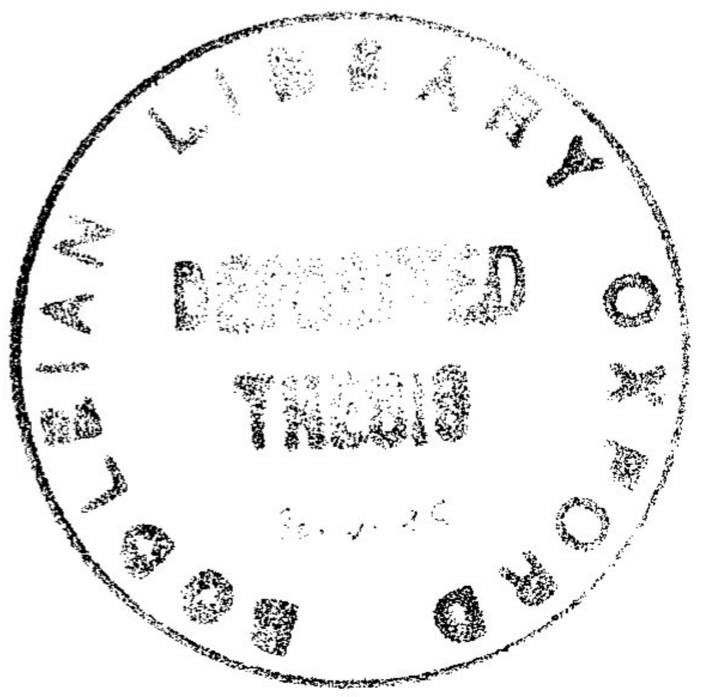
An Economic Analysis of Enterprise in the Music Industry

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D.Phil Thesis
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Abstract

The thesis conducted an economic analysis of enterprise in the music industry and was the first quantitative analysis of the industry. The research focused on the sectors of the music industry relating to the sale of audio software. This initially involved an analysis of the intermediate market for music where the output of musicians was sold as an input to the production of audio software. In the absence of data in this sector of the industry, the research entailed the collection of a comprehensive data set and used this to examine record company formation, survival rates of composers and the contracting of musicians by record companies. The analysis then progressed to look at the audio software market. It examined the similarity of music in the singles and albums markets and used these results to assess the importance of music innovation at the firm and industry level. The research then investigated the audio hardware sector and examined the strategic interdependence between audio hardware and software companies in the event of systems innovation. The final chapter of the thesis looked at the public good characteristics of music and assessed how this affected the productivity of the industry as a whole. The thesis provided a theoretical model of enterprise in the industry and compiled a history of audio technology innovation. The thesis also generated results of interest from a specific level to the general. Firstly, the quantitative methodology of the analysis demonstrated that such an approach is feasible in other cultural industries. Secondly, the application of the economics of entrepreneurship to an industry where a significant proportion of agents are primarily motivated by non-pecuniary factors was found to be feasible. However, the research indicated that in such industries a significant proportion of enterprise is likely to be unproductive, particularly new firm formation.

In memory of my mother

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Introduction: Enterprise in the Music Industry

Introduction

Cultural industries such as theatre, music and literature have featured in a relatively sparse and haphazard manner among economic industry analyses [see Throsby (1994) for a survey]. Economists have apparently been deterred from analysing such industries due to data constraints and a pessimistic view of the relevance of economic factors in determining the behaviour of these industries. As opposed to being discouraged by these factors, this thesis is inspired by their potential to generate value added to research.

In this thesis we conduct an economic analysis of enterprise in the music industry. More specifically, a quantitative analysis of the sectors of the music industry relating to the sale of audio software i.e. records, tapes, CDs etc. A major incentive for this research is that to our knowledge, it is the first comprehensive quantitative analysis of this industry. Apart from this 'general to the specific' motivation, we also hope to achieve goals that may be described as 'specific to the general'. These latter objectives may be classified under two headings.

(1) *A quantitative approach to cultural economics:* The growing literature on cultural industries is dominated by qualitative analyses. Analysts in this field regularly 'apologise' for this methodological approach with reference to a lack of data or the immeasurability of key determining factors. For example, such could certainly be said of the music industry in relation to a lack of data in the area of the artist labour

market.

The thesis aims to demonstrate that even in cases of cultural industries where data is unavailable or key artistic variables are apparently immeasurable, a quantitative analysis can make a significant contribution. Through such an analysis of the music industry, the thesis aims to illustrate that similar research of other cultural industries would be a fruitful exercise.

(2) *Enterprise and economic performance:* There is a growing and vibrant literature developing on entrepreneurship which we document throughout the thesis. One of the aspirations of this research is to generate a better understanding of the dynamics of economic performance. A recent development in the literature on entrepreneurship is the classification of enterprise according to its productivity [see Baumol (1990)]. However, this literature has generally focused on enterprise in mainstream commercial industries where rewards and measurement are mainly pecuniary. If enterprise is to explain economic performance, it also makes sense to look at enterprise in an industry where non-pecuniary factors would be expected to play a major role. In particular, such an analysis would highlight the generality of the factors which are commonly viewed as determining enterprise. This is a major objective of the thesis, namely an analysis of enterprise in the music industry.

In meeting these objectives we will focus exclusively on music whose main point of sale is the audio software market. There are two reasons for this decision. Firstly, this specialisation is necessary because of the difference in functioning between artists whose primary market

is in performance royalties and those whose primary market is mechanical royalties. In the latter, the composer usually writes the music for a particular performance. For example, an advertising jingle for radio or theme music for a film. In these cases release of recordings on record are usually an afterthought and depend on the success of the product in the performance market. Thus, success in the performance market generates a derived demand in the audio software market e.g. a popular theatrical performance may generate a demand for recordings of the theme music.

In the case of artists whose primary market is the audio software market, the causation runs in the opposite direction. A successful single or album generates public performance demand in discotheques, bars, restaurants, and live venues. Thus, the release of a single or album is the primary objective of musicians in this sector of the industry. In terms of economic importance, music whose main market is in audio software accounts for the vast majority of activity within the music industry.

The second reason for choosing to focus on music whose main point of sale is in the audio software market is the fact that data availability is mainly concentrated in this area of the industry.

The remaining sectors of this introduction are structured as follows. Section one provides an overview of enterprise and how it is generally analysed at an empirical level. Section two then goes on to define property rights in the music industry which is an effective mode of familiarising the reader with the various markets for music. Finally, section three outlines the chapter structure of the thesis.

Section 1: Defining Enterprise

It is important at the outset to be clear about the meaning of the term 'enterprise', in its application to the music industry. In far too many instances of economic research, unnecessary ambiguity and debate has been generated by a lack of rigour in defining enterprise. This point has been made eloquently by Casson (1982), and we quote:

> "Most studies of the entrepreneur make no attempt at definition. They rely instead on a stereotype, that of the swashbuckling business adventurer. Anybody who conforms loosely to this stereotype is dubbed an entrepreneur."[1]

We assume that enterprise occurs when there is a coincidence of a profit opportunity, and an economic agent willing and capable to exploit the opportunity[2]. This, in effect, is a supply and demand approach to enterprise, [see Casson (1982) and Schultz (1975) for an outline of the framework and Black et al (1993), Foreman-Peck (1985) and Kihlstrom and Laffont (1979) for examples of the analysis in practice]. The approach has become widely accepted and utilised because it accommodates the various schools of entrepreneurial thought within a general framework. Each school identifies entrepreneurship with a key characteristic, (for example, risk-taking), and the supply and demand approach treats these characteristics as resources that are allocated through their respective markets. In each case, an individual's endowment of entrepreneurial characteristics determines the level of income that she may

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[1] Casson (1982) pp 1

[2] The income from enterprise, therefore, is a reward for the co-ordination of resources necessary to exploit a profit opportunity. In this manner, the income from enterprise can materialise directly to a sole proprietor of an enterprise and/or indirectly in the form of wages to an employed entrepreneur.

expect to derive from enterprise. Thus, each individual makes a career choice by comparing entrepreneurial income to income from non-entrepreneurial employment . Through aggregation, a supply schedule for enterprise may be derived. The interaction of this supply of entrepreneurs and available profit opportunities, (i.e. the demand for enterprise), determines the level of enterprise.

The Knightian school of entrepreneurship is based on the seminal work of Frank Knight (1921), where an entrepreneur is defined as someone who undertakes economic activities involving uncertainty i.e. uninsurable or impure risk. Kihlstrom and Laffont (1979) use Knightian risk-taking as the key feature of a general equilibrium, supply and demand model of entrepreneurship. In this model individuals choose between wage work and setting up a new firm; the wage rate clears the market. If, for example, enterprise was low, this would be exhibited in unemployment which would drive the wage rate down, increasing enterprise and generating a full employment equilibrium.

In the case of Schumpeter's (1939) approach to entrepreneurship, risk is assumed to play no role as entrepreneurs can find investors to back their projects.

> "...risk bearing is no part of the entrepreneurial function. It is the capitalist who bears the risk."[3]

[3] Schumpeter (1939) [p 104]

Schumpeter's key characteristic of entrepreneurship is entrepreneurial ability. For Schumpeter the key characteristic of entrepreneurship is the ability to conceive and implement 'new combinations'. This approach has been adopted by Evans and Jovanovic (1989), where risk neutrality is assumed, and an individual's endowment of entrepreneurial ability determines her income from enterprise. Evans and Jovanovic argue that since banks require collateral for bank lending, self-employed entrepreneurs cannot avoid Knightian risk-taking. Blanchflower and Oswald (1991) describe a similar model based on entrepreneurial ability but argue more coherently that the need for collateral for bank loans is due to asymmetric information between the lender, (usually the banks) and the borrower (entrepreneur). Collateral is necessary to avoid problems of moral hazard and adverse selection among entrepreneurs. This style of model of entrepreneurial supply is commonly coupled with a theory of profit opportunities in order to explain a model of enterprise within a supply and demand framework. Two recent examples are Black et al (1993) where a controversial link between house prices and firm start-up is mooted, and Johnson and Parker (1994), where inter-temporal effects of firm start-ups and firm deaths are examined.

Since Schumpeter's view of entrepreneurship is more commonly associated with creating disequilibrium, it may seem counter intuitive to embody this theory within an 'equilibrium' framework. This would of course be true if the entrepreneur's sole activity was disequilibrating. However, profits from enterprise can also be made by equilibrating activities. This point of view was recognised by Schumpeter's fellow Austrian school economist Israel Kirzner (1979), who saw rewards for enterprise existing as long as disequilibrium persisted. He argued that as entrepreneurs exploited opportunities, the market moved towards equilibrium. Both Casson (1982) and Schultz (1980) have necessarily included the

equilibrating roles of entrepreneurs within a supply and demand framework. Casson chose to construct a general synthesis of definitions and identified an entrepreneur as:

> " ...someone who specialises in taking judgemental decisions about the coordination of scarce resources."[4]

In this definition, both the equilibrating and disequilibriating entrepreneurs are captured by Casson's generality. Schultz (1980) draws a distinction between innovation and imitation of innovation. Within Schultz's schema, an innovating entrepreneur throws the market into disequilibrium, while an imitating entrepreneur helps the diffusion of an innovation reach maturity, thereby moving the market towards equilibrium.

The key feature of the supply and demand approach is that the discussion moves away from a search for an elusive entrepreneur (or what Kilby (1971) described as 'the heffalump'), and towards an examination of enterprise as a resource. Each individual is assumed to be endowed with a level of enterprise acumen (i.e. entrepreneurial ability in the case of Schumpeter and Kirzner, or willingness to take risks in the case of Knight), and this resource is allocated as individuals choose careers. In this setting an individual who is an entrepreneur under one vector of incomes may seek non-entrepreneurial employment under a different vector. In this manner, the supply and demand approach moves the emphasis of analysis away from the individual and towards the determinants of entrepreneurial acumen. Thus, risk-taking could be an important attribute for enterprise in one industry, while a unique skill could be crucial in another. Therefore, the supply and demand framework does not have to search

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[4] Casson (1982) [p23]

for the 'heffalump', as it assumes at the outset that entrepreneurship is a set of heterogeneous attributes which change in emphasis between industries and over time. With this perspective, it is not surprising that attempts at a general characteristic approach to enterprise have always generated debate not to mention high passions.

Baumol (1990) made an important augmentation to the supply and demand framework. He argues that entrepreneurship is not always productive and in some cases is actually destructive. Baumol claims that certain forms of entrepreneurial activity do not enhance total wealth in the economy and may even reduce total wealth. This activity, commonly referred to as 'rent-seeking' has important welfare implications for a supply and demand approach to enterprise. In this framework, an entrepreneur aims to maximise her income and she does this by exploiting opportunities. Some of these opportunities entail the generation of new wealth i.e. new output generated by the entrepreneur, in addition to multiplier effects to other firms. However, some profit opportunities arise from a redistribution of wealth where entrepreneurs are actually unproductive. If such a redistribution of wealth reduces entrepreneurial activity in another sector then it may have the effect of being destructive.

Baumol's contribution implies that the supply and demand framework must be augmented if it is to explain economic performance. In effect, the demand for enterprise must be divided into productive and unproductive enterprise. In this manner, a modest level of enterprise may not merely be due to a lack of qualified entrepreneurs or a lack of opportunities, but due to an imbalance between 'pure entrepreneurial' and 'rent-seeking' opportunities. In terms of the supply and demand framework this would be reflected in unproductive entrepreneurial opportunities 'crowding out' a proportion of their productive counterparts.

Section 2: Enterprise in the Music Industry

This section defines the output of the music industry. Music as a product is defined according to copyright legislation and this affects both the existence of music property rights and the means through which they are most effectively exploited by musicians, record companies and consumers of music.

The salient economic activities carried out within the music industry revolve around music's public good characteristics. These stem from the fact that generally a musical composition is neither diminishable nor exclusive in its use. A recital of a particular tune to an individual consumer rarely diminishes the durability of the tune for further recitals, especially in the case of recordings[5]. Therefore, as in the case of many other public goods produced in the private sector, copyright protection is necessary to provide an incentive for production.

There are two forms of property right associated with music: these are composers' rights (C), and 'idiosyncratic version' rights (P). Composers' rights pertain to the composition, i.e. actual tune and lyrics. The version rights relate to a particular adaptation of a musical composition. Thus, a musical recital or recording involves both rights.

Both version and composer rights have two areas of application:

(a) *Performance rights*: These relate to the enforcement of music rights in the

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[5] Music is of course diminishable in cases where audience capacity constraints become binding.

realm of public performance e.g. radio, television, live concert, disco, rave etc. Thus, a public performance of a recording would entail the utilisation of both a version performance right and a composer's performance right. For example, if the Byrds' version of Bob Dylan's "Mr. Tambourine Man" is played on the radio then both Bob Dylan's composer performance right and the Byrds' version performance right are being utilised.

(b) *Mechanical rights*: These pertain to the right to issue recordings on audio software, both blank and pre-recorded. As in the case of performance rights both the composer and version copyright apply. Therefore, for example, if a copy of the Byrds' single "Mr. Tambourine Man" is bought by a consumer, then the Byrds' version mechanical right and Bob Dylan's composer mechanical right are being exploited.

The market for music, therefore, is defined by these four property rights and the means through which they are sold e.g. records, radio, film etc. Copyright is assigned to the author of a creative work as soon as it is recorded either in written or audio form. The life of the copyright extends for the life of the author plus fifty years after her death. The European Community intends to harmonize these property rights across Europe in line with the aspirations of the current G.A.T.T. discussions. This will involve extending the duration of property rights to 70 years after the author's death.

As of 1994, version and composer rights are defined by the 1956 Copyright Act and the amendments made to this act via the 1988 Copyright, Designs and Patents Act. The realm

of the property rights extend over the following areas:[6]

(1) Copying the tune

(2) Issuing copies of the tune to the public

(3) Performing and playing the tune in public

(4) Broadcasting the tune

(5) Adapting the tune or adapting it in any of the above forms

The realm of these rights effectively defines the various sectors of the music industry. The exploitation of music copyright in the area of copying the tune and issuing copies, to the public refers to the market for audio software. Both version and composer rights are licensed directly to record companies, who sell recordings on various audio software formats such as compact disc, analogue cassette, digital compact cassette etc. In the case of version rights, an agreement is made on an individual basis between the artist and the record company. This almost always assigns an exclusive right to the record company to issue 'copies to the public' within a particular market area defined by national boundaries.

The agreement between an artist and a record company is usually intimate and in most cases record companies play an active role in the strategic management of their artists. However, the relationship between an individual composer and a particular record company is very often an informal arrangement, especially where a musical composition of the composer is being used only once. In this case the costs of monitoring audio software sales and securing

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[6] These rights do not apply to storing the tune in archives or for use in judicial proceedings. A statutory waiving of rights is made when the tune is used for certain educational purposes.

payment for each individual composer, can be greatly reduced if a central agency undertakes this activity on behalf of all composers. Therefore, in each country composers assign their rights to such an agency. In the U.K. this is called the Mechanical Copyright Protection Society (M.C.P.S.).

The licensing of music within the public performance sector of the market is more complex. In this sector the public good characteristics of music are most accentuated and hence controlling licensing by a central agency is necessary. We can identify seven main benefits to composers and bands if this sector of the market is controlled by a collection agency whose repertoire of music is an effective monopoly of the market:

(1) *Policing and Monitoring Costs*:

The centralisation of music royalties reduces the cost to musicians of policing the use of their music. This occurs through two means:

(a) The fixed costs of policing public performance outlets are spread across all recipient musicians and hence are greatly reduced for each individual musician.

(b) A public performance outlet is obliged to pay a licence fee as long as it utilises a single tune in the collection agency's catalogue. Since the catalogue embraces virtually all available music, the ease of detecting a liable user is greatly aided. This implies that the amount of resources necessary for policing are greatly reduced, hence decreasing the total costs of policing.

Assuming collection agencies do not abuse their monopoly power, they will tend to pass on these cost savings to music users in the form of reductions in licensing fees.

(2) *Legal Costs*:

Closely related to the last point are the economies of scale in legal costs entailed in the prosecution of public performance outlets which infringe musicians' property rights. Again, these stem from two sources:

(a) By spreading the legal costs over many musicians, the cost to each individual musician is greatly reduced. This is of further benefit to musicians, by ensuring that outlets take the threat of prosecution seriously since they know musicians will not be deterred, (by legal costs), from prosecuting infringing venues.

(b) Winning a legal suit is greatly facilitated by centralised licensing, since the plaintiff has only to prove that music within the vast catalogue was played in public; as opposed to proving that a particular composition or recording was performed.

(3) *Transaction Costs*:

Contractual and exchange costs between musicians and public performance outlets are spread across all member musicians, greatly reducing costs to each musician. By offering a collective licence, the agency brings down the overall transaction cost bill, as a single contract suffices for the performance of all music.

(4) *Information costs*:

The concentration of music property rights also creates cost savings directly to public performance outlets. Since all music is licensed by a single agency, outlets are saved the time and expense of locating the owner of the right.

(5) *Flexibility of Use*:

The nature of the market for public performance of music implies that such firms often require a high degree of flexibility in the variety of music used. This flexibility is facilitated by a 'blanket license' which allows these firms benefit through the utilisation of a 'blanket licence', allowing access to all types of music. This flexibility benefits musicians as it effectively increases the demand for their output.

(6) *Double Marginalisation of Prices*:

Double marginalisation of prices occurs when one producer sells an intermediate product to another producer on a per unit cost basis, thereby raising the latter's marginal costs. When the second producer then chooses the optimal price to sell the final product, the price is therefore increased on a per unit basis. The outcome is a welfare loss to society as both consumers and firms could benefit if the firms were to vertically integrate, (resulting in increased output, lower prices and greater profits).

In the case of a collection agency, double marginalisation of prices does not occur as most collection agencies, (such as the M.C.P.S.), are non-profit organisations whose members are the owners of version and composer property rights. In effect, these two

groups operate as if they are vertically integrated.

(7) *Monopoly Power*:

Since collective licensing implies that collection agencies are the sole suppliers of music performance rights, they therefore have monopoly power. As a result, the pricing behaviour of collection agencies are monitored in most countries by the relevant competition authority. In the U.K. this falls under the jurisdiction of the Monopolies and Mergers Commission and the Copyright Tribunal.

