanged by replacement, then (from equation 9, page 115 of main text),

$$Y = X + S + I - M - L - R - D - Go - Ho - Wo \quad \ldots\ldots\ldots\ldots 9a$$

$$\bar{Y} = X - dX + S - M - L - R - Go - Wo - Ho - \bar{K}o \quad \ldots\ldots\ldots\ldots 9b$$

$$\therefore \; Y-\bar{Y} = dX - (D-I) + \bar{K}o \quad \ldots\ldots\ldots\ldots 17$$

The condition for the IPC to be superior to a replacement firm is now that

$$Y > \bar{Y} \text{ when } \quad dX > D - I - \bar{K}o \quad \ldots\ldots\ldots\ldots 18$$

The expression $(D-I-\bar{K}o)$ is of course the income effect $(\bar{Y}-Y)$ of the Alternative II model, for which figures were given in Table D6. By dividing the series in Table D6 by total export earnings X, we are therefore left with the values of 'd' which equalise Y and $\bar{Y}$ for each level of the accounting rate of interest. These values, on the basis of inequality 18, will be the minimum values compatible with IPC superiority, and the maximum compatible with beneficial replacement.

Table D15 presents the results of this exercise. Under any of the sets of assumptions used, a 30% fall in export prices as a result of replacement would leave Peru better off without the IPC. With a 10% accounting rate of interest a fall of at least 58% in export prices could be borne; and the discounted model indicates that a replacement firm bearing the full costs of the IPC's total operation would yield higher income effects in the complete absence of exports, if the ARI were 10%. For a 5% ARI, the permissible fall in export prices which the replacement firm could bear ranges between 71% and 94%. Only with accounting rates of interest of 15% or above would the replacement firm have to improve its export prices in a significant number of years in order not to yield a net loss; and the poor performance of the replacement in the years 1916-1921 under these ARI's is outweighed by the favourable results for later years.

TABLE D15

Alternative III Replacement with Limited Export Prices: Values of 'd'

Year	X £p000 of 1925	Values of 'd' which equalise Y and $\bar{Y}$ for various ARI's: ARI = 5% Version A	ARI = 5% Version B	ARI = 10% Version A	ARI = 10% Version B	ARI = 15% Version A	ARI = 15% Version B	ARI = 20% Version A	ARI = 20% Version B
1916	1,813	.50	.50	.31	.31	.13	.13	-.05	-.05
1917	1,123	.31	.35	.00	.05	-.32	-.28	-.63	-.64
1918	1,028	.50	.56	.14	.20	-.22	-.24	-.58	-.75
1919	1,794	.58	.63	.36	.41	.14	.11	-.08	-.26
1920	1,123	.29	.42	-.09	.05	-.46	-.48	-.83	-1.20
1921	3,610	.32	.37	.19	.19	.06	.03	-.08	-.24
1922	5,494	.72	.76	.62	.66	.52	.50	.42	.26
1923	4,072	.63	.74	.48	.63	.32	.40	.16	.02
1924	5,541	.70	.80	.56	.72	.43	.53	.30	.20
1925	4,546	.65	.83	.46	.74	.27	.48	.09	.01
1926	6,209	.55	.72	.41	.67	.28	.49	.14	.08
1927	8,696	.71	.85	.60	.84	.50	.71	.40	.37
1928	10,540	.83	.98	.74	1.00	.66	.92	.57	.61
1929	12,129	.85	1.02	.77	1.09	.70	1.04	.62	.76
1930	6,402	.79	1.22	.64	1.44	.50	1.45	.35	.91
1931	4,903	.75	1.39	.55	1.78	.34	1.87	.14	2.18
1932	7,333	.76	1.09	.61	1.56	.47	1.68	.33	1.98
1933	9,310	.73	1.15	.61	1.47	.49	1.64	.37	1.98
1934	11,535	.73	1.12	.63	1.45	.53	1.48	.42	1.26
Total	107,201								
Average results		.71	.94	.58	1.03	.45	.97	.32	.76

Source: Table D6 divided through by X.

Note: Average results are totals from Table D6 divided by total X.

Alternative III Replacement with Higher Unit Costs

This model is set out in equation 12c in the main text. The replacement firm's costs are increased by a proportion representing relative inefficiency in production when compared with the IPC, while income from sales is held constant, at the factual level. If the proportional increase in costs is denoted by 'c', then

$$Y = X + S - M - L - R - D - Go - Wo - Ho$$

$$\bar{Y} = X + S - (1+c)(M + L + R + Go + Wo + Ho) - \bar{K}o$$

$$\therefore Y - \bar{Y} = I - D + c(M + L + R + Go + Wo + Ho) + \bar{K}o \quad \ldots\ldots 19$$

Hence the condition for the IPC to remain superior to the replacement firm is that

$$Y > \bar{Y} \text{ when } \quad c > \frac{D - I - \bar{K}o}{M + L + R + Go + Wo + Ho} \quad \ldots\ldots 20$$

The number of unknowns is now increasing to the point where findings are increasingly speculative, and calculations complex. Because of the complexities of applying the discounted model, Version B, in this case, results have been calculated only for Version A, using ARI of 10% and 15% and taking 'b' as equal successively to 0.5 and 0.75. The results appear in Table D16, and indicate that for all the selected values of the parameters, the replacement firm could absorb a 100% or higher increase in unit costs without entirely wiping out the positive income effects from replacement. Use of an ARI of 5% would give higher values for 'c' than those obtained with 10% and 15%; on the other hand, the assumption that $b > 0.75$ would reduce the permissible values of 'c'. The raising of 'b' to 1.0, however, does not demolish the general conclusion that a doubling of the costs (i.e. halving of the productivity) of the IPC operation in the process of replacement would not destroy the case in favour of replacement.