In the U.K. the licensing of version performance rights are administered by Phonographic Performance Limited (P.P.L.) while the respective composer rights are administered by the Performing Right Society (P.R.S.). The P.R.S. collects substantially more revenue than the P.P.L. due to the fact that it is unnecessary for the P.P.L. to license version rights in the case of live concerts (as the performers own the version rights), while in the same case the P.R.S. is obliged to administer composer rights.[7] In the latter case, live performances by bands often entail the use of compositions by composers who are not members of the performing band. In such cases it is more efficient for the P.R.S. to administer the licensing.

In some cases musicians may sell a proportion of their version and composer rights to a publisher, who in return seeks out mechanical licensees among record companies, and performance licensees among broadcasters. In the case of composer rights this activity also extends into the realm of locating performers for tunes.

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[7] For example, in 1986 the total gross revenue of the P.R.S. and the P.P.L. was respectively £74 million and £12 million.

Section 3: Entrepreneurial Activity in the Music Industry:

The realm of music property rights effectively defines the markets for music. It follows that a particular musical composition could hope to generate a return through both the audio software market, and the market for the public performance of music. The economic performance of the music industry is, therefore, determined by the degree to which musical output satisfies the desires of consumers in these two markets. Thus, enterprise in the music industry is exhibited in two forms. Firstly, it may entail enterprise within the characteristics of the music itself. This involves, innovation in a composition and/or version of a composition, record company marketing, and the style of presentation of the music, i.e. the artist's public image. All of these characteristics affect the style of music, and for brevity we will refer to this form of enterprise as tune innovation.

The second form of enterprise relates to the means through which music is presented to the consumer e.g. a new style of audio software format, quality of broadcast, cost of music to the consumer etc.

These two forms of entrepreneurship may be initially disequilibriating as in the Schumpeterian schema e.g. a new style of music causing a superannuation of an existing mode. However, if it proves to be successful it will divert a range of opportunities in favour of similar entrepreneurial endeavours. In this manner equilibrating enterprise, such as that described by Kirzner's alert entrepreneur or Schultz's imitator, may become the main actor. In terms of the previous example, if a band introduces a new style of music this may translate into a new wave of music, if imitators adopt the style when they create new versions and/or compositions

of music.

Baumol's unproductive/destructive entrepreneur is not lost in this analysis either. Through manipulation of legal loopholes or through breach of property rights directly, enterprising individuals can reallocate rewards from one sector of the industry to another. If this results in a net decrease in industry output then this is an instance of destructive enterprise. A possible example of this, is the case of 'pirate' record companies who ignore all mechanical property rights relating to sound recordings. The income from pirate record sales is derived at the expense of losses of record sales by legitimate record companies.

The analysis commences in chapter 1 with a history of the music industry since the introduction of the earliest audio software format. This section is aimed to provide an overview of the evolution of the industry in order to give the reader a perspective of its structure and dynamics over time. It is also used as reference point for much of the research throughout the thesis. Chapter 2 complements the introductory nature of chapter 1 with a theoretical approach to enterprise in the music industry. This chapter develops a model of the supply of enterprise which is both relevant to the music industry and also applicable to other industries where a significant proportion of enterprise activity is carried out by incumbent firms. The model raises many of the propositions that are tested in the empirical sections of the thesis.

The empirical analysis commences in chapter 3 where a comprehensive data set is collected and analysed. The data pertain to the performance of the intermediate market for music, namely a labour market where artists are faced with the decision to either licence their music

to incumbent firms or set up their own record companies. The chapter identifies the main factors that determine this behaviour and also attempts to gauge whether new record company formation by artists generally represents the seeds of future industry or the rejection of low quality enterprise by existing firms.

Chapter 4 examines the market for audio software. It seeks to determine the extent to which tune innovation affects industry output. It examines the main determinants of the demand for audio software. The chapter also examines record companies' market share to ascertain how firm performance is affected by their ability to sell music which satisfies consumers' tastes, i.e. successful tune innovation. The interaction between the audio singles and albums market is closely examined using industry data, market share data and cross reference of music charts.

Chapter 5 moves the analysis from an examination of the importance of the type of music, to the role of the nature of the audio software format through which music is sold. This chapter researches 'systems innovation' in the audio software market; particularly the introduction and diffusion of the compact disc. The chapter highlights the importance of the strategic interaction between audio hardware and software firms. It also attempts to explain the determinants of the success of a new format innovation.

Finally, chapter 6 continues the analysis of enterprise of the means through which music is sold. It highlights how 'rent-seeking' entrepreneurs can introduce innovations that generate profits through the infringement of music property rights. We use the term 'rent-stealing' here to refer to forms of rent-seeking activities which are illegal. This chapter, therefore, is more akin to the analysis of rent-seeking carried out by Tullock (1967) rather than the more

commonly cited account by Krueger (1974). The chapter focuses on two areas which feature two different problems for productive enterprise in the music industry. The first area is pirate record companies that flourish in economies where property rights either do not exist, or are not enforced. This section examines the extent to which such rent-stealing behaviour may be destructive in the terms described by Baumol (1990). It identifies the importance of music industry-wide corporate organisations to enforce such rights. The second area of focus is the market for blank tapes, where music property rights are infringed by consumers who make home copies of pre-recorded software. It attempts to assess whether such apparent rent-stealing actually amounts to non-productive enterprise rather than having a welfare enhancing impact akin to price discrimination. This section also highlights the difficulty in distinguishing between rent-seeking and productive enterprise.

1: The Historical Evolution of the Music Industry

Introduction

The analysis in the thesis uses either cross-section data or time series data over an historically short duration. Therefore, we feel it is necessary to provide an historical overview of the industry in order to provide a more comprehensive perspective of the analysis. In particular, the analysis of systems innovation of chapter 5 is facilitated with an understanding of the historical evolution of technology within the industry.

The chapter is divided into two sections. Section 1 outlines the history of audio technology. Since no comprehensive audio technology history exists, it was necessary to knit this history together from music industry organisation reports. The second section outlines the history of musicians and the nature of their profession in Britain over the twentieth century. It is mainly drawn from the work of Peacock and Weir (1975) and Ehrlich (1989). The chapter contains an appendix containing a chronology of enterprise in the record industry.

Section 1: The History of Format Innovations

In 1877 in his Menlo Park laboratories, New Jersey, Thomas Edison became the first person to record sound when he recited "Mary Had A Little Lamb" in front of the horn microphone

of his phonograph.[8] Edison's invention involved a needle cutting vertical hill and trough grooves, (numerous small dents), along a spiral path in a cylinder wrapped in tinfoil. These engravings were vibrations of sound which were generated by rotating the cylinder with a handle, while speaking into the horn microphone.[9] When played back with a needle running along the grooves the original sound was reproduced. The non-durability of the tinfoil implied that each recording could only be played back a few times before wearing out.[10] Edison applied for a patent for his new invention under the name of 'phonograph' (Greek for 'sound writer') on Christmas Eve 1877. The following year, with the help of a group of investors, Edison tried to commercialise the tinfoil Graphophone throughout the United States by demonstrating it at social events such as fairs and theatres. The venture was not successful, as the novelty wore off and consumers were not impressed by its potential for practical use given its low durability and poor sound quality. The project was abandoned by the end of 1878 and Edison shifted his attention to electric light.[11]

Alexander Graham Bell took up the challenge to produce a workable phonograph and produced an improved version of Edison's previous tinfoil phonograph, replacing tinfoil by soft wax-coated cardboard. This improved version of the phonograph was made available for hire under the name of 'Graphophone' in 1888. This entailed improved sound quality, and play back durability, and meant that the invention now had some commercial potential in the form of an office dictating machine. In light of this development, Edison returned to the

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[8] Record Industry Association of America [R.I.A.A.] (1985).

[9] Gelatt (1958).

[10] R.I.A.A. (1985).

[11] R.I.A.A. (1985).

project and developed a phonograph powered by electricity. Bell made a further contribution by using hard, (instead of soft), wax and replaced the needle by a loosely mounted stylus. These improvements reached the market two years later in 1890 when Edison made available for sale the Edison-Bell-Tainter Graphophone.[12]

A new commercial use for the Graphophone was soon identified by Louis Glass in San Francisco. He augmented the Graphophone to produce a machine commonly known today as the 'Juke Box'. These juke boxes, powered by batteries, were housed in phonograph arcades and mainly played music, comedy and vaudeville (American variety entertainment). The success of these arcades spawned the production of pre-recorded cylinders of differentiated music, comedy and other audio entertainment. However, more importantly, they highlighted the viability of producing proto-juke boxes for domestic use. As a result, domestic graphophones appeared in the 1890s. Columbia-Graphophone produced a model for $50 and Edison, under the auspices of his National Phonograph Company, produced a version for $40.[13]

However, the Graphophone was not free from competition. A year before the introduction of the Edison-Bell-Tainter Graphophone, Emile Berliner, a German inventor resident in the U.S., launched his 'Gramophone' with the help of a German toy manufacturing firm. Berliner derived his invention from the theoretical work of Charles Cros published in 1887.[14] Berliner's concept was based on the notion that if vertical hill and trough grooves could

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[12] The National Sound Archive [N.S.A.] (1989).

[13] R.I.A.A. (1985).

[14] Gelatt (1958).

reproduce sound; so also might horizontal 'zig-zag' grooves. He used a disc on a rotating plate which later became the standard format for record production in the twentieth century.

In 1896 Berliner's partner, Eldridge Johnson, improved Berliner's Gramophone by using a spring-motor and an improved speaker.[15] A year later Berliner introduced a process innovation to the Gramophone which involved the use of shellac discs. This allowed duplicates of discs to be made by pressing. In practice, this was quite similar to printing and greatly simplified production.[16] In 1901 Berliner and Eldridge formed the highly successful 'Victor Talking Machine Company'. This company went on in 1906 to introduce the first single unit gramophone which had the reproduction horn-speaker embodied in the player.[17]

By the turn of the century, domestic phonographs had sufficiently diffused so as to encourage further imitation and innovation in the worldwide recorded sound industry. 1898 marked the birth of the music industry in Britain, with the inauguration of the Gramophone Company, (later E.M.I.) selling gramophones and seven inch discs.[18] Within two years there was a choice of over 5,000 pre-recorded discs available in the British market, signifying the scale of tune innovation.[19] Competition from the Graphophone soon followed with the opening of the Edison-Bell factory at Peckham in 1903.[20]

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[15] N.S.A. (1989).

[16] Gelatt (1958).

[17] R.I.A.A. (1985)

[18] N.S.A. (1989).

[19] N.S.A. (1989).

[20] R.I.A.A. (1985).

Systems innovation specific to each format also grew. In the U.K. in 1901 the Gramophone Company produced ten inch discs.[21] Mass production of double-sided discs was developed by Odeon of Germany in 1904.[22] Even hybrids of the Gramophone and Graphophone emerged in the form of Columbia's lateral groove disc graphophone, and France's Pathe Freres producing vertical cut discs. The number of record companies continued to grow, (companies such as Parlophone and Brunswick were formed in this period), and this trend received an added impetus in the years between 1915 and 1920 when both Edison and Berliners' patents expired.[23]

Despite further improvements to the Graphophone, with Edison extending its playing time from two to four minutes in 1908, and improving its sound quality with the launch of the 'Blue Amberol Cylinder' in 1912 (which had a superior sound quality to discs), it was becoming increasingly clear that the gramophone was diffusing sufficiently fast to establish itself as the market format for the record industry. The first indication of this was apparent in 1912 when Columbia terminated production of the Graphophone. By 1926 Edison's National Phonograph Company started to produce discs. Finally, in 1929 Edison withdrew the Graphophone from the market.[24] While the gramophone became the norm, it did not establish a single format as other record companies produced incompatible gramophones and discs. It seemed that companies were able to pursue this strategy both because they had a reasonable market share, and produced hardware as well as software.

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[21] N.S.A. (1989).

[22] N.S.A. (1989).

[23] R.I.A.A. (1985).

[24] N.S.A. (1989).

While the industry was becoming more deterministic as far as formats were concerned, a new destabilising influence was emerging in the form of commercial music radio. David Sarnoff, an employee of the Marconi Wireless Company, had long been pushing for the idea of a 'music box' receiving broadcast music. The idea was rejected by Marconi who were more interested in expanding their maritime communications service geographically. However, as Marconi merged into the Radio Corporation of America (R.C.A.) in 1920, Sarnoff got his opportunity, culminating in the launch of R.C.A.'s 'Music Box' in 1922.[25] This became a big threat to the record industry, especially considering that at the time of launch, wireless sound quality was superior to the Gramophone.[26] Music box sales were dramatic, valued at $548 million between 1922 and 1924; over seven times the figure projected by Sarnoff.[27] Good news for radio producers was bad news for record producers, and record sales fell dramatically. However, the record industry responded with a string of improvements, most of which involved the use of electricity. Joseph Maxfield's invention of electrical recording resulted in the first electrically recorded disc in 1920.[28] This innovation diffused rapidly and Victor, H.M.V. (the re-named Gramophone Company) and Columbia released their first electrically recorded discs in 1925. In the same year Brunswick (U.S.A.) produced the first electric record player which made use of the previous year's launch of the electric exponential horn speaker.[29] This system allowed a greater range of sounds to be transmitted through the speaker. These innovations upgraded the sound quality of records to a level that could

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[25] Graham (1986).

[26] Lewis (1956).

[27] Graham (1986).

[28] R.I.A.A. (1985).

[29] N.S.A. (1989) and R.I.A.A. (1985).

compete with radio.[30]

With the arrival of the Great Depression in 1929, the record industry was hit by a further blow and the U.S. market experienced a fall in record sales from 100 million units in 1928 to 10 million units in 1933.[31] Again the record industry responded admirably with innovation occurring on four fronts. Firstly, companies attempted to capitalise on the popularity of radio by presenting records as a complement rather than a substitute. Victor Talking Machine, (which had been taken over by R.C.A. in 1929), produced a turntable which could be connected to radiograms, thus saving the consumer the expense of a horn speaker.[32] Decca for its part launched a portable radio-gramophone in 1935.[33]

Secondly, following the lead of Decca, companies reduced prices in response to higher price elasticities resulting from the fall in real incomes. Interestingly, this period also heralded the demise of pricing records according to artist popularity. In 1929 records in the U.S. were priced at one of three levels: 75 cents, 35 cents and 25 cents. Decca, who had very few artists in the lowest category, priced all their records at 35 cents.[34]

Thirdly, the range of retail outlets for records increased, and again following Decca's lead,

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[30] Lewis (1956).

[31] R.I.A.A. (1985).

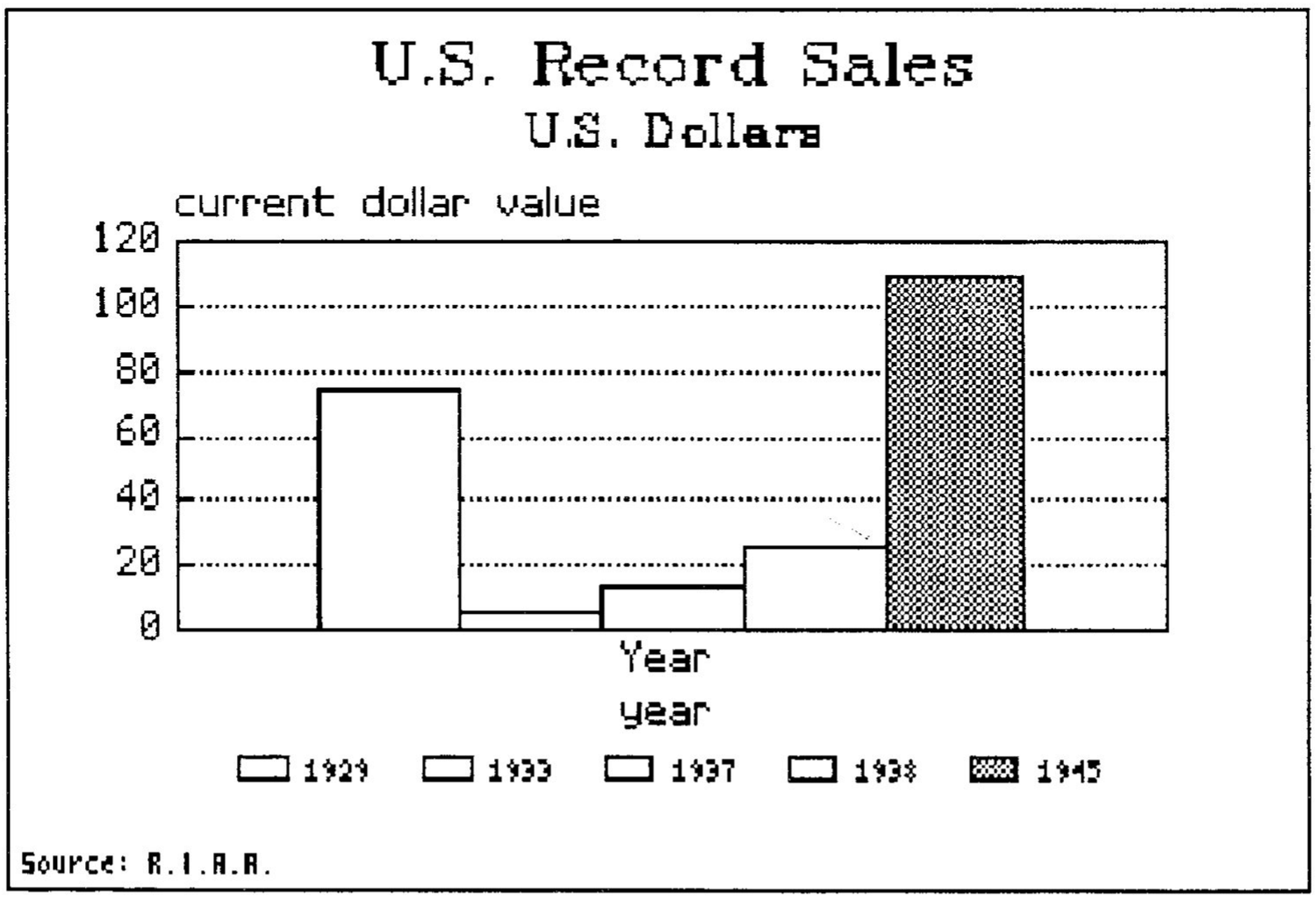
[32] R.I.A.A. (1985).

[33] R.I.A.A. (1985).

[34] Lewis (1956).

companies marketed their records to chain and department stores[35]. Finally, companies continued to innovate improvements in the quality of the product. Sound quality was improved with R.C.A./Victor's 'high fidelity' in 1934 and Decca's 'full frequency range production' (ffrr) in 1935.[36] Playing time was increased with the launch of R.C.A./Victor's 33 rpm long playing coarse groove record in 1931, but this innovation failed to diffuse. The cumulation of these innovations was apparently sufficient to ward off the threat from the radiogram. The recovery in record sales, paralleling G.D.P., began in the U.S. in 1934 and followed belatedly in Britain in 1938.[37]

Figure 1.1



Source: R.I.A.A.

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[35] Lewis (1956).

[36] R.I.A.A. (1985).

[37] R.I.A.A. (1985).

The recovery continued throughout World War Two despite being hindered by shortages of shellac. Ted Lewis of Decca Records noted that in Britain sales were boosted by the war as people, afraid of venturing out to cinemas and restaurants, bought gramophones as part of an effort to raise entertainment in the home.

Post-War innovation commenced in 1948 when Columbia (now controlled by C.B.S.) launched the 33 rpm micro-groove vinylite long-playing (23 minutes per-side) record onto the U.S. market.[38] This was a significant development as it heralded a number of improvements in one move. The new disc claimed to be unbreakable which was not completely honest, but the disc was flexible and not prone to snapping like the old shellac discs. More importantly, the disc was vastly superior in sound quality to the popular shellac 78 rpm discs and being cheaper to produce, was selling at a lower price.[39] A year later in 1949, R.C.A. Victor introduced its seven inch 45 rpm micro-groove record to the American market. With a lower playing time than the L.P., R.C.A. marketed packages of seven inch records to form long-playing sets.[40] Decca released Britain's first 33 rpm L.P. in 1950 followed by E.M.I. in 1952.[41]

These innovations heralded the launch of a format war which became known as the 'battle of the speeds'. The most widely used speed was the 78 rpm shellac disc using the pin needle as stylus. Vinylite discs had to be played using a much finer diamond needle and thereby

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[38] N.S.A. (1989).