TABLE D16

Alternative III Replacement with Reduced Efficiency: Version A only

Year	£p000 of 1925: (M+L+R+Go+Ho+Wo)when b = 0.5	b = 0.75	Values of 'c' when Y=$\bar{Y}$ and ARI and 'b' are:- ARI = 10% b = 0.5	b = 0.75	ARI = 15% b = 0.5	b = 0.75
1916	642	718	.89	.80	.37	.33
1917	556	620	- .01	.01	- .64	- .57
1918	412	463	.34	.30	- .56	- .50
1919	573	653	1.12	.99	.43	.38
1920	705	797	- .14	- .12	- .73	- .65
1921	2,333	2,454	.30	.28	.09	.08
1922	1,078	1,299	3.16	2.62	2.64	2.19
1923	1,285	1,444	1.51	1.34	1.01	.90
1924	1,480	1,671	2.11	1.87	1.61	1.43
1925	1,621	1,811	1.29	1.16	.77	.69
1926	2,459	2,723	1.04	.94	.69	.63
1927	2,449	2,726	2.15	1.93	1.79	1.61
1928	1,879	2,184	4.17	3.59	3.69	3.18
1929	1,867	2,196	5.02	4.27	4.53	3.85
1930	1,495	1,782	2.75	2.31	2.13	1.78
1931	1,322	1,582	2.03	1.69	1.28	1.07
1932	1,402	1,767	3.21	2.55	2.46	1.95
1933	1,837	2,328	3.07	2.42	2.46	1.94
1934	2,399	2,974	3.02	2.44	2.53	2.04
Total	27,794	32,192				
Average			2.22	1.92	1.72	1.48

Source: Data from Table D6 and Appendix B.

Conclusions

With the margins in favour of replacement found in each of the models tested above, it is clear that a good case exists for the statement that, within the restrictions imposed by the type of quantitative analysis used, the absence of the IPC from Peru and the existence in its stead of a locally owned replacement would not have implied any loss for the Peruvian economy, and would probably have implied substantial net benefits. It would be possible, using various combinations of inefficiency (high unit costs), export inferiority (low export prices) and lower volume of output (reduced export quantities) to construct models which showed no net gain from replacement; and it might even be possible to construct a model showing a net loss. The assumptions which would have to be made about the inefficiency of local producers, the tightness of oligopoly control in world markets, the level of opportunity costs, and the accounting rate of interest, would however have to be (if the arguments in the main text are accepted) unrealistic in the extreme before such results could be derived. The calculation of complex hybrid simulation models will not be attempted here.

APPENDIX E

Estimation of Imported Production Inputs for Cerro

The purpose of this appendix is to derive an estimated series for M, using the figures on import duties paid by Cerro in each year from 1922 to 1937, since this is the only hard data available bearing on the issue. The estimation procedure uses a simple formula: if total duties paid are N and the ratio of duties to the value of imports is t, then

$$M = \frac{N}{t}$$

There are, however, two problems. In the first place, Cerro imported (and paid duty on) a large volume of goods which were destined, not to become inputs to the productive process, but for resale to employees through the Mercantile branch of the firm;[1] the total duties paid are therefore higher than the duties paid on productive imports alone, and N is thus inflated.

The second problem is the absence of any direct estimate for 't' as it applied to Cerro. The only information on tariff incidence is the overall ratio of duties to imports for Peru as a whole. In Table E1 this national average incidence is used to derive an estimate for M. For the years 1922-1932 the estimation uses only basic import

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1. The stock carried by the Mercantile in the early 1920's was valued at about $2 million, but there are no figures available on turnover. (Dunn, Peru: a Handbook, p. 394.) If this stock turned over once a year, it would represent sales of about £p500,000, much of which would have been imported goods.

TABLE E1

Derivation of an Estimate for M 1922-1937: £p000 at current prices

Year	Using basic duties only		Using duties plus other charges		
	Average incidence of duties on all Peruvian imports	Basic duties paid by Cerro	Average incidence on all Peruvian imports	Amounts paid by Cerro	Estimate of Cerro total imports
1922			.179	36.9	206
1923	.128	36.1			282
1924	.135	42.7			316
1925	.123	36.1			293
1926	.119	54.2			455
1927	.108	62.5			579
1928	.145	51.2			353
1929	.146	59.8			410
1930	.148	78.4			530
1931	.126	36.9			293
1932	.138	10.6			77
1933			.185	38.0	205
1934			.180	50.3	279
1935			.201	95.8	477
1936			.218	138.0	633
1937			.196	151.1	771

Sources: Incidence of basic duties 1922-1932 calculated from annual tables showing duties collected, in Estadística del Comercio Especial for those years.

Basic duties paid by Cerro from Alvarez Calderón, 'El Problema de la Plata y el Convenio de Londres', p. 90.

Incidence of total charges on Peruvian imports calculated from Extracto Estadístico 1927, pp. 157-160; 1931-1933, pp. 209-212; 1934-1935, pp. 284-288; and 1939, pp. 504-507.

Cerro payments of total charges from Fernandez, 'Los Humos de la Fundición de La Oroya' in B.O.M.P. No. 3, p. 9; and Hohagen, 'La Minería en el Perú' in B.C.I.M. No. 122, p. 262A.

duties paid, since these are least likely to suffer from distortions in their general incidence (changes in the tariff system during this period took the form of the addition of special surcharges rather than any major modification of the basic rates). For 1922 and the years after 1932, the only information available on Cerro was payments of duty including surcharges and various special port fees; for those years, the national average incidence of duties including these charges has been used.

The question to which no firm answer can be given is the net effect of the two elements of bias built into the figures. On the one hand, Cerro's productive imports were only part of its total import bill, and the M series is there thus too high. On the other hand, the type of products which would have been imported for the production process tended to be in low-duty categories, so that the national average used for 't' is too high, and M is thus too low. In order to obtain working figures, it is proposed to use a range of possible values for M. At the lower end of the range it is assumed that the two biasses noted above exactly cancelled each other out, and that the estimate of M derived in Table E1 is therefore correct. At the upper end of the range it is assumed that the error in 't' is twice as significant as the error in 'N', and that the correct value of M is therefore double that obtained in Table E1. On impressionistic grounds, it is suspected that the lower end of the range is more probably accurate than the higher end. The two series are presented and used in Appendix F below.

APPENDIX F

Construction of an Alternative II Replacement Model for Cerro [1]

The condition for an Alternative II counterfactual firm to be superior to the factual firm is that the social opportunity cost of the capital bound up in the former, $\bar{K}o$, should be below the foreign-exchange cost of the foreign firm's presence, given by (D-I). Table F1 uses data on Cerro's earnings and outlays to derive estimates of (D-I+M) for 1922-1937. Table F2 then uses two estimates for M, drawn from Appendix E, to obtain limiting series for (D-I).

For the years before 1922, no detailed information is available on Cerro's expenditure within Peru, but published annual accounts of the firm do exist back to 1916. In order to obtain a rather longer run of figures on income effects, some estimates of (D-I) during the years 1916 to 1921 have been made, and appear in Table F3. The Peruvian costs of Cerro have been estimated very roughly as 70% of total outlays by the company in each year, with total outlays defined to include operating expenses plus gross investment in each year. (The figure of 70% corresponds to the average proportion of Peruvian costs in total costs during the years 1922-1929, for which the detailed figures are available.)

Table F4 then gives the figures on net investment in Cerro from 1916-1937, and Table F5 presents series for $\bar{K}o$ calculated, as in the case of the IPC, in two ways: Version A (treating all net returns as consumption) and Version B (compounding forward net returns). Table

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1. I am grateful to Miss S. Watt for assistance in the gathering of data for this analysis.

TABLE F.1

Derivation of (D-I+M), 1922-1937: £p000 at current prices

Year	(1) Total Peruvian income of Cerro	(2) Total Peruvian outlays of Cerro	(3) D-I+M
1922	4,708	2,111	2,597
1923	5,345	2,352	2,993
1924	3,930	2,254	1,676
1925	4,597	2,429	2,168
1926	4,750	3,260	1,490
1927	5,328	3,295	2,033
1928	6,409	3,461	2,948
1929	7,815	3,682	4,133
1930	5,549	3,240	2,309
1931	3,532	2,502	1,030
1932	1,547	1,399	148
1933	2,782	1,408	1,374
1934	3,205	1,639	1,566
1935	4,951	2,233	2,718
1936	5,038	2,990	2,048
1937	6,071	3,549	2,522

Sources: Column 1 from Table V.2, Column 3.
Column 2 from Table V.3, Column 8.
Column 3 calculated, Column 1 minus Column 2.

TABLE F2

Estimates of M and of (D-I): £p000 at current prices

Year	High estimate for M	Low estimate for M	D-I+M	Low estimate for D-I	High estimate for D-I
1922	412	206	2,597	2,185	2,391
1923	564	282	2,993	2,429	2,711
1924	632	316	1,676	1,044	1,360
1925	586	293	2,168	1,582	1,875
1926	910	455	1,490	580	1,035
1927	1,158	579	2,033	875	1,454
1928	706	353	2,948	2,242	2,595
1929	820	410	4,133	3,313	3,723
1930	1,060	530	2,309	1,249	1,779
1931	586	293	1,030	444	737
1932	154	77	148	- 6	71
1933	410	205	1,374	964	1,169
1934	558	279	1,566	1,008	1,287
1935	954	477	2,718	1,764	2,241
1936	1,266	633	2,048	782	1,415
1937	1,542	771	2,522	980	1,751

Sources: Columns 1 and 2 from Appendix E.
Column 3 from Table F1.
Columns 4 and 5 calculated.