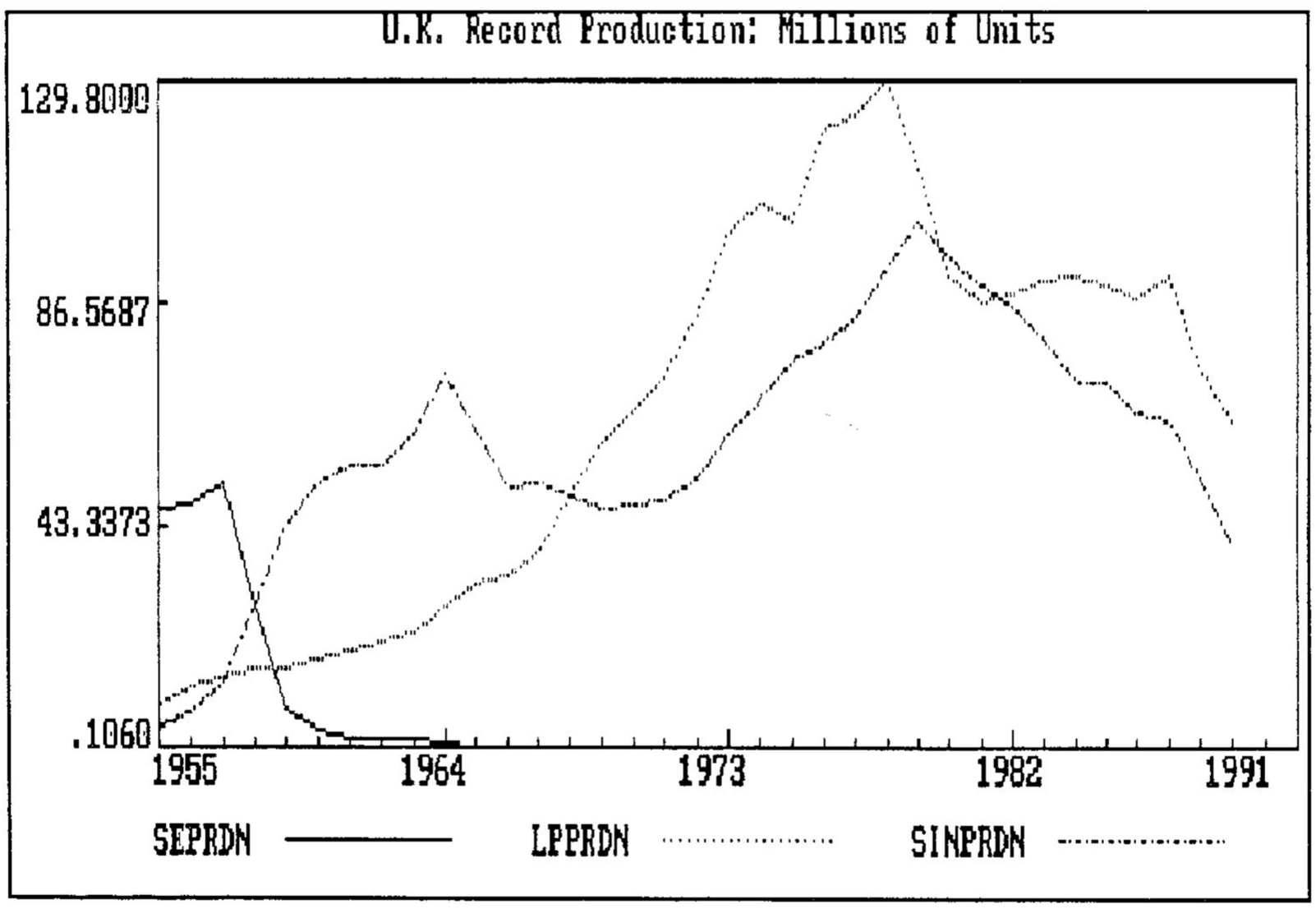
[39] R.I.A.A. (1985).

[40] R.I.A.A. (1985).

[41] N.S.A. (1989).

required consumers to change their audio hardware to the new format. Realising this fact, both Columbia and R.C.A. produced audio hardware compatible with the stylus and speed requirements of their own particular vinylite record. It was not until the mid 1950s that multi-speed record players appeared. In both the U.S. and Britain, by the end of the 1950s the 33 rpm disc was established as the long-playing format, with 45 rpm records restricted to 'single' song release. These trends for the U.K. are portrayed in Figure 1.2 where 'SEPRDN' is 78 production, 'LPPRDN' L.P. production and 'SINPRDN' single production. In the U.K. 1958 marked a sharp downturn in 78 production culminating in the single outproducing the 78 by early 1958 and L.P.s doing the same later in the year.

Figure 1.2



Source: B.P.I.

Stereo, which had first been demonstrated by Alan Blumlein at Columbia's British laboratories

in 1931, finally reached the market in 1958.[42] Initially the innovation was mainly a 'novelty', with effects such as ping-pong balls being heard to bounce across the listener's room. Given its low usage by artists, it was slow to catch on and did not become universally utilised until the late 1960s.

Given that micro-groove was the established format, with hardware available from many different companies, entry into the audio software market no longer required the dual production of hardware and software. In light of this constraint relaxation, many record companies entered the market with the aim of producing only software - if the format remained fixed then the risk associated with the 'software-only' strategy was substantially reduced. Therefore, in 1958 it was not surprising that the main international record companies agreed that the 'Blumlein cutting method' become the standard format for the entire industry.[43]

The number of record companies continued to grow, facilitated by consumers' heterogeneous music tastes, which permitted entry via product differentiation. In the U.S.A. in the 1950's, a proliferation of new speciality record companies began to emerge. These catered for diverse music tastes such as blues, jazz, and country and western.[44] The aggregate growth in record purchases, which rose from $189 million in 1948 to $511 million ten years later, ensured that production of these more specialised records were commercially viable.[45] This growth in the

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[42] Hunter (1976).

[43] N.S.A. (1989).

[44] R.I.A.A. (1985).

[45] R.I.A.A. (1985).

volume and diversity of sales continued in the 1960s, fuelled by the teenage population boom and high levels of disposable income available to these teenagers. In the U.K. these movements occurred later and the boom in the industry was delayed until the 1960s. An indication of the buoyancy of this growth was reflected with L.P.'s starting to outsell singles by 1968.[46]

However, these changes altered the 'rules of the game' in that the decision to adopt a particular format was now dichotomised between two separate groups, hardware manufacturers and record companies. Record companies produced audio software and had different priorities to hardware manufacturers. They maximised sales by differentiating their products through tune innovation, while utilising the format used most commonly by the industry. There was no incentive to introduce a new format since helping hardware companies during the early diffusion stages offered no long-term reward. This point was borne out with the failure of all non-compatible systems innovations in the period 1950-1982, with the exception of the tape cassette. Innovations such as Garrard's reel to reel three inch tape in 1961 and Grundig's high speed D.C. cassette in 1963 all failed. This was due to the fact that these hardware manufacturers had no pre-recorded software support from record companies.[47]

On a theoretical level one would expect hardware manufacturers to subsidise record companies who supported the diffusion of a new format. In fact, the only two systems innovations that did make some headway in the market, did precisely that. These were Phillips' 2-track Cassette and R.C.A.'s 8-track Cartridge, both launched in 1963. Phillips aided the diffusion

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[46] B.P.I. (1976a)

[47] Bauldie (1991.b).

of the Cassette by refraining from seeking a patent and by producing pre-recorded cassettes from its record division (which it had established in 1953).[48] R.C.A. did patent the Cartridge, but provided pre-recorded Cartridges.[49] Consumers preferred the Cassette for home listening and the Cartridge far car stereos.[50] Originally, the Cartridge was of higher sound quality than the Cassette, but this imbalance was rectified through innovations of Dolby Noise Reduction in 1969 and 1970, alongside the introduction of Du Pont's 'Chromium Dioxide Tape' in 1968.[51] The Japanese hardware manufacturers backed the Cassette, and this significantly helped its diffusion. The larger potential sales volume from home listening over car listening also aided the diffusion of the Cassette; especially as it encouraged record companies to promote a greater selection of pre-recorded cassettes. In Britain this was manifested in a severe downturn in both cartridge sales and production in 1974 and the eventual withdrawal of the Cartridge from the market in 1979.[52]

The Tape Cassette increased its market share throughout the late 1970s and 1980s stimulated by further innovations improving the sound quality of cassettes alongside the diffusion of portable personal cassette players.[53] By 1985, cassettes were outselling vinyl records in the U.K.

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[48] N.S.A. (1989).

[49] Graham (1986).

[50] Bauldie (1991.b).

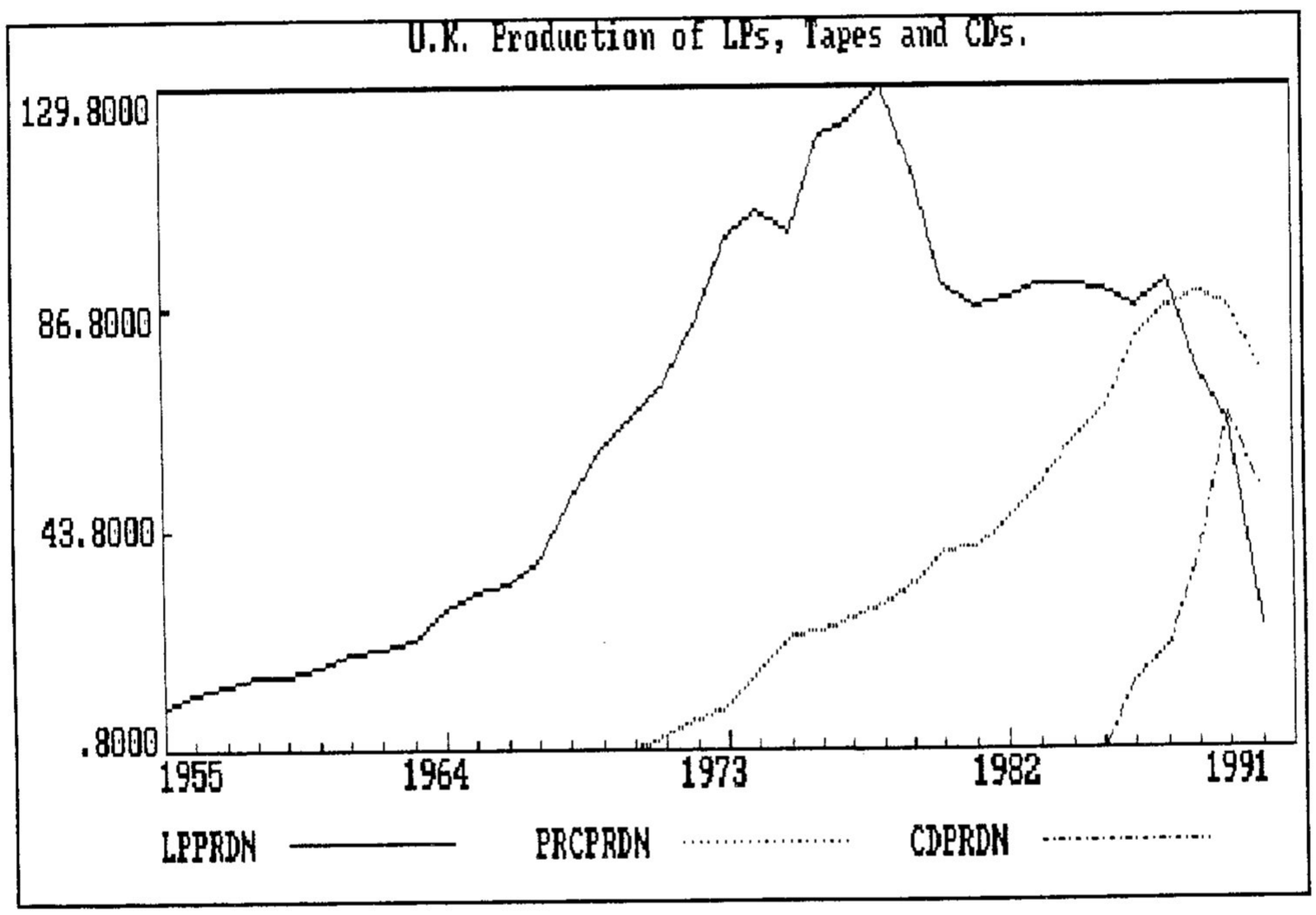
[51] Bauldie (1991.b).

[52] B.P.I. (1982)

[53] The first personal cassette player was the Sony Walkman which was launched in 1979.

Earlier in 1982, Sony and Phillips launched the Compact Disc (CD). This new software format involved the evolution of audio technology into digital sound. This entailed sound waves being encoded and read by a laser. The new technology greatly enhanced the quality of sound reproduction and enabled record companies to re-market audio software as a vastly improved product. The CD was widely supported by audio hardware and software companies alike, and diffused rapidly in the market (see figure 1.3).

Figure 1.3



Source: B.P.I.

The high sound quality feature of the CD facilitated a significant rise in the price of audio software. In 1983 the retail price of a vinyl album was £4.99, a CD version sold for £11.99[54]. The rapid diffusion of the CD reflects the fact that consumers were willing to pay this relatively higher price. This buoyant demand obviously facilitated the diffusion of the

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[54] B.P.I. (1991b)

CD, however, it indirectly generated a further reduction in record company costs. Record companies secured the agreement of artists and composers to contribute to some of the diffusion costs of the compact disc. This took the form of a reduction in version and composer royalties. This reduction in musicians royalties, (which usually amounted to a 30% discount), alongside the relatively higher price of the CD, implied that on a per unit basis musicians were not receiving a reduction in royalty payments for each album sold[55].

In 1992 two further digital audio formats were launched. Phillips introduced the Digital Compact Cassette (DCC) which was a digital version of their two-track cassette. The diffusion of the DCC was aided by the fact that it was 'backwardly compatible' with the two track cassette. This implied that although existing two-track cassette hardware could not play DCCs, the new DCC hardware could play two-track cassettes. This feature meant that Phillips did not have to invest in a massive stock of software to present an attractive package to consumers.

Whether this latter feature proves to be sufficient has yet to be verified as competition to the DCC has been generated by Sony's 1992 launch of the Mini-Disc (MD). This is another digital format which, like the DCC, has the ability to record as well as play music. The MD is not compatible with any existing audio format and hence Sony have had to support its launch with a significant catalogue of Mini-Disc software.

At the time of writing, the audio software market was in the throes of absorbing the latest format war. The latest data for Europe, (exhibited in table 1.1) indicates a great deal of

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[55] Music and Copyright (1992)

diversity in the diffusion of the new formats. While Germany and the Netherlands appear to be opting for the Mini-Disc, the UK and France seem to favour the DCC.

Table 1.1:

Total unit sales of pre-recorded Mini-Discs and DCCs up to March 1993

	Mini-Disc	**DCC**
France	8,235	18,328
Germany	95,000	36,000
Netherlands	17,000	2,000
UK	5,000	35,000
Total	125,000	91,000

Source: Music & Copyright (1993b)

In a similar manner to the launch of the CD, record companies have secured the agreement of artists to a 25% reduction in version and composer royalties in a bid to support the diffusion of the new formats. However this is less generous than the deal struck in the case of the CD; being lower in the duration of the reduction in royalties and in the amount of the reduction.

In terms of the future of the industry, the diffusion of digital recordings looks likely to herald a new era within the audio software market. Through satellite and/or cable transmission, consumers are likely to be offered recorded music on a pay per listen basis. It seems plausible, therefore, that Schumpeterian innovation may divert the audio software market

before the new digital formats have reached their potential equilibrium.

Section 2: The History of Musicians and Composers.

The history of British musicians and the sale of their music over the twentieth century has been documented by Peacock and Weir (1975) and Ehrlich (1989). The history outlined here is a summary of the salient points of these studies.

At the turn of the century, composers in Britain made their living mainly through the exploitation of mechanical rights. At this time they did not exploit performance rights. Thus, their main source of income was through the sale of sheet music. However, composers in other European countries were beginning to derive a new source of income through the exploitation of performance rights. They achieved this though the creation of central licensing and collection agencies. The first of these agencies appeared in France, where S.A.C.E.M. was set up in 1851. This was followed in Italy in 1882, Austria in 1897, Spain in 1901 and Germany in 1903.[56]

In Britain, the P.R.S. was not founded until 1914. According to Ehrlich, the dispersed and disorganised nature of U.K. composers delayed its formation. After the establishment of the P.R.S. some composers chose not to join as they felt that public performance of their tunes aided the dissemination of their music and thereby, helped the sales of their sheet music. Similarly, there was opposition from the Musicians' Union who felt that the cost to public

[56] Ehrlich (1989)

outlets of music performance licensing would reduce the level of music performed in these venues and, therefore, reduce the number of musicians hired. This point was compounded by the fact that the P.R.S. was charging its license according to the number of artists involved in the musical performance. Thus, at its outset, the P.R.S. was not very effective since it had only a proportion of the total music repertoire within its licensing jurisdiction.

With the arrival of silent movies, employment for musicians increased and this reduced the intensity of the opposition to the P.R.S. from the Musicians Union. The P.R.S. also capitalised upon the diffusion of silent movies to extend the realm of its licensing outlets. Simultaneously, sheet music sales declined dramatically in the 1920s as the 'Music Box' (Radiogram) and the Gramophone rapidly replaced the piano as sources of home music entertainment. These two factors resulted in a dramatic rise in the income made by a composer through public performance rights, relative to sheet music sales. The result was an increase in the number of composers who chose to join the P.R.S. The culmination of this trend ensured that the P.R.S. catalogue of tunes was close to universal proportions by the 1930s and this greatly facilitated the extension of its licensing operations.

In 1929 the International Council of Music Users (I.C.M.U.) attempted to stymie the progress of the P.R.S. in the U.K. by launching what became known as the 'Tuppeny Bill'. The main features of the bill were that all music products were to state clearly that copyright applied and also that two pennies would be the statutory fee for perpetual performance of the tune. Composers viewed the fee as being excessively low and through extensive lobbying, the Bill was defeated. This victory was important because it was generally expected that the Bill would be passed. This expectation was based on a presumed general distaste for music

performance royalties by the public; especially in light of the activities of one Harry Wall in the late 19th century.[57]

The 1930s silent movies were replaced by 'talkies' and diffusion of the radiogram and the gramophone continued. Despite increased leisure hours and transport infrastructure, which led to an increase in attendances and live music performances, the net effect of these changes led to a fall in the level of musician employment.

During the Second World War the British government explicitly recognised that music in the workplace could increase labour productivity. They made an agreement with the P.R.S. to pay a lump sum of £25,000 to cover composer royalties for the performance of music in all factories. Earlier the P.R.S. had established the enforcement of composer performance licences in a successful legal case against Gilette.

After the War, the British market was dominated by U.S. composers. Only 19% of B.B.C. musical airplay was accounted for by British artists. Peacock and Weir (1975) argue that this occurred for two reasons. Firstly, during the War the Musicians Union lifted its ban on the broadcast of recorded music, (up to this point the B.B.C. was only able to broadcast live performances), and the B.B.C. responded by playing gramophone recordings. However, British gramophone records were in short supply during the war and this shortfall was more than amply catered for by American gramophone records featuring American artists. Secondly, the high number of U.S. servicemen, resident in Britain during the War, helped

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[57] Harry Wall purchased tune rights and then located unsuspecting users who breached these rights (often charity fetes). He used the existing law to extract a penalty of £2 per breachment. This activity left strong anti-performance property rights sentiments with the general public for many years.

disseminate American music in Britain.

Once this style of music was established, it was difficult to dispel, as popularity ensured airplay and airplay maintained popularity, so that a vicious circle of American dominance of the U.K market continued. The Musicians Union attempted to combat this by lobbying the B.B.C. to play a minimum level of British artists and composers. However, their efforts were unsuccessful and the B.B.C. did not agree to this request. Some respite did come in 1955 with the establishment of Independent Television which opened a new outlet for British composers.

In the 1950s there was a change in the style of popular music from Swing, (big bands), to 'skiffle'/'rock n roll'. This was stimulated by two forces. Firstly, the arrival of electric amplification meant that bands no longer needed large numbers of musicians to achieve a loud volume of music. Smaller bands could play at greatly reduced costs using amplified instruments. Secondly, a rise in an affluent youth population created a demand for music by young artists who were not just musicians, but heros, role models and sometimes heart-throbs! However, U.K. musicians failed to grab this opportunity to enter the market. They probably failed to see the opportunity until after the Americans had exploited it, due to the fact that this demographic feature occurred in the U.S. before the U.K.

It was not until the 1960s with the advent of the Beatles, that U.K. composers and artists re-established the majority share of the U.K. market. This was largely due to a new trend where the artist and composer were one and the same person. As artists came more into the public eye, due to television and the growing size of the music market, consumers demanded that

their 'stars' should be more than passive singers. They wanted personality and hence the artist who appealed most was the one that expressed her personality through songs. U.K. artists have continued to dominate their own market since the 1960s and have successfully dominated or had significant shares in many other markets since that date.

Over the century, the role of the music publisher has changed in a significant manner which has increased the supply of publishers. This, in turn, has reduced publishers' share of version and composer royalties from a 50% level they had regularly secured earlier in the century, to the 25% level, which has become the norm since the 1970s. With the demise of sheet music, their function changed from funding the printing of sheet music to funding the recording of a tune. However, with the arrival of tape technology in the 1950s, recording became inexpensive and this relaxation of a capital constraint facilitated an increase in the supply of producers. When composer-artists became the norm from the 1960s onwards, this superannuated one of the publisher's major functions, namely pairing artists with composers. Thus, over the period, the importance of the publisher declined, reducing their relative share of the final price of music.

Appendix: Chronology of Enterprise in the Record Industry

1877

-Charles Cros in France publishes his theoretical concept demonstrating that reproducing sound is possible.

- Thomas Edison demonstrates his tinfoil Phonograph.

1880

- Alexander Bell in the United States improves Edison's invention by using soft wax coated cardboard instead of tinfoil and replacing the reproduction needle by a loosely mounted stylus.

1880

-Edison improves his phonograph by using hard wax and electric power.

1888

-Emile Berliner in Germany demonstrates his Gramophone.

-An improved version of Edison's phonograph, the graphophone is made available for hire.

1889

- A German toy manufacturing firm is contracted by Berliner to produce Gramophones.

1890

-The Edison-Bell-Tainter Graphophone is made available.

1891

-The Columbia Phonograph Company enters the United States' market by publishing a catalogue of pre-recorded graphophone cylinders.

1893

-Berliner forms a company in the U.S.A. for production of Gramophone players and discs.

1896

-An improved gramophone player is made available using Eldridge Johnson's innovations of a spring-motor and improved speaker. He later improved discs by inventing a paper label for them.

1897

-Berliner produces the first shellac pressed disc.

1898

-In The U.K. the Gramophone Company (later EMI) is founded to market the improved gramophone and 7 inch discs. By 1900 the company had a choice of 5,000 pre-recorded discs available in the British market.

1899

-Francis Barraud's famous painting of 'His Master's Voice' featuring 'Nipper' the dog is sold to the Gramophone company for fifty pounds plus a further fifty pounds for exploitation of copyright.

1900

-Columbia Phonograph Company moves its headquarters from Paris to London.

1901

-The Gramophone Company makes available the first ten inch discs.

-Emile Berliner and Eldridge Johnson form the Victor Talking Machine Company in the U.S.A. This was bought out by RCA in 1929. Interestingly Victor used 'His Master's Voice' portrait in the U.S.A. and this was acquired by RCA in the take-over. The result being two unconnected companies using an identical trademark on different sides of the Atlantic !

1902

-Columbia produce their first graphophone discs using lateral grooves similar to gramophones.

1903

-Edison-Bell open up a phonograph factory in London making cylinder players.

1904

-Edison's National Phonograph Company moves its headquarters from Antwerp to London.

-The German Company, Odeon, produce double sided discs.

1906

-Europe's largest Cylinder manufacturers, Pathe Freres of France, terminates production of cylinders and commences production vertical cut discs.

1908

-Edison improves the cylinder, by extending its playing time from two to four minutes.

1910

-The Gramophone company adopts 'His Master's Voice' as its trademark and in the same year loses its exclusive right to the use of the word 'gramophone'.

1912

-Columbia terminates production of the Cylinder Graphophone.

-Edison launches his 'Blue Amberol Cylinder' with improved sound quality.

1913

-Odeon in Germany produce the first symphonies on disc. Up to this point only opera was available due to the fact it was simpler to record with only vocals and no instruments.

1920

-The first electrical recording is made on disc by Guest and Merriman.

1922

-Commercial Radio (both hardware and stations), playing Music, is launched in the U.S.A. by RCA.

1924

-The electric exponential horn speaker system becomes available. This facilitated a greater

range of sounds to be transmitted through the speaker. This innovation coupled with the electric microphone allowed the feasible production of orchestral records and also a sound quality of records that could compete with radio.

1925

-Columbia (U.K.) buys a controlling share of American Columbia and operates it as a branch of the British firm.

-The first electrically recorded discs are released by Victor, HMV and Columbia.

-In the U.S.A. Brunswick makes available the first electric record player.

1926

-Edison releases an 78rpm long playing disc with a capability of twenty minutes per side.

1929

-The Decca Record Company is launched in the U.K.

-Edison drops out of the record industry by terminating production of discs, cylinders and all instruments. It concentrates its efforts on office dictating machines.

1931

-Victor releases 33rpm long playing coarse groove records.

-U.K. Columbia and the Gramophone Company merge to form Electric and Musical Industries Ltd (E.M.I.).

1932

-Decca buy U.S.A.'s Warner Brothers' list of artists for release in the U.K.

1933

-Stereo is patented by Alan Blumlein.

1934

-American Decca is founded.

-The term 'high fidelity' is first applied to records in an American advertisement.

1935

-A.E.G. in Germany demonstrate the first use of plastic magnetic tape.

1934

-Decca launches its improved sound quality records with 'full frequency range reproduction' (ffrr).

1948

-American Columbia releases the 33rpm micro-groove long playing record in vinylite.

1949

-RCA Victor in America releases the 7 inch 45rpm micro-groove vinylite disc.

1950

-Decca releases Britain's first 33rpm long playing vinylite record.

-First publication of pre-recorded reel-to-reel tapes.

1951

-EMI demonstrates stereo on tape.

1952

-EMI releases its first 33 rpm vinylite L.P.

1953

-PYE Record Company is launched.

-Phillips Electrical Ltd forms a gramophone records division and locates it in the U.K.

1954

-Pre-recorded stereo spool reel-to-reel tapes become available.

1958

-A standard record format is agreed by the main international record companies. They opt for Blumlein's cutting method.

-The first release of a stereo record.

1961

-EMI abandons production of 78 rpm records.

1963

-Phillips launches the 2-track tape cassette.

-RCA launches the single reel 8-track cartridge cassette. The cartridge allowed the consumer the choice of 4 songs at any point on the tape and had the added advantage over Phillips' Cassette in that the cartridge did not have to be flipped over in order to change tracks. Further, the cartridge played the tape at a higher speed than the cassette and hence gave superior sound quality.

1969

-Dolby, the noise reduction system is applied to pre-recorded tapes.

1970

-EMI abandons production of radiograms.

1971

-Quadraphonic discs become available.

1976

-Sony launches its Betamax videotape.

1977

-Digitally recorded records are demonstrated in Japan.

-RCA launch VHS videotapes onto the American market on behalf of Matsushita.

1979

-Digitally recorded records become available in the U.K.

-Sony release their portable personal tape player, 'The Sony Walkman'.

1981

-RCA America launch VideoDisc under the name Selectavision.

1982

-The Phillips-Sony Compact disc is demonstrated.

1984

-The Phillips-Sony Compact Disc is launched onto the market with available hardware and a limited selection of pre-recorded software.

-RCA withdraws VideoDisc from the market.

1986

-Sony announce the release of Digital Audio Tape (DAT) in pre-recorded form alongside DAT hardware. However, the launch is prevented by record company legal action, fearing widescale home taping.

1988

-Sony buys a controlling share of the world's largest record company, CBS Records.

1990

-Sony launch DAT hardware and software. The record companies do not support the launch and do not issue pre-recorded DAT software. The product has poor first year sales.

1991

-Commodore Computers launch the Compact Disc Television (CDTV) in the U.S.A.

-Phillips and Sony announce that they are to launch the Compact Disc-Interactive (CD-I) in October. This system is compatible with current CD systems and like the Commodore system reproduces video as well as sound. However, the CD-I system is superior to CDTV in that it is interactive so that it allows the consumer to mix the sound and videos. It also has pre-packaged camera scan of cities etc. which will allow the user to 'fly' at their own direction around any part of the city.

1992

-Sony release the mini-disc (MD).

-Phillips launches the Digital Compact Cassette (DCC).

Sources: The National Sound Archive (1989), Lewis (1956), Graham (1986), Hunter (1976), Gelatt (publication date not provided;1950s), Robson (1976), BPI (1989) and Bauldie (1991).

2: A Model of the Supply of Commercial Music

Introduction

In this chapter we want to model the supply of tune innovation. Tune innovation involves creative input from both artists and record companies, and for clarity, we will refer to the creative musician's output as 'raw' tune innovation. We use this term as new music recordings are an input to the production of pre-recorded software.

The chapter models the economic determinants of tune innovation. Therefore, it models the audio software market and uses this model to identify the demand for new music. Thus, the chapter defines the income of a creative musician as being a function of the value of the musician's music in the audio software market. The chapter then applies a model of the supply of enterprise to explain the behaviour of creative musicians, (namely the level of new music they produce), and their decision to license music to record companies or to set-up their own record company.

Enterprise in the audio software market is represented by the commercial value of the new music produced. Since record companies utilise new music as an input to audio software production, the value they place on a particular tune is itself based on a forecast of consumers' tastes. Thus, in the case of most record releases, the record companies are Knightian impure risk-takers i.e they take on uninsurable risk.

Creative musicians are also impure risk-takers, where they set-up their own record company this is obvious. However, in the case of artists who license their compositions to existing record companies, impure risk-taking is still not avoided. Record companies generally pass some of the impure risk onto musicians by rewarding tune innovation through royalties on sales. If a record does not sell many copies of a tune, the musician receives minimal royalties. Even in cases where one hears of artists being signed to record companies for large sums of money, impure risk taking is still occurring. In these instances the lump-sum payment is usually an *advance* on royalties and is dispensed to the artist in order to provide for the costs involved in the generation of new music (i.e. session musicians, rehearsal studios, recording studios, sound engineers, musical equipment etc.). Thus, once the music is released in the audio software market, the artist does not receive any royalties until this 'advance' has been recouped by the record company.[1]

If the creative musician is an impure risk-taker, the issue immediately arises as to whether or not she is an entrepreneur. An objection to such a classification would emphasize that their activity is artistic rather than entrepreneurial, is motivated by non-monetary factors and ignores the role of band managers. We are inclined to accept these arguments to the extent that such features are certainly inconsistent with archetypical entrepreneurship. Nevertheless, we feel that the conclusion that a 'creative musician' undertakes some

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[1] In some cases record companies do offer lump-sum payments for tune innovation. These are fairly rare and are usually cases where Knightian uncertainty is minimal i.e. in the case of established artists where a certain threshold of record sales is almost guaranteed.

entrepreneurial endeavours is inescapable.

Firstly, the fact that their innovative skills are artistic should not be an issue considering the industry they operate in. In essence the output of the music industry is artistic and to generate music of commercial worth, artistic skills are necessary. A creative musician needs to be alert, (in Kirzner's sense), to the desires of consumers in order to write commercially successful music. In this industry Schumpeter's 'new combinations' are new musical combinations i.e. particular genres of musical styles such as jazz and punk rock. Similarly, Schultz's innovators and imitators are in evidence through the creation and diffusion of new musical styles. Casson's 'ability to take judgmental decisions about scarce resources' is also apparent in the artistic directive roles that creative musicians take on.

Secondly, the fact that creative musicians may be motivated by non-pecuniary factors is not a characteristic unique to the music industry. A desire for independence is often cited as a determining factor of enterprise in other industries [see Kendal (1987) and Blanchflower and Oswald (1991)]. Moreover, even though the division of creative musicians into pecuniary and non-pecuniary motivated individuals is practically impossible, it is also analytically unwise. By ignoring commercially successful new music which was motivated by non-pecuniary factors, one generates the possibility of identifying enterprise without an entrepreneur.

This leads us to the final objection that a band manager is the entrepreneur. We can reject this to the extent that most bands are formed, recording demonstration tapes and performing live concerts prior to the involvement of a band manager. The implication, therefore, of assigning the entrepreneurial role to the band manager generates a contradictory outcome where band formation, as well as tune innovation, occur prior to the involvement of the entrepreneur; who supposedly is coordinating the resources to produce new music output.

Our defence of the entrepreneurial role of a creative musician is not an attempt to 'bully' the reader into the belief that a creative musician is the sole entrepreneurial actor in the intermediate market for music. Rather, our aim is to claim that a creative musician is a significant, if not the main, contributor of enterprise in this market. Therefore, we are adopting a methodological approach where we aim to explain enterprise by accounting for the allocation and employment of entrepreneurial qualities [see Evans and Jovanovic (1989), Holtz-Eakin et al (1994) and Schmitz (1989)]. These qualities vary across individuals and hence, some individuals will appear more entrepreneurial than others. This approach, therefore, does not attempt to 'pigeon hole' individuals into a dichotomous two-tier classification where an individual is either an entrepreneur or not. Instead, an individual's actions are classified according to the extent to which they are entrepreneurial.

The remainder of the chapter is structured in the following manner. Section 1 conducts a survey of characteristics that are generally cited as stimulating the supply of enterprise.

Section 2 develops the model of Evans and Jovanovic (1989) along a similar path to Holtz-Eakin et al (1994). The latter expand Evans and Jovanovic's model of self employment to allow for the possibility that some entrepreneurs may decide to form a partnership. In our model we assume that entrepreneurial skills have a market value in employment as well as in self-employment. Therefore, we assume that an individual with entrepreneurial acumen can compare income from self-employment, employment as an entrepreneur and non-entrepreneurial employment. We assume she chooses a career which maximises her income.

In the second part of section 2 we apply this model to the behaviour of creative musicians. These musicians have three career choices: self-employment, (which involves setting-up a record company), contracted musician, (an exclusive licensing agreement with an existing record company), and wage work, i.e. employment not involving music creation. The model explains the behaviour of creative musicians in terms of relative income and is in this sense is based purely on pecuniary motivations.

Section 1. Factors Determining the Supply of Entrepreneurship

We now examine the characteristics of entrepreneurship that might play a role in an individual's decision to become an entrepreneur. We list the factors generally believed to influence the supply of entrepreneurs and then examine each factor individually.

The determinants of the supply of entrepreneurs:

(1) Capital Availability.

(2) Relative Income.

(3) Cost of Information.

(4) Attitude to Risk.

(5) Entrepreneurial Ability.

(6) Education and Training.

(7) Unemployment

(8) Social and Cultural factors

(1) Capital Availability: Recent studies of self-employed entrepreneurs such as Evans and Jovanovic (1989), Evans and Leighton (1989), Blanchflower and Oswald (1990, 1991) and Black et al (1993) all claim to find a statistically significant constraint placed on many self-employed entrepreneurs by capital availability. These analyses were preceded, however, by both government recognition and policy action to help small firms constrained by capital in most western countries. A study by Segal Quince Wicksteed (1988) finds that small firms are either quoted higher interest rates or do not have sufficient security to acquire adequate finance. In the U.K. the Government has responded to both of these constraints by acting as a guarantor for small business loans via the 'Small Business Loan Guarantee Scheme'. The Commission of the European Communities (1989) points out that such policies are prevalent throughout the E.C. and have been in operation for many decades in some countries, e.g. Ireland.

A survey of self-employed female entrepreneurs by Carter and Cannon (Dept of Employment, U.K.) came to similar conclusions. A study of small firms by the U.K. Advisory Council On Science and Technology (A.C.O.S.T. 1990) argues that small firms are at a disadvantage relative to larger firms in the capital market. This occurs because small firms cannot realistically hope to raise capital by going public, given that the fixed costs of a floatation are high. They point out that the vast majority of these firms secure capital via acquisitions and takeovers.

This latter point is important. If small firms are constrained by capital, as a result of merely not favouring acquisition, then such a constraint must be classed as voluntary. The work by Scase and Goffee (1980) find that prestige and independence are two commonly cited reasons for becoming self-employed and would seem to imply that small business owners may trade-off capital availability (and hence lower profits) in return for prestige associated with a managing directors title and/or independence in job activities. In Britain there is some historical evidence to support this proposition, particularly in the cotton industry, which was constrained by family ownership refusing to merge; [see Lazonick (1986)].

Up to this point, we have focused exclusively on how a self-employed entrepreneur may be constrained by capital. We now need to examine the case of a corporate entrepreneur. Addressing this point from another angle, suppose we ask the question: what happens if a self-employed entrepreneur is constrained by capital? The answer is that she could

Table 2.1

U.K. Venture Capital Industry: Investment by Financing Stage.

	% of amount invested		
Stage:	1983	1985	1988
Start-up	14.9	12.9	5.0
Other early stage	10.3	6.4	5.0
Expansion	43.3	36.1	31.0
Buy-out/buy-in/acquisition	24.2	38.1	56.0
Secondary purchase	6.8	5.6	3.0
Other	0.5	0.9	0.0
Total	100.0	100.0	100.0

Source: A.C.O.S.T. (1990).

either choose to become employed with a firm that is not constrained by capital, or merge with another firm. In each case she becomes a corporate entrepreneur. Such a case occurred when Randolph Fields, (owner of British Atlantic), decided to merge with Virgin Records to form Virgin Atlantic due his company being capitally constrianed, and hence became an employee of Richard Branson[2]. In general, as long as the firm employing the entrepreneur is not itself capital constrained, the corporate entrepreneur would, (assuming the firm is pre-disposed towards his ideas)[3], not find his activities curtailed by a lack of capital.

[2] Robinson (1990).

[3] Donaldson (1985) argues, in effect, that middle management corporate entrepreneurs are not perfect substitutes for top tier corporate entrepreneurs and self-employed entrepreneurs, as they do not have the same degree of freedom due to corporate hierarchal rules etc.

Table 2.2

Barriers to growth in smaller companies

Factor	% of firms inhibited in their growth by this factor
A long term management strategy for growth	63
Manufacturing components system	50
Management information system	43
Production and marketing management	30
Wider product range	30
CAD/product improvement	23
Quality improvement	20
External capital funds	13
Export orientation	10

Source: Welsh Development Agency, Technology Arm; WINtech. Published in A.C.O.S.T. (1990).

Looking at the total set of entrepreneurs, we would expect a higher importance attached to securing capital among self-employed entrepreneurs than among corporate entrepreneurs. Given this perspective, and our previous point that many small firms may be voluntarily capital constrained, it is possible that the problem of capital availability is overstated in empirical studies of entrepreneurship given their sole focus on the self-employed. A suggestion that such a perspective is indeed accurate is inherent in A.C.O.S.T.'s study of small firms (which includes subsidiaries of larger firms). Data from this study is reproduced here in table 2.2, and we see that only 13 per cent of small firms claimed that capital availability constrained their growth. Given that the focus of this

study is on small firms, we would expect that such an estimate would be substantially revised downwards if we were to remove voluntary capital constraint and also expand the sample to include larger firms.

(2) Relative Income: Allowing for utility from job satisfaction, an individual's career choice is determined by relative income. In general there are three sources of potential income: (i) self-employed entrepreneurship, (ii) employed entrepreneurship and (iii) non-entrepreneurial or 'routine' labour. Movements in income in these three sectors cause a flow of individuals across sectors. Thus, as Scase and Goffee (1980) point out in their study of the motivations of the self-employed, if an employed entrepreneur feels that she is being underpaid relative to what she could earn in self-employment, she will simply leave employment and become self-employed:

> "...there were others who felt that as employees, they were being exploited. As Mel Morgan recalled, 'I decided I was fed up with other people getting the money that I was really earning for them. They were all running about in fast cars and I was getting nothing'.....An employee who thinks in these terms has some notion of the profit margins to be made by an employer from the work produced by his employees. Economic calculation of this sort is likely to produce either a socialist or a new capitalist !"