TABLE F.3

Estimates of (D-I), 1916-1921: £p000

Year	(1) Income from Peruvian operations	(2) Estimated total outlays in Peru	(3) Estimate of (D-I) Current prices	(4) 1925 prices
1916	4,328	2,500	1,828	2,539
1917	4,519	2,300	2,219	2,551
1918	4,205	2,010	2,195	2,090
1919	3,755	2,092	1,663	1,526
1920	4,092	2,100	1,992	1,688
1921	5,159	3,730	1,429	1,415

Sources: Column 1 from Table V.2.

Column 2 from Cerro Annual Report and Balance Sheet; total operating costs, taxes, custom ores, and additions to gross capital during the year, all multiplied by 0.7.

TABLE F4

Capital Investment in Cerro, 1916-1937

Year	(1) Net capital stock at beginning of the year	(2)	(3) Net investment duri the year
	£p000 at current prices and exchange	£p000 at 1925 prices	£p000 at 1925 prices
1916	9,000	12,500	-2,051
1917	9,091	10,449	-1,459
1918	9,439	8,990	- 71
1919	9,722	8,919	- 186
1920	10,305	8,733	1,761
1921	10,599	10,494	3,521
1922	13,174	14,015	-2,317
1923	10,996	11,698	117
1924	11,224	11,815	-1,726
1925	10,089	10,089	1,405
1926	11,494	11,494	1,014
1927	12,508	12,508	32
1928	11,913	12,540	- 582
1929	11,001	11,958	9
1930	10,531	11,967	3,116
1931	13,122	15,083	1,223
1932	13,697	16,306	4,636
1933	18,638	20,942	-6,519
1934	13,413	14,423	-1,549
1935	12,102	12,874	-1,054
1936	11,229	11,820	- 945
1937	10,984	10,875	

Sources: Column 1 from Cerro's Annual Report and Balance Sheet, 1916-1937. The measure used is net fixed assets plus inventories and accounts receivable. Cash, deferred charges, U.S. Treasury Bonds, and miscellaneous investments (mostly, prior to 1919, in Backus and Johnston) are excluded. Figures for the years 1916-1925 also include an allowance for the appreciation of the company's properties during those years. The annual capital gain is assumed to be, for 1916-1921, one-fifth of the total amount of the 1921 revaluation in each year; and for 1922-1926, one-sixth of the 1926 revaluation in each year.

Columns 2 and 3 calculated.

TABLE F5

Estimates of $\bar{K}o$, 1916-1937, for an Alternative II Replacement

£p000 at 1925 prices

Year	-Estimates of $\bar{K}o$ for accounting rate of interest set at:-			
	--------ARI = 5%---------		--------ARI = 10%--------	
	Version A	Version B	Version A	Version B
1916	625	625	1,250	1,250
1917	522	554	1,045	1,170
1918	450	508	899	1,141
1919	446	530	892	1,248
1920	437	548	873	1,354
1921	525	663	1,049	1,665
1922	701	872	1,402	2,184
1923	585	800	1,170	2,171
1924	591	846	1,181	2,399
1925	504	802	1,009	2,467
1926	575	912	1,149	2,854
1927	625	1,009	1,251	3,241
1928	627	1,060	1,254	3,569
1929	598	1,084	1,196	3,867
1930	598	1,139	1,197	4,255
1931	754	1,352	1,508	4,993
1932	815	1,481	1,631	5,613
1933	1,047	1,786	2,094	5,997
1934	721	1,550	1,442	6,651
1935	644	1,550	1,287	7,161
1936	591	1,574	1,182	7,771
1937	544	1,606	1,088	8,454

Source: Calculated from Table F4.

F7 gives the results of an Alternative II model for accounting rates of interest of 5% and 10%. (The 15% rate, although used in the IPC chapter, was considered totally unrealistic and has therefore been ommitted from this set of calculations). The results indicate a strong case in favour of Alternative II replacement, naturally enough since the rate of repatriated profit obtained by Cerro during the period considered was consistently higher than the ARI's applied in the estimation. Table V.4 (in the main text) shows (D-I) in each year as a percentage of net capital stock at the beginning of the year, indicating that in most of the period Cerro's net repatriated earnings exceeded 15% of capital. (It should be noted, however, that the quantity (D-I) includes capital transferred out of the Peruvian operations of Cerro - i.e. this is not all profit). The impact on the firm's profitability of the 1920 recession, the 1924 fumes dispute, and the Great Depression from 1930 to 1934, are clearly evident. For the years in which (D-I) fell below 10%, the Version A calculations of $(\bar{Y}-Y)$ in Table F7, using an ARI of 10%, are automatically negative. It can be seen from Table F7 that for a number of years in the 1930's, the foreign firm carried low profits which would have translated into substantial costs for Peru in a replacement context. These losses were however greatly outweighed by the benefits accruing from Alternative II replacement in earlier years; and if Version B assumptions (reinvestment of all net returns on capital) are used, the losses of the 1930's are completely wiped out by the compounded gains from previous years.

TABLE F6

Compounded Values of (D-I) for Use in Version B Calculations: £p000 of 1925

Year	Compounded values of D-I, for various ARI's: low and high estimates			
	ARI = 5%		ARI = 10%	
	Low estimate	High estimate	Low estimate	High estimate
1916	2,539	2,539	2,539	2,539
1917	2,378	2,378	2,805	2,805
1918	2,351	2,351	2,624	2,624
1919	1,905	1,905	2,323	2,323
1920	2,162	2,162	2,717	2,717
1921	1,997	1,997	2,716	2,716
1922	3,006	3,226	3,896	4,116
1923	3,416	3,727	4,546	4,868
1924	2,102	2,461	3,516	3,903
1925	2,690	3,027	4,350	4,736
1926	1,822	2,339	3,783	4,370
1927	2,209	2,875	4,457	5,226
1928	3,804	4,297	6,387	7,026
1929	5,235	5,826	8,267	9,044
1930	3,315	4,093	6,912	7,923
1931	2,572	3,123	6,694	7,541
1932	2,184	2,516	6,846	7,533
1933	3,383	3,871	8,621	9,514
1934	3,551	4,135	9,484	10,536
1935	4,522	5,342	11,225	12,590
1936	3,694	4,714	11,294	12,954
1937	4,026	5,195	12,570	14,494

TABLE F7

Alternative II Replacement: Values of ($\bar{Y}$-Y), 1916-1937. £p000 at 1925 prices.

Year	Values of (Y-Y) for various levels of the ARI: — Using Low estimate for (D-I) — ARI = 5% — Version A	Version B	ARI = 10% — Version A	Version B	Using High estimate for (D-I) — ARI = 5% — Version A	Version B	ARI = 10% — Version A	Version B
1916	1,914	1,914	1,289	1,289	1,914	1,914	1,289	1,289
1917	2,029	1,824	1,506	1,635	2,029	1,824	1,506	1,635
1918	1,640	1,843	1,191	1,483	1,640	1,843	1,191	1,483
1919	1,080	1,375	634	1,075	1,080	1,375	634	1,075
1920	1,251	1,614	815	1,363	1,251	1,614	815	1,363
1921	890	1,334	366	1,051	890	1,334	366	1,051
1922	1,623	2,134	922	1,712	1,843	2,354	1,142	1,932
1923	1,999	2,616	1,414	2,375	2,299	2,927	1,714	2,697
1924	508	1,256	- 82	1,117	841	1,615	251	1,504
1925	1,078	1,388	573	1,883	1,371	2,225	866	2,269
1926	5	910	- 569	929	460	1,427	- 114	1,516
1927	250	1,200	- 376	1,216	829	1,866	203	1,985
1928	1,733	2,744	1,106	2,818	2,105	3,237	1,478	3,457
1929	3,003	4,151	2,405	4,400	3,449	4,742	2,851	5,177
1930	821	2,176	222	2,657	1,424	2,954	825	3,668
1931	- 244	1,220	- 998	1,701	93	1,771	- 661	2,548
1932	- 822	703	-1,638	1,233	- 730	1,035	-1,546	1,920
1933	6	1,597	-1,041	2,624	266	2,085	- 781	3,517
1934	363	2,001	- 358	2,833	663	2,585	- 58	3,885
1935	1,233	2,972	590	4,064	1,745	3,792	1,102	5,429
1936	232	2,120	- 359	3,523	898	3,140	307	5,183
1937	426	2,420	- 118	4,116	1,190	3,589	646	6,040
Totals	21,018	42,012	7,494	47,097	27,550	51,248	14,026	60,623
Average	955	1,910	341	2,141	1,252	2,329	638	2,756
% of total sales	20	39	7	44	26	48	13	56

Alternative II calculations of the sort presented in Table F7 give the impression that a replacement firm would have enjoyed considerable margins within which inefficiency or poor export performance could be accommodated, before the presence of Cerro became preferable to replacement. The compounded results with an ARI of 10% indicate Alternative II replacement gains totalling between £p47 million and £p61 million over the 22 years (£p2.1 - 2.3 million annually on average); and the results with an ARI of 5% are very similar: total gains of £p42 - 51 million. The non-compounded model, Version A, shows replacement gains of a lower order of magnitude, between £p7 million and £p28 million depending on what assumptions are made. Although some of the methods used in obtaining these results rule out the drawing of completely firm conclusions on the basis of quantitative analysis alone, there is no reason to doubt that the results in Table F7 provide reasonable approximations, so long as one assumes (as is done above) that the factual and counterfactual firms both begin operations in 1915 by buying-in at a price equal to net capital at the end of that year. That is, these would be the relevant results if one were assessing the possible gains to Peru from a process of replacement taking place in 1915, by expropriation or purchase of the foreign firm, and involving total costs equal to Cerro's net capital stock at the end of 1915. For a long-run historical analysis of Cerro's actual contribution, however, the assumption that gains and losses are to be measured only from 1916 introduces distortions in the results, and the possibility of relaxing it must therefore be explored further.