A common misconception is that corporate and self-employed markets for

entrepreneurship are dichotomous with little movement between them. This view assumes that self-employed entrepreneurs are either always self-employed, or temporarily take a menial job to acquire capital. However, empirical evidence is at odds with this view, as Storey et al's (Dept of Employment, U.K.) study of self-employed entrepreneurs finds that 69.4 per cent of their sample were employed in management in their previous job; suggesting similar job roles in employment and self-employment.

Given the scant data on employed entrepreneurs, we decided to gather an introductory data set of managerial entrepreneurs in top corporate management positions. The data was extracted from biographies of well-known businessmen. A list of these entrepreneurs is contained in appendix 2.1, and in table 2.3 below we show their mobility between jobs. The data shows that movement between the corporate and self-employed sectors is quite high; 38.5 per cent in the general sector and 60 per cent in the music industry, suggesting that a mobile market does indeed exist.

(3) The Cost of Acquiring and Analysing Information: Information necessary for the implementation of an innovation, is a common theme of many studies. The information required is usually of two kinds: firstly, managerial skills/techniques necessary for the smooth running of a project and secondly, information relating to the specifics of the innovation in question.

In nearly all related studies, policy advice recommends that the government should take

an active role in providing managerial advice to small firms - the sector needing it most. This has resulted in agencies such as the 'Enterprise Initiative Scheme' in the U.K. and the 'Mentor Scheme' in Ireland. Both offer business advice to small firms, (usually free of charge), by experienced individuals from both the private and public sectors.

Table 2.3

Mobility of entrepreneurs between self-employment and employment (previous and current employment).

Movement	General	Record Industry	All
Employment to Employment:	50.0% (13)	6.7% (1)	34.2% (14)
Self-employment to Self-employment:	11.5% (3)	33.3% (5)	19.5% (8)
Employment to Self-employment:	30.8% (8)	53.3% (8)	39.0% (16)
Self-employment to Employment:	7.7% (2)	6.7% (1)	7.3% (3)

Sources: Applause Magazine Numbers 1 to 24, and `The Risk-Takers' by J.Robinson.

Storey et al's study of small firms finds that 65 per cent of entrepreneurs in fast growing firms were previously in an area related to their current entrepreneurial endeavours. For

slower growing firms this figure is lower at 40 per cent suggesting that informed entrepreneurial actions may be important. This latter assertion seems to be supported by Carter and Cannons' study of female entrepreneurs, where they find that 80 per cent of small firm failures occurred with women whose previous job did not relate to the entrepreneurial project. Of the successful firms created, Carter and Cannon find a significantly higher proportion, usually around 85 per cent, of entrepreneurs worked in a field related to their present entrepreneurial endeavours.

(4) Entrepreneurial Ability: Entrepreneurial ability is used as an explanatory variable in most of the contemporary models of entrepreneurship. [For example, Holtz-Eakin et al (1994), Evans and Jovanovic (1989), Holmes and Schmitz (1990)]. Recently, Cressy (1994) highlighted the importance of entrepreneurial ability when he found evidence suggesting that after controlling for human capital proxies of entrepreneurial ability, capital constraints are not found to be a significant determinant of firm survival.

Entrepreneurial ability will obviously entail different characteristics across enterprise activities. For instance in one setting, the willingness to undertake Kirzner's 'alertness' may be the key characteristic, while in another it could be a Schumpeterian determination to innovate in the face of opposition to such change.

(5)Risk Aversion: In the introduction chapter we saw that the Knightian school of entrepreneurship regards impure risk-taking as the key characteristic of enterprise. On an

empirical level, it is difficult to identify risk aversion as a determinant of entrepreneurship. Blanchflower and Oswald (1990, 1991) found that individuals who gambled were not as likely to become self-employed than those who refrained from such activities. While gambling is not a perfect measure of risk aversion, other potential evidence of risk-taking qualities are usually mingled with other 'information' related variables. For instance, if an individual has observed a peer with similar entrepreneurial skills excelling in entrepreneurship, then one would expect such a person to be more likely to be an entrepreneur than, *ceteris paribus,* a similar individual who did not observe anyone in her social vicinity excelling at entrepreneurship. Impure risk-taking is likely to vary across entrepreneurial activities. For example, we would expect Schultzian innovators to incur more risks than Schultzian imitators. However, it is also important to stress that uncertainty, and hence impure risk-taking, is often associated with non-entrepreneurial endeavours. For example, when the Compact Disc was launched onto the audio software market, (given that it was warmly welcomed by the audio software industry in general), an individual record company would have incurred more impure risk if it persisted with vinyl software than adapt the new innovation.

(6) Education: Since education endows an individual with a greater amount of information, it may be expected to enhance her entrepreneurial ability. Griliches (1957) and Schultz (1980) found education to be a positive stimulus to entrepreneurship in U.S. agriculture. Similarly Burke, (forthcoming in the Review of Industrial Organisation) found evidence linking the importance of 3rd level education to new company registrations

in Ireland. These studies are in contrast to analyses of self-employed entrepreneurs, notably Evans and Jovanovic (1989), Evans and Leighton (1989) and Blanchflower and Oswald (1990) found no statistical evidence to suggest that education is an important factor determining self-employed entrepreneurship.

As in the case of other determinants of enterprise, education is likely to vary in importance across enterprise activities, given the latter's heterogeneity. Hence, it is also not too surprising to find conflicting evidence on the importance of education for enterprise across different data sets.

(7) Unemployment: The prospect, or reality of unemployment is often regarded as a 'push' factor into entrepreneurship. A relatively high level of unemployment is viewed as affecting the supply of entrepreneurs through its impact on the expected wage. When unemployment is high, the expected income from wage-work is low and thus, income from enterprise is relatively more attractive. Unemployment reduces the expected wage by diminishing the probability of becoming employed.

However, unemployment may affect the supply of enterprise through two other channels. Firstly, by reducing the value of time to an individual, it may provide a stimulus to invest human capital in developing entrepreneurial ability. Secondly, unemployment is often associated with lump-sum redundancy payments which may act as a capital base for an entrepreneurial venture. However, all of the means through which unemployment may

affect the supply of enterprise are indirect. They only affect entrepreneurship through factors which have already been identified above, namely relative income, entrepreneurial ability and capital availability. Thus, in this sense, unemployment is not a direct determinant of enterprise.

Empirical studies of enterprise sometimes encounter difficulties in finding evidence of a positive impact of unemployment on enterprise supply. This occurs because unemployment is itself negatively correlated with the demand for enterprise; more specifically, business conditions. Hence, as both Blanchflower and Oswald (1991) and Burke (forthcoming in the Review of Industrial Organisation) find respectively, unemployment is negatively correlated with self-employment in Britain and new company registrations in Ireland. More usually a positive correlation is found [see for example, Foreman-Peck (1985), Audretsch and Vivarelli (1993) and Black et al (1993)]. In the case of self-employment a positive correlation is found for the U.S. by Evans and Leighton (1989) and for the OECD by Acs et al (1992).

(8) Social and Cultural Factors: There is a significant body of sociological literature on entrepreneurship [see Wilken (1979) for a survey]. This research identifies the prevalence of particular minority groups or cultures, within the stock of entrepreneurs. Explanations usually hinge on such factors as peer approval, role models and discrimination. For example, a particular societal group may be forced to create their own employment if prejudice prevents their entry into wage work. In this fashion, they become entrepreneurs.

In terms of an economic analysis of the determinants of the supply of enterprise, the traditional utility function may be augmented in a number of ways. In cases where particular cultures tend to generate a greater utility from wealth, the parameter values of the utility function are altered. This often has the effect of increasing an individual's willingness to take risks associated with enterprise. In other instances it is necessary to add other independent variables into the utility function. For example, utility may be a function of "independence/one's own boss" [see Kendal (1987)].

Alternatively, it may be necessary to introduce an element of interdependence in an individual's utility maximisation problem. For example, cultural values such as equity would directly affect the independence of utility maximisation [see Casson (1993a)] and possibly deter the supply of enterprise.[4]

Section 2: A Model of the Supply of Tune Innovation

In this section we aim to model the supply of raw tune innovation in the immediate market for music. We define 'raw' tune innovation as tune innovation prior to record company adaptations. We therefore model both new company formation by creative musicians and the licensing of raw tune innovation to record companies. To this end, we

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[4] Cultural attributes also affect the demand for enterprise by altering the level of profit opportunities. Culture affects consumers tastes and hence impacts on potential revenues. It may also affect costs through factors such as trust [see Casson (1993a) and (1993b)].

augment the model of self-employed entrepreneurs by Evans and Javonovic (1989) to include the option of employment as an entrepreneur and apply the augmented model to the intermediate market for raw tune innovation. The former is carried out in section 2.1 and the latter in section 2.2.

Section 2.1: A Model of the Supply of Self-Employed and Employed Entrepreneurs

We start by assuming that an individual's utility function is solely dependent on income, ignoring the desire for independence cited in the empirical literature[5]. The individual has a choice of income from three sources:

(a) *Self-employed entrepreneurship*: income (Y) includes a return on enterprise and capital.

(b) *Employed entrepreneurship*: income (Y_e) includes a fixed wage and enterprise related pay. For example, managers receiving payment in the form of a fixed wage and profit related pay. The incentive component of the wage being related to the worker's innovative input to the firm, while the fixed wage relates to routine non-entrepreneurial duties.

(c) *Non-Entrepreneurial Employment*: Workers receive a fixed wage (W_l),

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[5] Augmenting the results of the model to cater for 'utility from independence' is simple and has obvious implications - essentially an 'independence wage wedge' is driven between corporate and self-employed entrepreneurship.

they are required to fulfil a defined task and not expected to innovate, (in an economic sense), in any significant manner.

To avoid tedious cross reference, we provide the reader with a brief review of the fundamental equations of Evans and Jovanovics' self-employment model. They assume that an individual has a choice between non-entrepreneurial employment and self-employment. We reproduce their wage equation in general form as

$$W_i = g(x_1, x_2): \qquad (2.1)$$

$$\partial g/\partial x_1,\ \partial g/\partial x_2 > 0.$$

$$\partial^2 g/\partial x_1^2,\ \partial^2 g/\partial x_2^2 < 0.$$

where 'x_1' is work experience and 'x_2' education.

Evans and Jovanovic assume an individual is certain of her entrepreneurial ability. We drop this assumption in order to include uncertainty of entrepreneurial ability as a factor determining career choice. Therefore, moving from certainty to uncertainty we replace Q by E(Q), (appendix 2.2 outlines a model of the estimation of entrepreneurial ability and the decision making process involved in investing human capital in entrepreneurial ability). Thus self-employed income is defined as

$$Y_g = E(Q)k^d \qquad (2.2)$$

k = *capital invested*

An entrepreneur in self-employment will have to find her own capital and Evans and Jovanovic assume that she can borrow up to a proportion 'b-1' (b > = 1) of her initial wealth 'Z'. [6] Evans and Jovanovic assert that an individual can raise capital up to a maximum of bZ, where Z = initial wealth. Hence capital k <= initial wealth + any borrowings

$$i.e. \quad k \leq Z + (b-1)Z = bZ$$

$$so \quad 0 \leq k \leq bZ \qquad (2.3)$$

Thus, a self-employed entrepreneur's net income is

$$Y = E(Q)k^d + r(Z-k) \qquad (2.4a)$$

where r = [1 + the interest rate]. Maximising (2.4a) to find optimal 'k' gives

$$k* = \left(\frac{dE(Q)}{r}\right)^{\frac{1}{1-d}} \qquad (2.5)$$

If the self employed individual is not constrained then

---

[6] Evans and Jovanovic do not identify the cause of the capital constraint. Possible explanations include an asymmetry of information between borrower and lender [see Blanchflower and Oswald (1991)] or high fixed costs of a stock market flotation [see A.C.O.S.T. (1990)].

$$k \leq bZ \qquad (2.6)$$

Substituting (2.5) into (2.6) and solving for E(Q) yields

$$E(Q) \leq (\frac{r}{d})(bZ)^{1-d} \qquad (2.7)$$

This gives us a locus in E(Q) and Z space which a self-employed individual is constrained above but not below. However, if an entrepreneur is indeed constrained then this optimal level of k is not attained and

$$k = bZ \qquad (2.8)$$

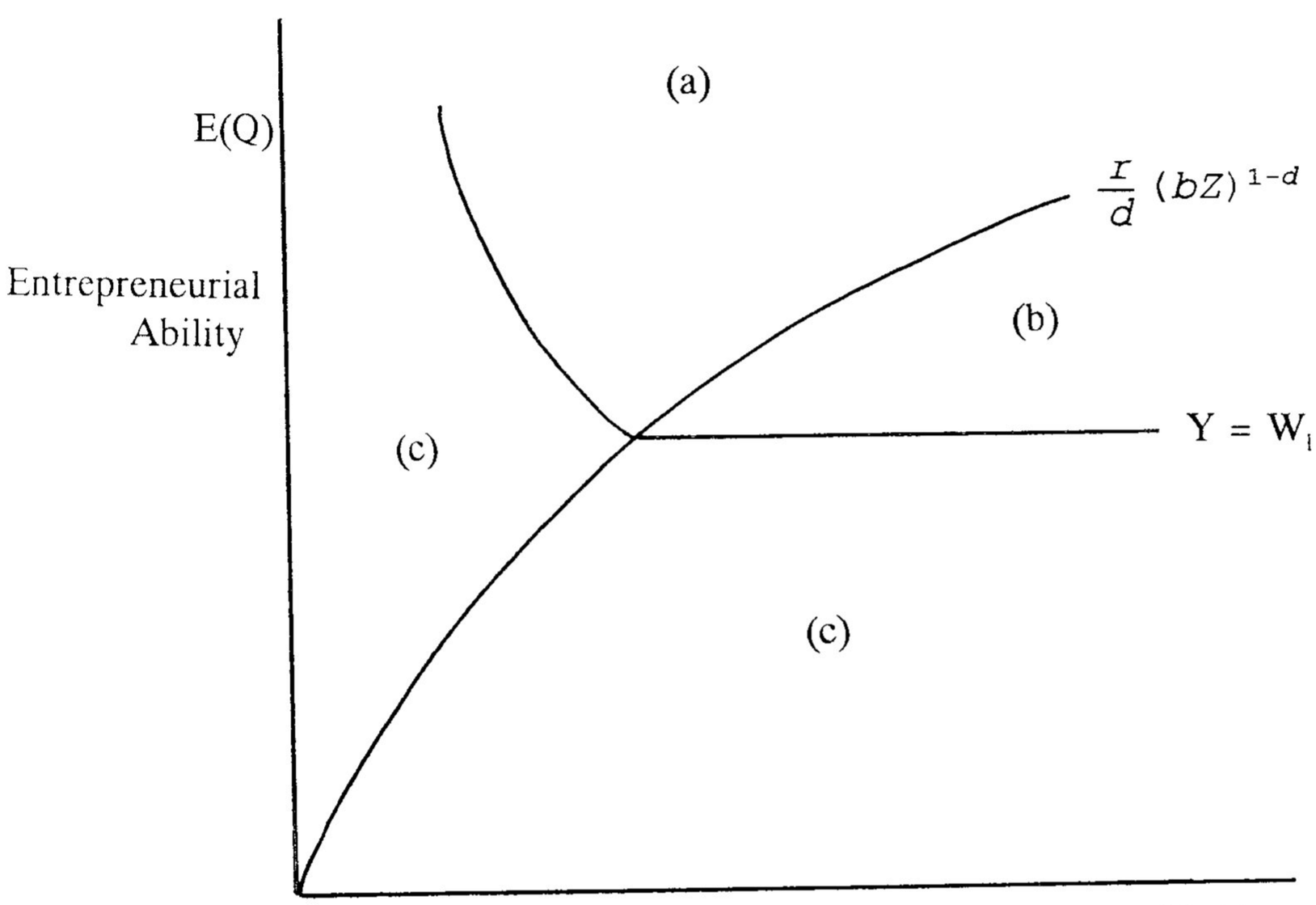
Thus, substituting the constrained (2.8) and the unconstrained (2.5) values for k into the self-employed gross income (2.2), gives constrained and unconstrained self employment gross incomes.

$$Constrained\ Y_g = E(Q)(bZ)^d \qquad (2.9)$$

$$Unconstrained\ Y_g = E(Q)^{1/1-d}(\frac{d}{r})^{d/1-d} \qquad (2.10)$$

Hence in the constrained region an indifference locus between Q and Z can be derived which has a slope of -(dE(Q))/Z from (2.9). In the unconstrained region this becomes a

Figure 2.1.



(a) Constrained Self-Employment

(b) Unconstrained Self-Employment

(c) Non-Entrepreneurial Employment

horizontal line as an increase in initial wealth no longer increases gross income as is apparent from (2.10). This gives Evans and Jovanovic a distinction between non-entrepreneurial employment and self-employed entrepreneurs which splits into 3 divisions: (a) constrained self-employed, (b) unconstrained self-employed and (c) non-entrepreneurial employment. This is represented in figure 2.1.

Now we want to further augment Evans and Jovanovics' model to allow some entrepreneurial endeavours to be imputed by the employed. Therefore, we define the net income of employed entrepreneurs (Y_e) as being made up of two components: that related to entrepreneurial ability (QA^{β}) and that related to certain routine tasks which do not involve entrepreneurship (D).

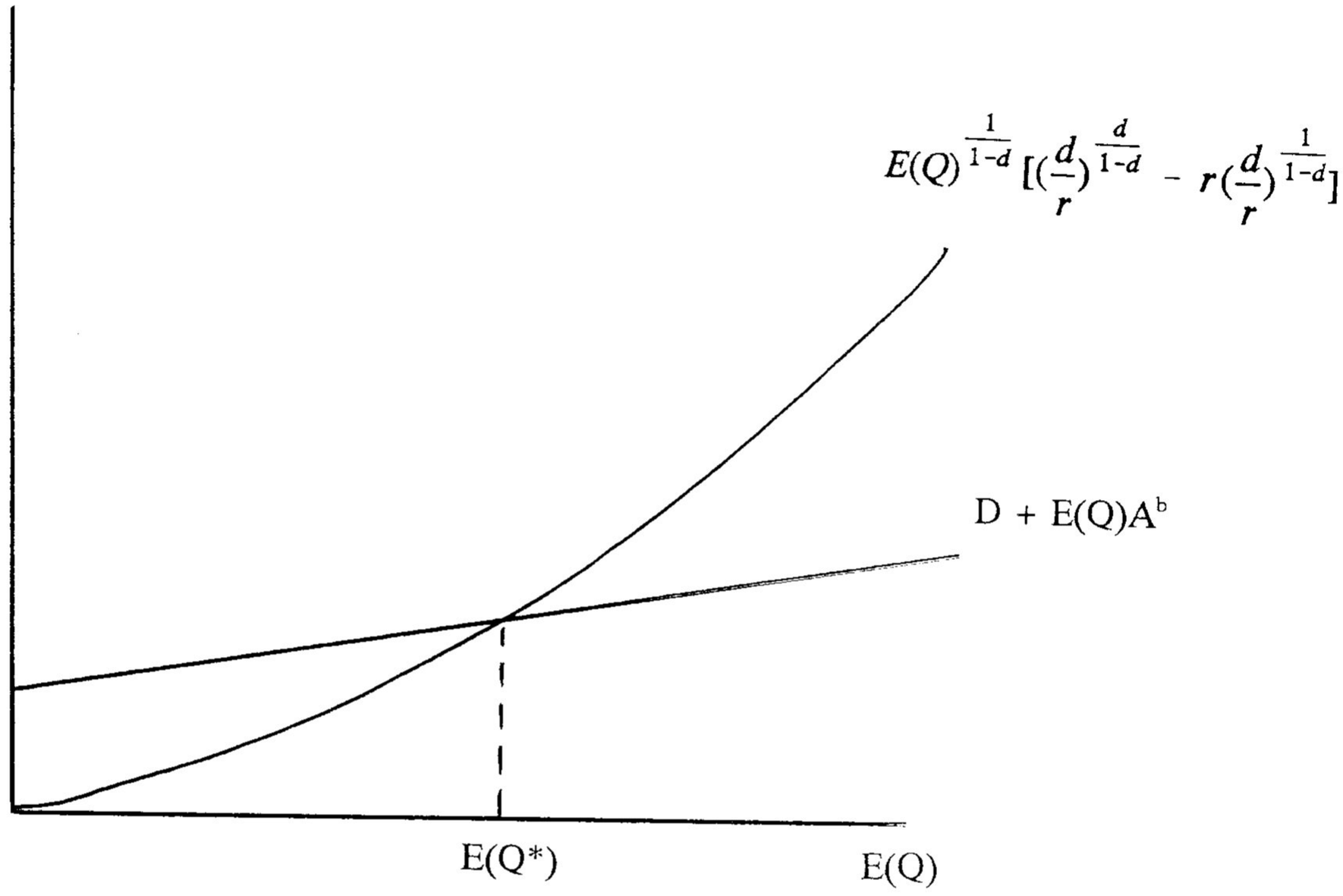
$$Y_e = D + E(Q)A^{\beta} + rZ; \qquad A,\beta \geq 0 \qquad (2.11)$$