The assumption that operations began in 1915, which amounts to ignoring all gains and losses accruing from years previous to 1916, was made also in the analysis of the IPC, and in that case it was not too unrealistic, since the building-up of the investment in the Negritos oilfield and the Talara refinery took place over a long period, during which production was in progress and profits were available to finance the bulk of the investment. In the absence of any data on the operations of IPC prior to 1916, it was reasonable to assume a rough balance between gains and losses for Peru during the first twenty-five years of foreign control of Negritos (in fact, if anything, there was probably a net loss for Peru over the earlier period as well). The case of Cerro, however, is very different. The enterprise was set up by means of a massive inflow of foreign investment, which was sustained over a period of five years without any production taking place, and without any repatriation of profits. To calculate gains and losses for Peru for only the period when the enterprise was in full swing and yielding very high profits, is to ignore the substantial gains to Peru from the original inflow of capital. Some attempt, at least, must be made to set the firm's performance of 1901-1906 against the material already presented on the period after 1915.

Before venturing into this area, it should be pointed out that the nature of data available for early years is so poor as to make the usefulness of detailed quantitative analysis very dubious. The estimations which follow are extremely crude, and represent merely an attempt to do as much as possible towards striking a balance on the full period of Cerro's first thirty years. During the period from 1901 to 1905

Cerro exported no copper and repatriated no profits, but undertook a massive construction and development programme financed entirely from the USA. Total outlays from 1901 to 1906 (that is, including the first year of production) amounted to $16 million, of which roughly $6 million were spent on purchases of mines, and the remainder on development work and the installation of equipment.[1] In Table F8 this total expenditure is arbitrarily broken down into year-by-year flows, and divided into import expenditure and local expenditure on the basis of very limited evidence.[2]

Capital losses for local enterprises (denoted here by K) consisted mostly of the enforced closure of the small Peruvian smelters around Cerro de Pasco; the capital invested in these plants (all set up in the four or five years prior to Cerro's entry) had not been written off by the time they were forced to close.[3] The losses to Peruvian capitalists on this score have been estimated arbitrarily as £p90,000 spread over the three years 1902-1904.[4]

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1. Mayer, Conduct of the Cerro de Pasco Copper Company.
2. Basadre, Historia, p. 3420, states that during the years 1901-1907, Cerro converted a total of £p1.9 million from foreign to domestic currency to meet local expenses. The assumption made for Table F9 is that £p600,000 of this was spent in 1901 on the original purchases, and the remaining £p1.3 million was spread evenly over the six years 1902-1907, at roughly £p220,000 per year. The remainder of the $16 million total is assumed to have been spent on imports of equipment, at about £p250,000 annually from 1901 to 1906.
3. The entry of Cerro forced the closure of at least nine independent copper smelters with combined matte output capacity of 22 tons daily (7,000 tons p.a.) and employing about 280 workers (Velarde and Denegri, op. cit., p. 21). None of these plants operated for more than five or six years before closing.
4. One important set of losses for Peruvians which has not been included here (being too difficult to estimate) comprises the loss of business for local haulage contractors when the sending-out of ores from Cerro de Pasco by mule, llama and cart ceased.

TABLE F8

Direct Income Effects of Cerro, 1901-1906: £p000
at current prices

Year	Outlays by Cerro				Local capital losses K	Export losses $\bar{X}$
	Mine purchases	Imports M	Local outlays G+W+H+L	Total I		
1901	600	-	-	600	-	-
1902	100	250	160	510	30	200
1903	100	250	160	510	30	200
1904	100	250	160	510	30	200
1905	100	250	160	510	-	200
1906	100	250	160	510	-	-

The complete closure of the mines at Cerro de Pasco by the US syndicate contributed to a substantial drop in Peru's export earnings from copper in the years 1902-1905. Copper export earnings fell from £p940,000 in 1901 to £p311,000 in 1902, as a result of three forces: a sharp drop in the New York price of copper as the Standard Oil cartel collapsed; reduced output caused by flooding of the mines at Cerro de Pasco; and the abrupt closure of all mines purchased by Cerro. Of this fall of about £p630,000 in the annual value of copper exports should be added parallel losses of silver exports resulting from the closure of the mines. As a working figure, it has been assumed that the entry of Cerro can be held responsible for a drop in export earnings of £p200,000 annually for the four years of closed mines, and exports of this magnitude have been credited to the counterfactual firm under $\bar{X}$.

The measurement of the net income effect of Cerro's presence, $(Y-\bar{Y})$, is again based upon the equations

$$Y = X + S + I - L - M - R - D - Go - Wo - Ho - K \quad \ldots\ldots\ldots 9$$

$$\bar{Y} = \bar{X} + \bar{S} + \bar{I} - \bar{L} - \bar{M} - \bar{R} - \bar{D} - \bar{G}o - \bar{W}o - \bar{H}o - \bar{K}o \quad \ldots\ldots\ldots 9a$$

In equation 9 the items X, S, R, and D disappear, since there were no exports by the factual firm during the period, and no repatriated earnings. In equation 9a the items $\bar{S}$, $\bar{I}$, $\bar{R}$, and $\bar{D}$ disappear, since there were no local sales and no foreign participation (by assumption). This leaves, by subtraction,

$$Y - \bar{Y} = I - K - \bar{X} + \bar{K}o - (M-\bar{M}) - (Go-\bar{G}o) - (Ho-\bar{H}o) - (Wo-\bar{W}o) \ldots 21$$

The net benefits, that is, are given by the net inflow of foreign capital, minus any local capital costs associated with Cerro's entry, minus

the exports which the counterfactual firm(s) would have produced, plus the opportunity cost of capital for counterfactual investment, minus the excess of factual imports and opportunity costs over counterfactual imports and opportunity costs. In this case the Alternative II assumption, that factual and counterfactual firms were identical, is too unrealistic to apply. These were years in which the entry of foreign capital completely disrupted the pre-existing pattern of development of the industry, and it is impossible to hypothesize that any of the existing Peruvian enterprises would have acted as did Cerro, had the counterfactual state existed. The point of this early period was that Cerro halted exports (which would certainly have continued otherwise) and stepped up the rate of investment above the previous trend. In order to take some account of these changes, the model used below includes some modifications to the Alternative II framework. Instead of assuming that factual and counterfactual firms were identical throughout their lives, an Alternative III situation is postulated for 1901-1906 on the assumption that counterfactual firms at Cerro de Pasco in those years would have operated and invested at only 75% the level achieved by the US company, and income effects for thos years are calculated on this basis. It is then assumed that over the following decade the counterfactual firm steadily overtook Cerro, reaching an Alternative II position in 1916. This enables us to integrate the 1901-1906 estimates with the series for the later period, and also to fill in the gap in the data, from 1907 to 1915, by a simple linear projection.

Table F9 presents calculations of the net income effect (ignoring non-quantifiable issues) of Cerro during the period 1901-1906; it can

TABLE F9

Net Income Effect of Cerro, 1901-1906: £p000

Year	(1) (I-Ko-$\bar{X}$)	(2) (M-$\bar{M}$)	(3) (O-$\bar{O}$)[a]	(4) [I-Ko-$\bar{X}$-(M-$\bar{M}$)-(O-$\bar{O}$)] Current prices	(5) 1925 prices[d]	(6) Investment by counterfactual[b] Current prices	(7) 1925 prices	(8) Counterfactual net capital stock[c] 1925 prices	(9) -----Values of (Y-$\bar{Y}$) for various ARI's---- ---------5%--------- Version A	(10) Version B	(11) ---------10%-------- Version A	(12) Version B
1901	600	-	-	600	1,463	-	-	-	1,463	1,463	1,463	1,463
1902	280	63	30	187	445	308	733	-	445	518	445	591
1903	280	63	30	187	445	308	733	733	482	581	518	723
1904	280	63	30	187	445	308	733	1,393	515	656	584	870
1905	310	63	30	217	517	308	733	1,987	616	788	716	1,102
1906	510	63	30	417	948	308	733	2,521	1,074	1,294	1,200	1,716
								Totals	4,595	5,300	4,926	6,465

a. O = Go+Ho+Wo. Opportunity costs assumed 75% of local outlays.
b. 75% of (M+G+W+H+L).
c. Derived from Column 7, assuming 10% annual depreciation.
d. In the absence of any Peruvian price index before 1913, an average of the British and US wholesale price indexes has been used to deflate these figures.

be seen that the total effect for those six years (in Libras of 1925) ranged from £p4.6 to £p5.3 million with an ARI of 5%, and from £p4.9 to £p6.5 million with an ARI of 10%.

Table F10 then provides straight-line interpolations for (D-I) and capital investment from 1907-1916. The (D-I) estimates are obtained by taking the 1906 level of /$\bar{I}$-K-$\bar{X}$-(M-$\bar{M}$)-(O-$\bar{O}$)/ as equivalent to (I-D) for that year, and interpolating through to the 1916 figure for (D-I). /The switch from (Y-$\bar{Y}$) to ($\bar{Y}$-Y) as the object of the calculations of course changes the sign of the earlier income effacts./ By taking Tables F9, F10, F3 and F2 in sequence, series for the whole period 1901-1937 can be constructed for (D-I) or equivalent. The detailed calculations are not included here, but the results of the whole exercise are gathered together in Table F11. There it can be seen that the results using an ARI of 5% all agree in finding that the early positive income effects caused by Cerro's entry were outweighed by later losses under Alternative II assumptions, whether the compounded or non-compounded versions are used. With an ARI of 10%, however, the two versions give conflicting results. The non-compounded results show an overall gain from replacement (i.e. loss attributable to Cerro) totalling £p3.2 to £p9.8 million, whereas the compounded version shows replacement losses (gains attributable to Cerro) totalling £p84.9 to £p98.3 million. Here as elsewhere the results are not very sensitive to the estimate of (D-I) used for the years 1922-1937; but they are sensitive (if an ARI of 10% is used) to the assumptions made concerning the proportion of income gains which was reinvested and therefore should be compounded forward. This issue is taken up in the main text.