To model an individual's expanded career choice, we will first clarify relative income between employed entrepreneurship and self-employment. With this relationship specified, we can then use the indifference curves in figure 2.1 to compare all four possible income sources. Noting that rZ is constant for a given individual, we can graph the relative income of employed entrepreneurship and unconstrained self-employment in figure 2.2. The slope of employed entrepreneurial income is given by equation (2.11) and therefore, its derivatives with respect to E(Q) are:

---

[7] We expect D = $f(x_1, x_2)$; $f'(\ ) > 0$, $f''(\ ) < 0$

Figure 2.2.



$$\frac{\partial Y_e}{\partial E(Q)} = A^{\beta} > 0 \qquad (2.12)$$

$$\frac{\partial^2 Y_e}{\partial (E(Q))^2} = 0 \qquad (2.13)$$

The slope of unconstrained self-employment income is given by equation (2.4b) (which is (2.4a) net of rZ, and where k is at its optimal level):

$$Y = E(Q)^{\frac{1}{1-d}}(\frac{d}{r})^{\frac{d}{1-d}} - rE(Q)^{\frac{1}{1-d}}(\frac{d}{r})^{\frac{1}{1-d}}$$

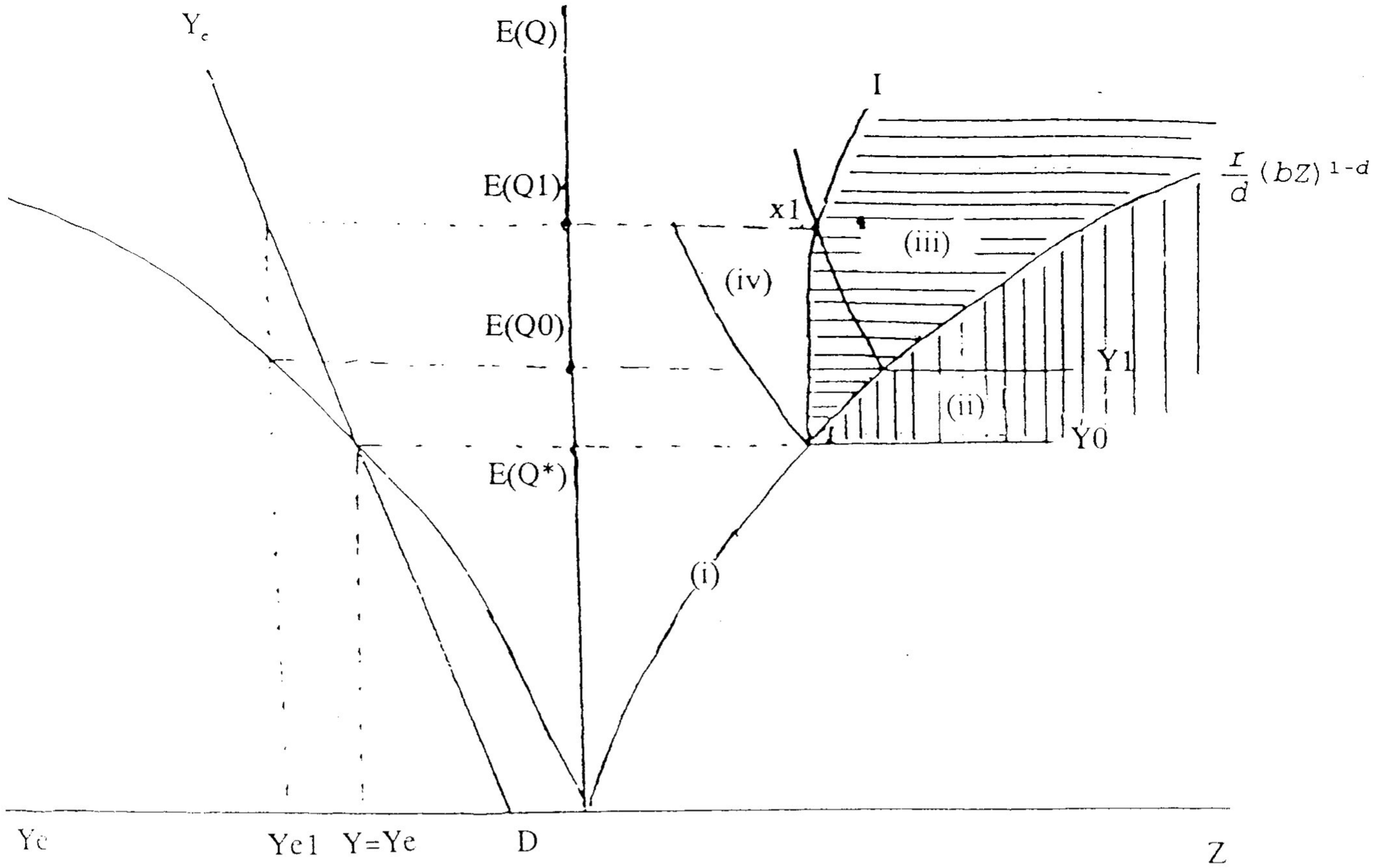
$$= E(Q)^{\frac{1}{1-d}}[(\frac{d}{r})^{\frac{d}{1-d}} - r(\frac{d}{r})^{\frac{1}{1-d}}] > 0 \qquad (2.4b)$$

$$\frac{\partial Y}{\partial E(Q)} = \frac{1}{1-d}E(Q)^{\frac{d}{1-d}}[(\frac{d}{r})^{\frac{d}{1-d}} - r(\frac{d}{r})^{\frac{1}{1-d}}] > 0 \qquad (2.14)$$

$$\frac{\partial^2 Y}{\partial E(Q)^2} = d(1-d)^{-2}E(Q)^{\frac{2d-1}{1-d}}[(\frac{d}{r})^{\frac{d}{1-d}} - r(\frac{d}{r})^{\frac{1}{1-d}}] > 0 \qquad (2.15)$$

Assuming there are diminishing returns to capital ($0 < d < 1$), entrepreneurial ability causes unconstrained self-employed income to increase at an increasing rate. In figure 2.2 for all entrepreneurial ability up to demarcation E(Q*), (where the income of both forms of entrepreneurship are equal), an individual secures a higher income in employment than self-employment. Above E(Q*), an unconstrained individual is better off in self-

Figure 2.3.



(i) Employment as an Entrepreneur

(ii) Unconstrained Self-Employment

(iii) Constrained Self-Employment

(iv) Employment as an Entrepreneur

employment.

Linking figures 2.1 and 2.2 we derive figure 2.3. Using the equation for unconstrained self-employment as numeraire, we are able to compare incomes in indifference curve space. By tracing an income level from the horizontal axis of the left hand panel through $Y_{unconstrained} = [E(Q)^{(1/(1-d))}][(d/r)^{(d/(1-d))}]$ we are able to ascertain the E(Q) level that would have secured the same an income if the individual was self-employed and unconstrained by capital. This derived E(Q) value links our original income to an indifference curve in the right hand panel, which represents the same income level. To find this indifference curve we just trace the derived E(Q) value horizontally across until it intersects $(r/d)(bZ)^{(1-d)}$; thereby linking it to the indifference curve which represents the same unconstrained self-employed entrepreneur's income.

Thus, for example, tracing the income level $Y=Y_e$ at $E(Q^*)$ across to the right hand panel in figure 2.3, we find it represented by indifference curve Y_0. Initially ignoring the option of employment in routine labour we can divide the right hand panel into forms of entrepreneurship. On all utility curves below Y_0, employment as an entrepreneur is a superior income source to both constrained and unconstrained self-employment, as is apparent from the left hand panel. Therefore, this area is made up exclusively of employed entrepreneurs and is represented by area (i) in figure 2.3. Also from the left hand panel we know that unconstrained self-employed entrepreneurs earn more than their employed counterparts for all levels of E(Q) above $E(Q^*)$. This gives us area (ii) in figure 2.3

which is solely made up of unconstrained self-employed entrepreneurs.

The remaining area, (formerly entirely devoted to constrained self-employed entrepreneurs in Evans and Jovanovics' framework), is now divided between employed and constrained self-employed entrepreneurs. We can see this by choosing $E(Q_1) > E(Q^*)$ which is associated with employed entrepreneurial income Y_{e1}. We can find the indifference curve corresponding to Y_{e1} by tracing it through $Y_{unconstrained} = [E(Q)^{(1/(1-d))}][(d/r)^{(d/(1-d))}]$ in the left hand panel. This gives us $E(Q_0)$ which corresponds to utility curve Y_1. Thus the income of an employed entrepreneur with entrepreneurial ability $E(Q_1)$ is represented by the point 'x' on indifference curve Y_1. This allows us to compare the income derived from employed entrepreneurship and constrained self-employment.

Supposing an individual is initially at point 'x' where she is indifferent between employed entrepreneurship and constrained self-employment. If we were to increase her initial wealth 'Z' above that at 'x', then her income from self-employment would increase while that of employment would remain unchanged (since Y_e is independent of 'Z'). Hence she would choose to become self-employed. If on the other hand we were to reduce her initial wealth below that at point 'x', we would diminish the income to be derived from self-employment but again leave income derived from employed entrepreneurship unchanged. Therefore, in this case, she would choose to become an employed entrepreneur. Thus, by locating corresponding points to 'x' for each E(Q) above E(Q*), we are able to derive an indifference locus 'I' where the individual is indifferent between

employed and constrained self-employed entrepreneurship. To the right of 'I', [denoted (iii)], the individual chooses to become a self-employed entrepreneur and to the left of 'I', [denoted (iv)], she opts for employment as an entrepreneur.

In the forgoing analysis we adopt the assumption that $(bZ)^d < A^\beta$ so that the 'I' locus is presented with a positive concave slope. The slope of 'I' is easily ascertained. Along 'I' the income from constrained self-employment is equal to the income from employed entrepreneurship i.e. $E(Q)(bZ)^d + r(Z-bZ) = D + E(Q)A^\beta + rZ$. The first derivatives of these incomes with respect to E(Q) are $(bZ)^d$ and A^β, respectively. The second derivatives are both equal to zero. If $(bZ)^d < A^\beta$ then as E(Q) rises income from employed entrepreneurship grows faster than that of constrained self-employed entrepreneurship. Consequently, in order to reduce this differential so that incomes are equal, we must give (take) an increasing (decreasing) amount of initial wealth Z to (from) the constrained self-employed, as E(Q) increases, in order to maintain equality between employed and self-employed incomes. This implies that if $(bZ)^d < A^\beta$ then the 'I' locus will have a concave slope.

We make this assumption on the grounds that it appears to be empirically more likely. The adoption of either assumption does not change the conclusions of the analysis except in one area. This is where we increase E(Q) in the limit: the adoption of the assumption $(bZ)^d < A^\beta$ implies that the probability of the individual choosing employed entrepreneurship as a career approaches 1. If we assume $(bZ)^d > A^\beta$ then as E(Q)

increases in the limit the probability of the individual choosing self-employment approaches 1. The first outcome seems more realistic, entrepreneurs such as Lord James Hanson of Hanson PLC, and Dr Tony O'Reilly of Heinz initiate ventures that require a level of capital investment that generally cannot be supplied within the constraints of their own initial wealth. They either become employed entrepreneurs or, if already self-employed, become semi-employed by selling shares and/or merging with other companies.

Thus, if an individual is self-employed and endowed with an initial wealth Z, then as her entrepreneurial ability increases, she becomes increasingly constrained. On the other hand, an employed entrepreneur is unlikely to be constrained by capital (as her entrepreneurial ability increases), since this is being provided by the firm. Therefore, as E(Q) increases in the limit, the wealth generating capacity of the employed entrepreneur will exceed that of the self-employed entrepreneur (who will eventually become capital constrained) as long as the firm continues to supply capital for the employed entrepreneur's projects. Hence, we see an area that was formerly constrained self-employment under Evans and Jovanovics' schema now being split between employed and constrained self-employed entrepreneurship.

Now re-introducing the option of employment in non-entrepreneurial employment we can model the supply of enterprise in figure 2.3. If the routine wage rate is equal to Y_0 then it can be represented by income indifference curve Y_0. This implies that for individuals whose E(Q) and Z characteristics are represented within the area to the southwest of Y_0,

(i.e. area (i)), maximise income by becoming employed in the non-entrepreneurial employment sector. Thus, the availability of a wage equal to $Y = Y_e$ at $E(Q^*)$ reduces the supply of corporate entrepreneurs.[8] As the wage increases above this level to, say, Y_1, (represented by indifference curve Y_1), it reduces the supply of entrepreneurs from all sectors i.e. (iv), (iii) and (ii). Therefore, the model is consistent with self-employment models of entrepreneurship supply in that the supply of entrepreneurs is negatively affected by the wage rate. It does, however, caution the use of average wages to represent this effect in empirical analyses, as average wages include employed entrepreneurial income.

The augmented model of enterprise supply is suitable for application to industries where the allocation of enterprise is divided between self employment and employment. In considering employed enterprise, the model makes a progressive step towards a global analysis of the effects of economic variables on aggregate enterprise. Most notable is the case of capital grants for new industry. The model highlights that capital grants cause major distortions in the demand for enterprise and may actually reduce enterprise. This effect of capital grants is examined in appendix 2.3. The main findings of this analysis are that: (1) capital grants may *increase* the level of capital constraint in enterprise rather than alleviate it, (2) generate unproductive rent-seeking opportunities and (3) may affect industrial structure.

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[8] At the relatively low E(Q) and Z levels, individuals are drawn into corporate enterprise due to a lack of capital to set up their company and the income, D, from non-entrepreneurial endevours.

We now move on to apply the augmented model of enterprise supply to the intermediate market for raw tune innovation.

Section 2.2: A model of the supply of creative musicians:

The pre-recorded software market consists of three main components: composers, record companies and consumers. In economic terminology these may be respectively labelled producers of intermediate goods, final good manufacturers and consumers. Sometimes record producers act as middle-men, facilitating trade of intermediate goods between composers and record companies, by financing recordings, marketing tunes and less so recently, finding performers for composers. Thus, the market for tunes can be summarized by modelling consumers' demand for music, using this to determine the behaviour of record companies and using record company behaviour as the intermediate demand for composers' tunes. Since the audio software market is characterised by product differentiation, we assume that consumers have heterogeneous preferences. Thus, the demand for each audio software title is assumed to be of the Chamberlinian form

$$x_i = x_i (p_i, p_{-i}, M) \qquad (2.16)$$

where x is the vector of available i...z audio software titles and x_i is the quantity demanded of title i. p_i is the price of p_i and p_{-i} is the vector of prices for the remaining elements of x. M is a price vector for all other goods which we denote as G. Inverting (2.16) we get the Chamberlinian price function

$$p_i = (x_i, x_{-i}, G) \qquad (2.17)$$

Ignoring artist royalties for the present, the record company profits from the sale of x_i are

$$\pi_i = p_i x_i - c_i(x_i) \qquad (2.18)$$

where c_i is the cost of producing and marketing x_i. In the Chamberlin model it is implicitly assumed that each firm does not take into consideration the behaviour of other firms in deciding on its own actions. Therefore, profit maximising output of x_{i*} is determined by the first order condition

$$\partial\pi_i/\partial x_i = p_i + (\partial p_i/\partial x_i)x_i - \partial c_i/\partial x_i = 0 \qquad (2.19)$$

However, it is clear from equation (2.17) that changes in the quantity of x_i supplied will have an impact on the revenue of x_{-i} software. In effect, an increase in x_i is likely to divert some of the existing audio software market from x_{-i} to x_i. In the literature on monopolistic competition this is often referred to as 'cannibalization' or 'business stealing effects' [see Beath and Katsoulacos (1991) for a survey]. Such effects are likely to generate a response from other firms, so that the profit function for x_i is more generally defined as

$$\pi_i = \pi_i (\mathbf{x}) \qquad (2.20)$$

Thus, the gross profit function for a record company, f,that sells a selection of titles $x_{j...k}$ (a subset of $x_{i...z}$), is

$$\pi_f = \sum_j^k \pi_j(x) \qquad (2.21)$$

Firm f's optimal level of x_i is determined by the first order conditions

$$\frac{\delta \pi_a}{\delta x_j} = \sum_j^k \frac{\delta \pi_j}{\delta x} \frac{\delta x}{\delta x_j} = 0 \qquad (2.22)$$

Equation (2.22) tells us that record company f's decision to sell an audio software title will depend on how much of its own existing business x_i will steal and how other companies will respond to the sale of x_i. Therefore, this immediately implies that record companies would tend to hire artists who have minimal internal (to the record company) cannibalization effects.

In practice record companies are unsure of the actual demand for a software title prior to its release. They are also uncertain of the exact effect x_i will have on other software titles and the response of other companies. Therefore, they can only estimate their profit function i.e. $E(\pi)$. Further, record companies are also obliged to pay artist royalties. As is generally the case, we assume they pay an advance on royalties g_i. We denote artist

royalties on record sales as u_i per unit of x_i. Thus we can rewrite record company f's gross profit function as an expected net profit function.

$$E(\pi_f) = \sum_j^k E(\pi_i(x,u_i)) \qquad (2.23)$$

Thus, the expected income of a representative creative musician who produces x_i is either

$$Y_e = g_i + u_i E_i(p_i)x_i*; \quad if\ u_i E(p_i)x_i* > g_i \qquad (2.24a)$$

or

$$Y_e = g_i; \quad if\ u_i E(p_i)x_i* < g_i \qquad (2.24b)$$

where x^*_i is the record company's planned output level of x^*_i and where $E_i(p_i)$ is the creative musician's estimate of the price function of x_i. If, on the other hand, the creative musician sets up her own record company to sell x_i, then her expected income would be

$$Y_e = E(p_i)x_i - c_i(x_i) \qquad (2.25)$$

Optimal x_i is determined by the first order condition

$$\frac{\partial Y}{\partial x_i} = E(p_i) + \frac{\partial E(p_i)}{\partial x_i}x_i* - \frac{\partial c}{\partial x_i} \qquad (2.26)$$

The individual is constrained by capital if $c(x_i^*) > bZ_i$ and unconstrained if $c(x_i^*) <= bZ_i$ where bZ_i is as defined in the previous section, namely the amount of financial capital to which the individual has access.

Comparing (2.24a), (2.24b) and (2.25) we can identify the main determinants of a creative musician's decision to either sign a record contract or set up her own company:

1. *Asymmetry in the estimation of the value of music's commercial viability* i.e. $E(p_i)_{\text{record company}} < E(p_i)_{\text{artist}}$. This can occur for two reasons. Firstly, the record company may be more pessimistic of market demand for x_i than the artist. In an extreme, but frequent case this implies that the artist is not offered a contract i.e. $g_i = 0$ and $u_i = 0$. However, if the company is willing to offer a contract the optimal level of x_i^* produced is likely to be low in the artist's view, as are the royalties rates offered to the artist. If these asymmetries are significant they may incite an artist to set up her own record company.

2. *Business stealing effect*: Even in cases where a record company and artist have similar views as to the commercial potential of the artist's music, a record company may not be willing to offer a 'reasonable', or any, contract if the release of the record 'steals' record sales from the company's existing repertoire. In such cases artists may optimise by setting up their own record company.

3. *Risk*: Income in (2.24c) involves a greater risk than (2.24a) and (2.25). Hence risk averse artists may be more likely to sign record contracts, while less risk averse artists may be stimulated to set up their own record company in the expectation of greater profits if the record sales are successful.

4. *Capital constraint*: In equation (2.25) the optimal x^*_i may not be attainable if the musician does not have access to sufficient capital. Since corporate record companies would not be expected to face a capital constraint, an artist may maximise income by signing a record contract.