TABLE F10

Interpolated Series, 1907-1916: £p000 of 1925

Year	D-I	Counterfactual net capital stock	Counterfactual investment
1907	-599	2,969	1,059
1908	-251	4,028	1,059
1909	98	5,087	1,059
1910	447	6,146	1,059
1911	796	7,205	1,059
1912	1,144	8,264	1,059
1913	1,493	9,323	1,059
1914	1,842	10,382	1,059
1915	2,190	11,441	1,059
1916	2,539	12,500	

Source: Straight-line interpolations between 1906 and 1916 figures.

TABLE F11

Results obtained with modified Alternative II model, 1901-1937

£p000 of 1925

	$\bar{V}$-Y	
	37-year total	Annual average
1. Using low (D-I) estimate 1922-37:		
ARI = 5%, Version A	20,343	550
ARI = 5%, Version B	26,634	720
ARI = 10%, Version A	3,243	88
ARI = 10%, Version B	-98,296	-2,657
2. Using high (D-I) estimate 1922-37:		
ARI = 5%, Version A	26,875	726
ARI = 5%, Version B	35,870	969
ARI = 10%, Version A	9,775	264
ARI = 10%, Version B	-84,870	-2,294

APPENDIX G

Estimation of the Balance-of-Payments Contribution of Peru's Exports 1916-1934

The object of this appendix is to derive a series showing the total returned value from all Peruvian exports. The figures appear in the two Tables G1 and G2. Table G1 presents data on the returned value from the exports of the five main foreign firms producing for export. Table G2 breaks down total exports into those produced by the five foreign firms, and others. The latter category, dominated by Peruvian firms, is assumed to have returned value averaging 85% of aggregate earnings. Addition of this to the total from Table G1 yields the final total contribution.

TABLE G1

Returned Value from the Exports of Five Foreign Firms, 1916-1934: £p000

Year	Cerro	IPC[e]	Lobitos[e]	Vanadium Corporation	Northern Peru	TOTAL
1916	2,200[a]	230	69	90	-	2,589
1917	2,000[a]	209	76	93	-	2,378
1918	1,710[a]	181	75	50	-	2,016
1919	1,792[a]	337	123	113	-	2,365
1920	1,800[a]	349	146	276	-	2,571
1921	3,430[a]	490	168	13	-	4,101
1922	2,111	842	198	-	-	3,151
1923	2,352	584	314	16[b]	300[d]	3,566
1924	2,254	712	442	58[b]	378[c]	3,844
1925	2,429	698	562	24[b]	258[c]	3,971
1926	3,260	1,047	668	32[b]	292[c]	5,299
1927	3,295	1,118	557	35[b]	569[c]	5,574
1928	3,461	1,168	462	10[b]	614[c]	5,715
1929	3,682	1,218	515	35[b]	756[c]	6,206
1930	3,240	922	465	30[b]	529[c]	5,186
1931	2,502	779	455	-	417[c]	4,153
1932	1,399	1,191	608	-	125[c]	3,323
1933	1,408	1,741	628	-	161[c]	3,938
1934	1,639	2,141	741	-	150[d]	4,671

a. Estimates from Cerro Annual Report and other scrappy data. Total costs including imports are estimated as 70% of the total costs of Cerro given in the company accounts, and estimated imports of £p300,000 subtracted for all years. This introduces an element of error into the 1921 figures, when there were heavy imports of equipment for Oroya; the bias is in the direction of higher returned value in that year.

b. Estimated from very scrappy data in the official mining statistics.

c. Northern Peru returned value estimated as a steady 50% of export earnings of the company, on the basis of complete figures for a limited number of years in the 1920's, from official mining statistics.

d. Pure guesses.

e. IPC and Lobitos figure obtained from Appendix B. The returned value from IPC exports is estimated by multiplying total IPC returned value by the proportion of export sales to total sales (i.e. the firm's total costs are assumed to be distributed equally between production for export and production for the local market).

TABLE G2

Estimates of Total Returned Value, 1916-1934: £ million

Year	Export Earnings			Returned Value		
	Total	Five foreign firms	Peruvian-controlled	Five foreign firms	Peruvian-controlled	Total
1916	80	29	51	12	43	55
1917	91	29	62	12	53	65
1918	97	39	58	11	49	60
1919	131	37	94	12	80	92
1920	172	27	145	12	123	135
1921	81	24	57	15	48	63
1922	91	31	60	12	51	63
1923	98	36	62	14	53	67
1924	102	43	59	16	50	66
1925	87	42	45	16	38	54
1926	89	46	43	20	37	57
1927	116	62	54	21	46	67
1928	125	75	50	23	43	66
1929	134	89	45	25	38	63
1930	83	49	34	18	29	47
1931	55	27	28	12	24	36
1932	38	20	18	8	15	23
1933	48	23	25	7	21	28
1934	70	39	31	11	26	37

Sources: Total export earnings from Extracto Estadístico 1934-1935, p. 76, unrevised customhouse totals, converted at par to 1922 and at current exchange thereafter.

Export earnings of the five foreign firms are reported exports of the relevant products through the ports used by the firms, obtained from the port-by-port statistics in Estadística del Comercio Especial, 1916 to 1934.

Returned value from foreign firms from Table G1, converted at current exchange rates.

Returned value from Peruvian-controlled exports estimated as 85% of earnings.

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