5. *Corporate expertise*: It may be the case that the corporate sector has economies of scale and/or first mover learning advantages. In such cases releasing a record through an established company might maximise the musician's income through a higher $E(p_i)$ and/or lower $c(x_i)$.

Perusing the above factors, it is reasonably clear that modelling the distribution of creative musicians between the contracted and self-employed sectors, identifies the same factors cited as the determinants of enterprise in section one.

We can use the augmented Evans and Jovanovic model to illustrate the impact of various shocks on the supply and distribution of creative musicians. In the context of the intermediate market for music, entrepreneurial ability, Q is the commercial worth of a

creative musician's artistic talents. We can define a creative musician's expected net income using the net entrepreneurial income equations from section one: thus, a creative musician signed to a corporate record company receives an income

$$Y_c = D + E(Q)A^B + rZ \qquad (2.27)$$

where D now denotes an advance on royalties and E(Q) is the record company's estimate of the commercial value of the musician's artistic ability. The income of a musician who sets up her own record company is defined by (2.28) for a capital constrained musician and by (2.29) for a musician unconstrained by capital.

$$Y_c = E(Q)(bz)^d + r(Z_i - bZ_i) \qquad (2.28)$$

$$Y_c = E(Q)^{\frac{1}{1-d}} \left(\frac{d}{r}\right)^{\frac{d}{1-d}} + r\left(Z_i - \left(\frac{dE(Q)}{r}\right)^{\frac{1}{1-d}}\right) \qquad (2.29)$$

Where E(Q) is the musician's own estimate of the commercial value of her artistic ability. We assume that the musician has an expected wage, E(w), outside of the music industry. If the musician is likely to be unemployed if she were to leave the music business, then this expected wage will be low. Thus, high unemployment would be expected to increase the number of active musicians; especially if the musician is able to collect unemployment benefit while composing music.

The application of the augmented Evans and Jovanovic model of entrepreneurship to

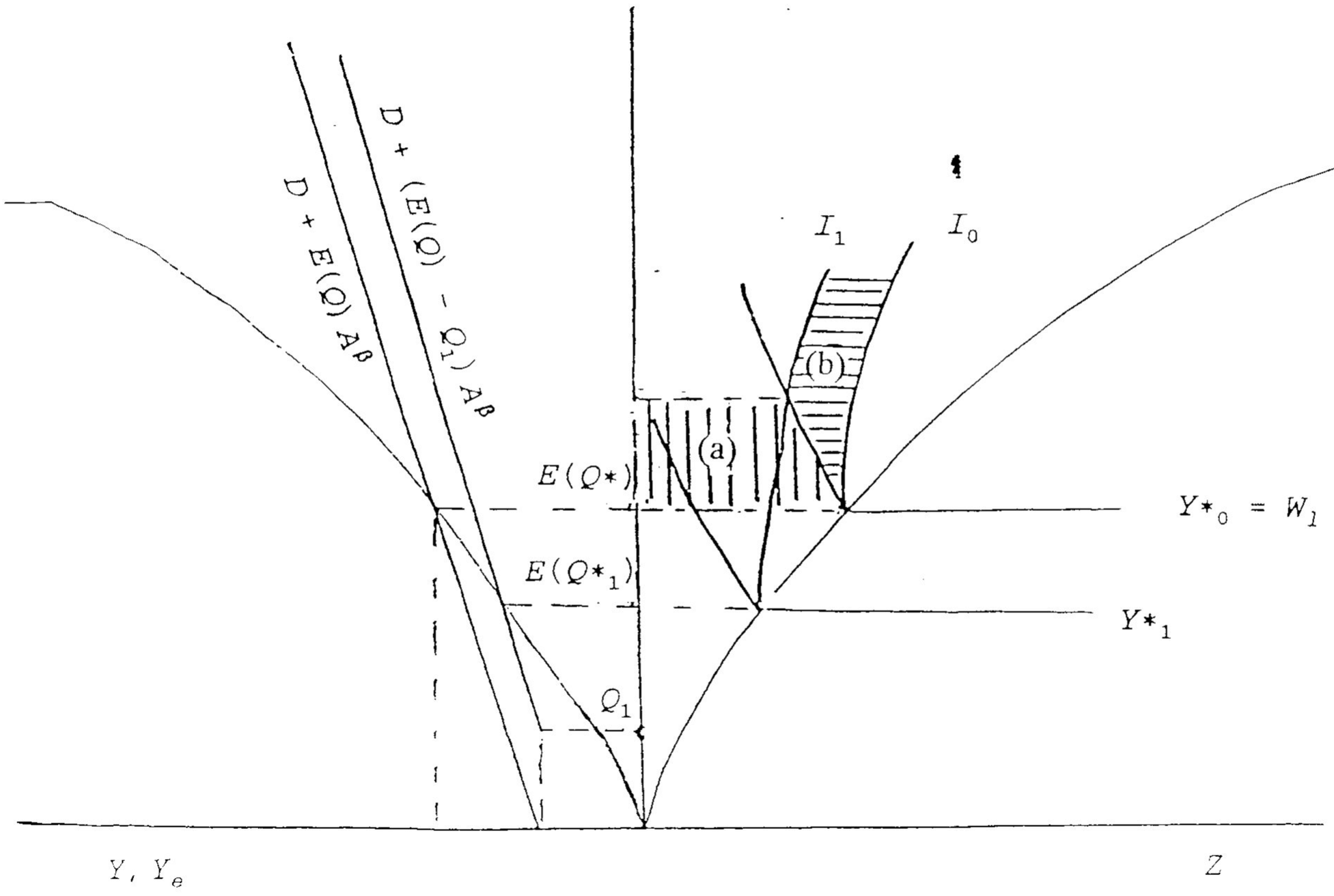
creative musicians implies that *if* creative musicians are stimulated by financial gain, then we would expect the factors outlined in section one to have an impact on the supply of new music. In addition, the augmented model highlights that an asymmetry in the record company's and artist's estimation of E(Q) is likely to affect the supply of new music. It will also be expected to affect the distribution of creative musicians between those who sign contracts and those who set up their own record company. The impact of an 'underestimation' of E(Q) by a record company is portrayed in figure 2.4. We assume that the difference between the artist's and the record company's estimate is an amount equal to Q_1. This has the effect of shifting the $Y = D + E(Q)A^{\beta}$ schedule towards to origin by a fixed amount Q_1A^{β} [since $Y = D + (E(Q) - Q_1)A^{\beta}$], leaving the slope unaltered. Thus, we observe a cohort of creative musicians, who formerly would have signed a record contract now leaving the industry. We also observe a second cohort, who similarly would have previously signed a contract now opt to set up their own record company.[9]

Such asymmetries in the estimation of E(Q) can be generated by simple differences in subjective estimation by artists and record companies. Alternatively, they may occur when an artist's tunes entail 'business stealing effects' which retard the sales of a record company's existing repertoire. In such a case, the record company will value the artist at a lower level than the artist herself. However, the record company could sign the artist

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[9] The fact those who now set up their own record company are all constrained by capital is due to assumptions of risk neutrality and also that record companies do not have first mover advantages over new firm start ups. Dropping these assumptions will generate a flow of musicians into unconstrained self-employment.

Figure 2.4



(a) Former Contracted Musicians who now opt for Non-Musician Employment

(b) Former Contracted Musicians who now set up their own Record Company.

and then ensure that the artist is marketed inefficiently so that the record company mitigates business stealing effects from its own repertoire. This may be an optimal strategy if another record company was also interested in contracting the artist.

The model can also be used to represent economies of scale within production and marketing in the music industry. Large record companies benefit by spreading fixed costs over many album releases. A creative musician releasing a single album does not have the same scope. Economies of scale also arise through more non-traditional channels, particularly in marketing. A large record company may use its popular artists' music as leverage to get radio and television airplay for its less well-known artists. For example, giving a radio station exclusive rights to a new album (for a limited period), in return for airplay of lesser known music. These economies of scale imply that the expected return of a particular album will be higher, if produced by a large corporate record company than a small independent label. In figure 2.4 this has the effect of increasing the slope of $Y_c = D + E(Q)A^b$ causing it to swivel to the left and hence increase the number of contracted creative musicians at the expense of the self-employed cohort.

Conclusion

In this chapter we described the the market for new music. This was achieved by modelling the audio software market and applying a model of enterprise supply to explain the behaviour of creative musicians and record companies. The model identified the

economic factors that would be expected to affect the supply of new music and the level of company start ups by creative musicians. In general, the model found that 'artistic enterprise' can be influenced by the same type of factors that affect enterprise in other industries. Thus, the model provides a theoretical benchmark for the empirical analyses in the audio software market in the remaining chapters of the thesis. The extent to which this model can explain enterprise in the music industry is a measure of the extent to which income maximisation may explain enterprise in an artistic or cultural industry.

Appendix 2.1: List of Entrepreneurs in Introductory Data Survey

Robert Sangster: Sangster Bloodstock

David Theime: Essex Overseas Petroleum Corporation

Albert Roux: La Gavrouch Restaurant

Michel Roux: The Waterside Inn

Randolph Fields: British Atlantic

Jacob Rothschild: Allied Rothschild Charterhouse

Asfraf Marwan: Marwan

Tiny Rowland: Lonrho

Paul Raymond: Paul Raymond Organisation Ltd.

James Hanson: Hanson plc

Gerald Ronson: Heron

Asil Nadir: Polly Peck

Ian Postgate: Alex Howden Group

Jack Bogardus: Alexander and Alexander

Clive Sinclair: Sinclair Radionics, Sinclair Research

Terence Conron: Habitat and Mothercare

Robert Maxwell: Pergamon Press, Mirror Group

Gerald Ratner: Ratners

Nigel Wray: Singer Friedlander

Michael Green: Carlton Communications

Chris Beard: Chris Beard Entertainment

Martin Sorrell: W.P.P.

Charles Saatchi: Saatchi and Saatchi

Maurice Saatchi: Saatchi and Saatchi

Tony O'Reilly: Heinz, Independent Newspapers

Michael Smurfit: Smurfit and Company

Richard Branson: Virgin Records, Virgin Atlantic

Mark Leiderberg: Mama Concerts

Bruce Findlay: Schoolhouse Management

Byron Orme: B.K.O.

Fritz Rau: Mama Concerts, Lipman

Jim Aitken: Jim Aitken Promotions

Jim Koplek: Metropolitan Entertainment

Tim Parsons: Midland Concert Promotions

Maurice Jones: Midland Concert Promotions

Stuart Galbraith: Midland Concert Promotions

Mikkal Brogart: M.B. Design and Production

Pino Sagliocco: Telka

Bill Graham: Bill Graham Enterprises

George Leitner: George Leitner

Denis Desmond: M.C.D.

Danny Betesh: Kennedy Street Enterprises

Michael Gudinski: Frontier Touring Company, Mushroom Record Company

Appendix 2.2: Entrepreneurial Ability

The incomes (Y, Y_e) from entrepreneurial careers are positively related to an individual's entrepreneurial ability (q). Therefore, an individual's estimate of her entrepreneurial ability will have a significant bearing on career choice. In this regard, we assume an individual has to make two rational estimations: one relating to her unknown level of innovative and imitative abilities, and the other concerning the value the market might place on these attributes. These two give the individual an estimation of the value of her entrepreneurial ability E(q).

We assume that an individual initially has a known vector of entrepreneurial ideas C1 = {c(t)1, c(t)2,....c(t)n} which have a value V1 = {v(t)1, v(t)2,..... v(t)n} in the present period, based on the current market conditions M1 = {m(t)1, m(t)2,.....m(t)n} relating to the ideas.[10] Thus, the expected value of an individual's entrepreneurial ability in the current period is E(q1) = V1(C1, M1) with a standard deviation 'S'. In the future period, period 2, an individual will be endowed with C1 plus some new entrepreneurial ideas. An individual estimates in period 1, the probability of producing new ideas in period 2. Thus the expected endowment of entrepreneurial ideas in period 2 is PC2 where C2 = {c(t+1)1, c(t+1)2,....c(t+1)n, c(t+1)o,c(t+1)p,...c(t+1)z} and P is a vector of the probabilities of the elements of C2 occurring. P = 1 for the range of C2: c1 to cn (since c(t)i = c(t+1)i; i....n), thereafter P is an element of [0,1] (since c(t+1); o...z are ideas not

[10] In the case of a composer, the set C would represent new musical compositions.

yet formulated in period t). The expected value, V2, of period 2 entrepreneurial ideas will depend on the expected market value, M2 = {m(t+1)1, m(t+1)2,....m(t+1)n, m(t+1)o, m(t+1)p, ...m(t+1)z} for these ideas in period 2. Thus, the expected value of entrepreneurial ability in period 2 is E(q2) = PV2(C2, M2) with a standard deviation 'S'. The total value of entrepreneurial ability is therefore E(q) = E(q1) + E(q2) so that

$$E(q) = V1(C1, M1) + PV2(C2, M2) \qquad (2.29).$$

We now want to examine how C1 and C2 are formed. We assume that some of the ideas are autonomous - just dreamed up while walking the dog - while others are induced to the extent that the process was prompted by expected income gain. Therefore, C1 + C2 are a function of autonomous and induced thought. We assume further that each individual has an ability (B) to generate new entrepreneurial ideas. For example, Kirzner's alertness or Casson's ability to make judgemental decisions. The ability B is assumed to be a function of a natural entrepreneurial ability, (R) on the part of the individual, alongside an acquired ability through life experience (x_1), and education (x_2). That is

$$B = B(R, x_1, x_2) \qquad (2.30).$$

Therefore, we assume that *autonomous* entrepreneurial ideas are a function of the ability to generate entrepreneurial ideas, 'B', a random brainstorm variable 'T' and the time spent autonomously thinking about the idea t_a, i.e. a vector of autonomous ideas = $f(B, T, t_a)$.

Induced entrepreneurial ideas are also assumed to be positively related to 'B' and 'T'. However, the time 't_i' spent developing ideas will depend on the expected income an individual expects to make from the expected final form of the idea. For example, time spent working on a new musical composition 'x', would be positively related to the level of income expected to be made from selling 'x' in the market. Two expectations are in play in determining the profit expectations of a particular idea: (1) The nature of technology expected to be employed in the production and distribution of the new venture and (2) the state of the market into which the new product/service will be launched. Thus, if we denote c' as the vector of ideas the individual is currently working on, with e(c') denoting the individual's expectation of what these ideas will be in their final form, then the individual will attach a value, ∂, to these ideas. This valuation will depend on e(c') and the uses the market has for these ideas in the current period, M1, and what uses the market might bestow on them in the future period, M2. Thus the expected income from nurturing current entrepreneurial ideas is $\partial = \partial(e(c'), M1, M2)$. Since '$t_i$' will be positively related to ∂ this implies that the vector of induced entrepreneurial ideas are represented by the function $g(B, T, t_i(\partial(e(c'), M1, M2)))$. Given that $C1 + C2 = f(.) + g(.)$ this implies

$$C = C1 + C2 = f(B, t_a, T) + g(B, t_i(\partial(e(c'), M1, M2)), T) \quad (2.31)^{11}.$$

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[11] It is interesting to note that firms who observe the relationship apparent in equation (2.31), might try to encourage a high level of C among their existing employees through a number of schemes. They may try to increase the education of employees by subsidising and allowing time off for education. This is exhibited by a rise in x_2, hence B, and therefore C, via both $f(.)$ and $g(.)$. Similarly, they can influence C through B by increasing work experience, x_1, through training schemes. They may also induce individuals to develop their entrepreneurial ideas by offering incentive schemes such as profit related pay, suggestion boxes etc. On the other hand, firms often aim to maximise the entrepreneurial ability of their workforce by careful selection processes in hiring employees. Such an interview process would attempt to estimate the individuals potential C. Given the asymmetrical information in

Equation (2.31) contains many variables that are endogenous to an individual's life experience or history. Thus an individual may use these variables to enhance E(q). In this manner the individual may choose to develop E(q) in order to have access to more favourable career options in the future. This decision process is easily modelled. We will illustrate it here with reference to the two most commonly used choice variables, namely education and work experience.

The cost of acquiring education is made up of tuition and related expenses, denoted as 'P', and the opportunity cost of income forgone by abstaining from the workforce which we denote as Y_f. Thus over time the cost of education is C_t.

$$C_t = P_t + Y_{ft} \qquad (2.32)$$

where

t = time.

Thus, the wealth optimising decision of an individual is to maximise the set of dynamic simultaneous equations representing income over time from all potential sources. Using

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such a process, firms may be forced to rely on education qualifications as a guide to entrepreneurial skill. In this case, firms are forcing individuals without education qualifications, who also have relatively high Q levels, to pursue their entrepreneurial skill in self-employment.

However, no matter how successful a firm is in encouraging/monitoring equation (2.31) it will never have full control over it due to the presence of T, t_a and how the employees evaluate M2. Thus, if the survival of a firm in a highly competitive environment depends to some degree on the ability of its employees to innovate, we can see that the survival of the firm is partly determined by these random variables outside of the control of the firm. Thus, no degree of efficient management safeguards firm survival.

the model of section 2.1, these are represented as H_l, (2.33), H_c, (2.34) and H_{s-e}, (2.35) below for routine labour, corporate entrepreneurship and self-employed entrepreneurship respectively. We include the impact of work experience as it economises on space and in no way complicates the analysis. Note that in these equations brackets denote functional relationships and a full stop (.) denotes multiplication. An individual's working life-time is denoted by 'n'. The amount of 'n' spent in education, x_2, or gaining work experience, x_1, is $m = m(x_1,x_2)$; $m'(x_1) > 0$, $m'(x_2) > 0$.

$$H_l = \int_m^n W_{lt}(x_1(t), x_2(t)).dt - \int_1^m P_t(x_2(t)).dt \qquad (2.33)$$

$$H_c = \int_m^n D(x_1(t), x_2(t)).d_t + \int_m^n E(Q(C(B(x_1(t), x_2(t))))).A^{\beta}.dt$$

$$- \int_1^m P_t(x_2(t)).dt \qquad (2.34)$$

$$H_{s-e} = \int_m^n [E(Q(C(B(x_1(t), x_2(t))))).k^d - r(t).k(t)].dt$$

$$- \int_1^m P_t(x_2(t)).dt \qquad (2.35)$$

To gauge the impact of education on income, we differentiate the relevant income equation. Thus, for a corporate entrepreneur the change in income resulting from an increase in education is represented by equation (2.36).

$$dH_c = \int_{\frac{\partial m}{\partial x_2(t)}.dx_2(t)}^{n} [D]d_t + \int_m^n [\frac{\partial D}{\partial x_2(t)}.dx_2(t)]dt$$

$$+ \int_{\frac{\partial m}{\partial x_2(t)}.dx_2(t)}^{n} [E(Q)A^{\beta}]d_t$$

$$+ \int_m^n [\frac{\partial E(Q)}{\partial C}.\frac{\partial C}{\partial B}.\frac{\partial B}{\partial x_2(t)}.A^{\beta}.dx_2(t)]dt$$

$$- \int_1^{\frac{\partial m}{\partial x_2(t)}dx_2(t)} [P_t]dt \qquad (2.2.36)$$

The sum of the second and fourth elements on the right hand side of equation (2.36) represent the increase in corporate entrepreneurial income stemming from an increase in education, dx_2. The first and third elements portray income forgone by not entering the workforce for the duration of time spent in education. The last element is the total cost of tuition and related expenses. Unless (2.36) is positive there are no net gains from education for a corporate entrepreneur.

Appendix 2.3: The Impact of Capital Grants on Enterprise

Capital grants to the self-employed undoubtedly stimulate the numbers of self-employed entrepreneurs, but do they achieve their desired objective of increasing the level of enterprise? Using the augmented model of section 2.1 we assume the introduction of capital grants, of amount Z_0, are made available to the self-employed. This has the same effect as increasing an individual's initial wealth and hence, increases the area in 'E(Q) and Z' space classified as unconstrained by capital i.e. it shifts the $(r/d)(bZ)^{(1-d)}$ locus up by the amount $(r/d)(bZ_0)^{(1-d)}$. Regardless of the level of the wage rate, the supply of self-employed entrepreneurs increases as self-employment income is enhanced through the reduced capital expenditure, rZ_0. However, only in the case of constrained self-employment is there a *real* increase in entrepreneurial income[12]:

$$Y = Q(bZ)^d + r(Z-k)$$

$$\partial Y/\partial Z = dQ(b^d)(Z^{d-1}) + r$$

$$So \quad \frac{\partial Y}{\partial Z}Z_0 = dQb^2Z^{d-1}Z_0 + rZ_0 \qquad (2.37)$$

$$i.e. = (income\ increase) + (wealth\ redistribution)$$

This real increase in income is due to the fact that the capital grant allows constrained entrepreneurs to move towards, and sometimes attain, the optimal level of capital required.

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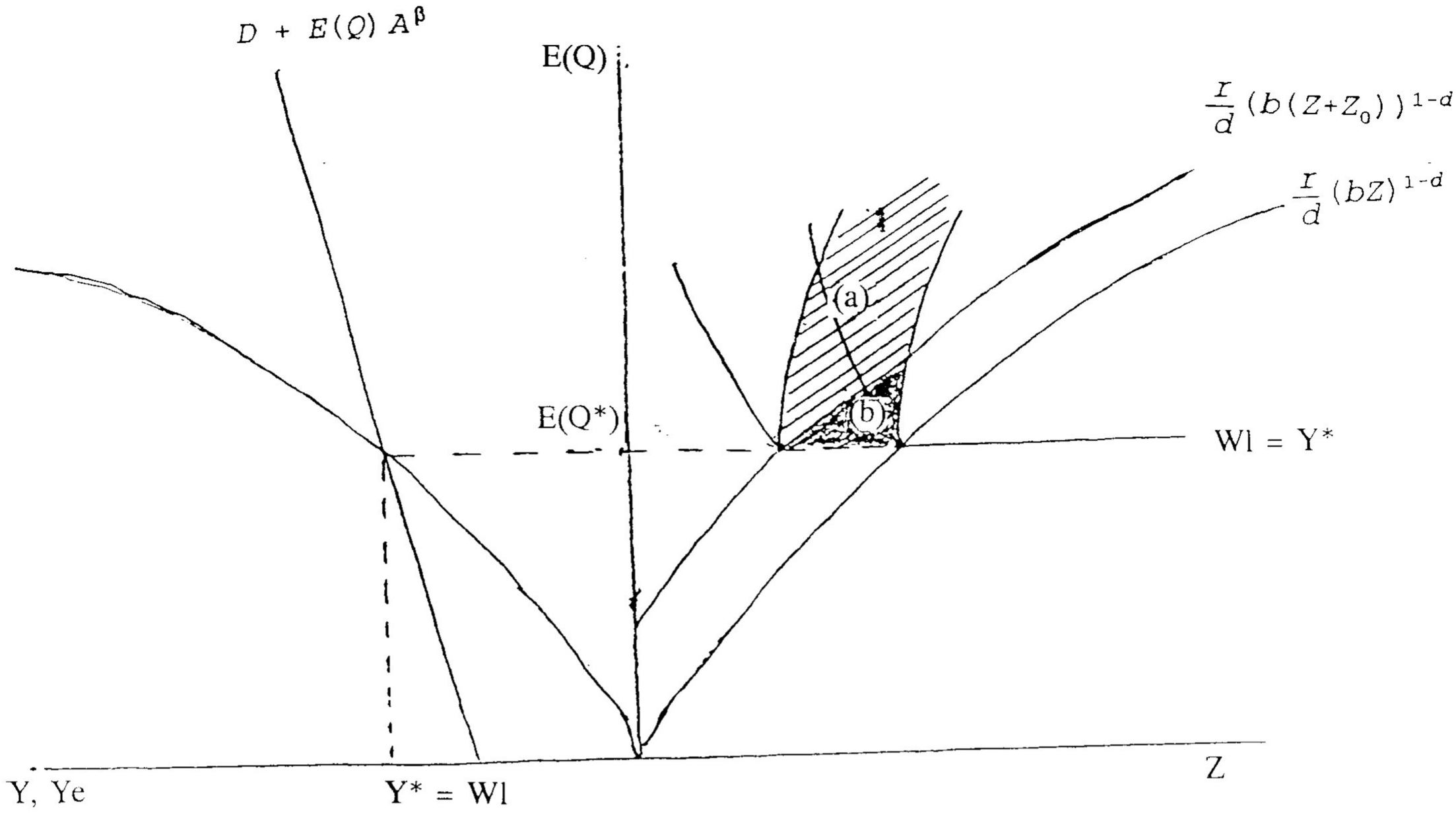
[12] 'rZ_0' is not a real increase in entrepreneurial income since it is merely a redistribution of wealth from taxpayers to self-employed entrepreneurs.

The introduction of capital grants causes a redistribution of entrepreneurs from the employed sector to self-employment. A proportion of this movement represents individuals who are moving from (capital unconstrained) employment as an entrepreneur, to capital constrained self-employment. It is possible, therefore, that the level of enterprise may be *lower* after the introduction of capital grants, than before.

This is illustrated in figure 2.5 by the area marked (a). Figure 2.5 represents the case where the non-entrepreneurial employment wage rate W_1 is equal to entrepreneurial income Y_e at $E(Q_*)$. The capital grant causes the constraint locus to shift upwards in the right hand panel. The new 'I' locus, I_1 and the downward sloping portion of the indifference curve are thereby shifted to the left. They are now located on the new constraint locus. Since the 'I' locus denotes the division between employed and self-employed entrepreneurs, the shift to the left of the 'I' locus causes a movement of entrepreneurs from the employment to self-employment. The portion of the new self-employed entrepreneurs who are located above the constraint locus will be constrained by capital. Since capital grants affect the allocation of enterprise between these sectors, it is worthwhile assessing how this may affect the structure of an economy. We examine this more closely by looking at the U.K. industrial base, classified according to firm type (self-employed, partnerships, and corporate). This is presented in table 2.4 for the U.K. in 1991.

It is clear from table 2.4 that specific forms of business activity tend to favour particular forms of ownership. In table 2.5 we list the top five most popular forms of business

Figure 2.5



(a) Former Employed Entrepreneurs who now become Constrained Self-Employed Entrepreneurs.

(b) Former Employed Entrepreneurs who now become Unconstrained Self-Employed Entrepreneurs.

activity, (measured by the percentage of the sector's market accounted for by a particular form of ownership), for the self-employed and corporate sectors. The table also lists the percentage of firms within these sectors which had a turnover of greater than, or equal to, £1 million in 1991. The table shows that among the five most popular forms of business activity there is no common business sector between self-employed and corporate firms. Furthermore, the turnover of self-employed firms is much smaller than that of the corporate firms. On average, only 6.8 per cent of the five most popular business activities of self-employed firms had a turnover in excess of £1 million. The comparative level for corporate firms was much higher at 23.2 per cent.

These two facts are interesting on their own merit, but together they contradict a common belief that encouraging self-employment will initially stimulate smaller enterprises, which will eventually grow into large corporate firms. The data seem to suggest that capital grants would cause self-employed entrepreneurs to locate in sectors *which by their nature* require small-scale business activities and hence, are unlikely to evolve into large corporate enterprises. It appears plausible that capital grants stimulate growth in particular sectors of the economy with particular long term size characteristics.

Table 2.4

1991 U.K. total number of business units (factory or site) and % of all units in brackets ( ).

	Self-Employed	Partnership	Corporate
Agric, Fish and Forestry:	41,379 **(36%)**	63,462 **(56%)**	9,121 **(8%)**
Mining:	125 **(10%)**	149 **(11%)**	1,036 **(79%)**
Manufacture:	34,114 **(23%)**	25,717 **(17%)**	90,965 **(60%)**
Construction:	122,393 **(52%)**	44,408 **(19%)**	69,652 **(30%)**
Road Transport Services:	32,584 **(49%)**	12,056 **(18%)**	21,472 **(33%)**
Other Transport:	251 **(10%)**	177 **(7%)**	2,059 **(83%)**
Post and Communications:	409 **(30%)**	196 **(14%)**	766 **(56%)**
Wholesaling and Dealing:	31,553 **(25%)**	19,165 **(15%)**	75,326 **(60%)**
Retailing:	111,898 **(45%)**	95,225 **(39%)**	39,721 **(16%)**
Finance, Property and Prof Services:	61,385 **(41%)**	28,965 **(19%)**	57,872 **(39%)**
Catering:	47,271 **(42%)**	49,497 **(44%)**	16,073 **(14%)**
Motor Trades:	36,131 **(47%)**	20,495 **(26%)**	21,250 **(27%)**
Business Services and Central Offices:	30,294 **(27%)**	13,398 **(12%)**	68,840 **(61%)**
All Other Services:	52,509 **(46%)**	23,791 **(21%)**	37,132 **(33%)**
Average:	40,153 **(40%)**	26,447 **(26%)**	34,086 **(34%)**

Source: Business Monitor (1991).

This point is borne out even more strongly when we add into consideration the five least popular forms of business activity for the corporate and self-employed sectors. This is presented in table 2.6 in the same format as table 2.5. Again, we find that there is no common business activity between the self-employed and corporate sectors. It is interesting to note that the five least popular business activities of the self-employed in table 2.6 are exactly the same activities which are the five most popular business activities of the corporate sector in table 2.5. Also, three out of the five activities listed as the least common forms of business activity in the corporate sector, are among the top five most common activities of the self-employed sector.

Thus, on aggregate, the conclusion we can draw from this evidence is that the dichotomy of business activity between the self-employed and corporate sector implies, that capital grants awarded in a non-discriminatory manner seem likely to affect the structure of the industrial base.

Table 2.5

1991 U.K. top 5 most common sectors of business activity by percentage of total business units. Percentage of units with a turnover at least as great as £1 million.

Self-employed:	*% of units*	*% >= £1m turnover*
(1) Construction:	52	7
(2) Road Trans Servcs:	49	7
(3) Motor Trades:	47	15
(4) All Other Services:	46	2
(5) Retailing:	45	3
Average:	47.8	6.8
Corporate:		
(1) Other Transport:	83	33
(2) Mining:	79	36
(3) Business Serv and C.O:	61	8
(4) Manufacture:	60	16
(5) Wholesaling and D:	60	23
Average:	68.6	23.2

Source: Business Monitor (1991).

Table 2.6

1991 U.K. top 5 least common sectors of business activity by percentage of total business units. Percentage of units with a turnover at least as great as £1 million.

Self-Employed	**% of units**	**% turnover >= £1m**
(1) Mining:	10	36
(2) Other Transport:	10	33
(3) Manufacture:	23	16
(4) Wholesaling and D:	25	23
(5) Business Serv and C.O:	27	8
Average:	19	23.2
Corporate		
(1) Agric, For and Fish:	8	1
(2) Catering:	14	1
(3) Retailing:	16	3
(4) Motor Trades:	27	15
(5) Construction:	30	7
Average:	19	5.4

Source: Business Monitor (1991).

3: The Intermediate Market for Music

Introduction

In the audio software market record companies act in an intermediary manner between consumers and creative musicians. They licence recordings from artists, contribute marketing and manufacturing inputs and then sell the final product to consumers. In this chapter we examine the intermediate market for new music. We look at the economics of licensing new music from an artist to a record company. We use the model of the previous chapter to analyse the behaviour of creative musicians. Therefore, we conduct a questionnaire survey of composers and attempt to identify the extent to which performance in the intermediate market for new music is determined by economic factors.

The chapter is divided into five sections. The first section describes the data collection process. Section 2 provides a profile of the behaviour of creative musicians within the various categories of music genres. Section 3 investigates the determinants of the survival of creative musicians in the intermediate model for new music. Section 4 seeks to identify whether composers who are relatively more motivated by economic gain are more successful at producing music with a commercial value. Finally, section 5 examines new record formation by creative musicians.

Section 1: Data Collection

As is often the case in cultural industries, quantitative measurement of economic behaviour is minimal. Not surprisingly, this is also the case in the intermediate market for new music; particularly for the behaviour of creative musicians. With this background, we felt it necessary to collect a data set on creative musicians. Therefore, through the co-operation of the Irish Music Rights Organisation (I.M.R.O.), we conducted a questionnaire survey of Irish composers who are members of the P.R.S. The aim was to identify the extent to which economic and non-economic factors exert an influence on the supply of new music.

The questionnaire was designed so that the subject could complete the form in a short a time as possible; little more than five minutes. A copy of the questionnaire is contained in appendix 3.1. The structure of the questionnaire allowed the interviewee to merely tick appropriate boxes (there were only one or two requests for written words). A total of 1,065 questionnaires were sent to all the Irish-based members of the Performing Right Society, including a pre-paid return envelope and a covering letter from Mr Brendan Graham, (Chairman of the I.M.R.O.[1]), which requested the recipients to return the questionnaire. Of the 1,065 members surveyed, two were known to have died (blank questionnaires were returned by the deceaseds' spouses), six were estimated to have been sent to the wrong address and, at the very least, 15 per cent were estimated to have been

[1] The covering letter is also included in the appendix.

sent to individuals who were away from their address during the collection period, (due to touring, recording or other work-related commitments)[2]. Therefore, the effective sample size was 897. The questionnaires were sent out in the second week of January 1993, and by the second week of March 1993, a total of 248 replies had been received; resulting in a response rate of 27.7 per cent. This, being a reasonably high response rate for a postal questionnaire, gives us confidence in treating the results as being reasonably representative.

The P.R.S. members are made up of composers, lyricists and publishers. With the exception of publishers, who comprise only 4.7 per cent of Irish-based P.R.S. membership, the survey is devoted exclusively to what we termed earlier as creative musicians. The nature of the questions in the questionnaire pertain exclusively to this latter group so the fact that publishers (who do not themselves write or compose) are surveyed, does not distort the results[3]. To become a member of the P.R.S., and hence affiliated to the I.M.R.O., composers must pay a once-off membership fee of IR£50 and have produced tunes that have already achieved a recognisable commercial value. The conditions of membership as set out in P.R.S.'s "Membership of the Performing Right Society" state that each member must either:

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[2] Both of the latter estimates were provided by Paula McDermott, P.R.S. Membership Officer and the I.M.R.O. Marketing Officer.

[3] Except to the extent that it may have caused the response rate to be underestimated.

*"**Have three works which must have been either:***

(a) commercially recorded, or

(b) broadcast within the 2 years, or

(c) performed in public on at least 12 occasions within the past 2 years, and commercially published.

Alternatively the writer can be:

(a) A writer who has had one work in the Top 50 of a popularity chart recognised by the P.R.S., within the past 12 months.

(b) A writer who has written the theme or opening/closing music for a film which has been publicly exhibited or for a series of 3 or more episodes broadcast on television or national radio.

(c) A serious music composer who has achieved a national broadcast lasting 5 minutes or longer.

(d) A serious music composer who has had 2 performances, each lasting 5 minutes or longer, at a concert or recital of serious music licensable by the Society."[4]

As is evident from the membership fee and conditions, commercially unsuccessful composers do not enter our sample. In fact, if members consistently fail to earn royalties through the Society's payment mechanism their membership is usually terminated. However, membership criteria are sufficiently lenient to ensure that our sample is not

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[4] P.R.S. (1990b).

overwhelmingly concentrated on commercially successful musicians. This is reflected in the survey results which show that 81 per cent of respondents claimed to be earning less in royalties and live performances than the minimum level of income they require to stay in the music business.

The questionnaire is divided into 16 primary questions. Some of these have sub-questions. Question 1 identifies which type of composer has replied. We are mainly interested in those who have composed music with the intention of selling an album with chart potential (from here on referred to as 'chart-based'). The categories that fall outside this classification are classical music, jingles, commissioned, and non-chart traditional music. Question 2 asks the composer whether she also performed her own tunes and this was mostly affirmative. Question 3 focuses on composers' career choice between securing a record contract and setting up a record company. It asks composers whether they had set-up a record company to release a record. Both 'yes' and 'no' respondents are then separated and asked to identify the factors that influenced this decision.

It is possible that many composers are stimulated to set up their own record company simply because they believe that corporate record companies do not recognise the commercial viability of their tunes. Therefore, it may be the case for some composers to have set up a company in the past, but to still aspire to acquire a record contract in the corporate sector in the future (i.e. they merely set up a company to demonstrate the true value of their entrepreneurial ability to the corporate sector). In order to allow this cohort

of individuals to state their reasons for preferring the corporate sector, question 4 asks composers whether or not they hope to secure a record contract in the corporate sector in the future. Question 5 seeks to identify the relative importance of economic factors for individuals choosing music composition as a career. Questions 6 and 7 cant be interpreted together as they cumulatively examine the supply of composers and whether composers are achieving their reservation income in the music industry. In so doing, these questions inquire into the decision to enter and exit the music industry and the extent to which economic factors play a role. Question 8 looks at elasticities of the supply of tunes relative to the royalties paid for performance and reproduction of tunes. Question 9 assesses the viability of Irish government intervention in the music and recording industry and the confidence expressed by composers therein. Question 10 seeks to identify the factors that often encourage composers to terminate the production of a new tune. Question 11 seeks evidence of waves in the styles of music written. Questions 12 and 13 examine the roles of 'education' and 'information' in acquiring the skill to play and write music respectively. Questions 14 and 15 are concerned with the contribution of 'role models' in encouraging the supply of composers. Finally question 16 examines the role that risk-taking plays in this form of enterprise.

The survey is primarily aimed at examining the behaviour of 'chart-based' composers. The content and structure of the questionnaire is designed to examine this group of composers and is, therefore, not directly relevant to the other categories of composers. The data is presented in tables where the columns are divided according to the type of

music composed. In the tables: CHARTS denotes chart-based composers; TRAD denotes non-chart traditional composers; and TOTAL denotes the sum of all types of composers.

Section 2: The economic profile of composers.

In this section we investigate the labour market characteristics of creative musicians. We are interested in, the determinants behind their decision to become a creative musician, their reservation wage, the factors that stimulate their creative activity, how they acquired the skills necessary for this career and their attitude to government intervention in the music industry.

Question 1, table 3.1, sorts the respondents into composer categories. Of the sample of 248, 73.4 per cent (182) are chart-based composers, 12.1 per cent (30) are non-chart traditional composers, 5.3 per cent (13) write serious classical, 6.1 per cent (15) are commissioned composers, and 3.2 per cent (8) fall into the 'other' category. Five of the 'commissioned' cohort are also classical composers. Composers in the 'other' category include church music, theatre music, cabaret and black economy. Only the 'chart-based' and 'non-chart traditional' categories are statistically significant with 182 and 30 observations respectively. Reference to response rates is mainly confined to statistically significant sample groups. Therefore, most of the observations are related to 'chart-based' and 'total' samples.

Question 2, table 3.2 asks composers whether or not they perform their own compositions.

Since the 1960s it has become characteristic for chart-based bands to compose their own tunes. The data confirms that this state of affairs still persists: 91.8 per cent (166) of composers in the chart-based category perform their own tunes. This is also true for the non-chart traditional composers where 93.3 per cent (28) perform their own compositions.

Table 3.1: Question 1

What is the main type of music you write? (Rounded %'s)

	#	%
Serious classical	13	5.3
Album/singles chart based music e.g. rock, rap, pop, etc.	182	73.4
Commissioned and/or jingles	15	6.1
Non-chart trad. (including arrangements)	30	12.1
Other	8	3.2
TOTAL	248	100

The remaining sectors of composers, by nature, do not necessarily perform their own compositions and the data confirms this (although the sample size is insignificant for these cohorts): 33.3 per cent (5) of commissioned composers, 33.1 per cent (3) of classical composers and 62.5 per cent (5) of 'other' composers perform their own tunes. Of the total sample 83.5 per cent (207) of composers perform their own music.

In question 5, table 3.3 and 3.4, we focus on the decision to become a composer. In this question we offer the choice of many non-economic factors that may have stimulated their entry to the music industry. The results are presented in table 3.3: question 5 and table

Table 3.2: Question 4

Do you perform your own tunes?

	Yes #	Yes %
Serious classical	3	33.1
Album/singles chart-based music e.g. rock, rap, pop etc.	166	91.8
Commissioned	5	33.3
Non-chart trad. (including arrangement)	28	93.3
Other	5	62.5
TOTAL	207	83.5

3.4: question 5. It is clear that the decision to select this career is mainly stimulated by non-economic factors. When asked to identify the factors encouraging one to become a composer, only 33 per cent (60) of the charts group, 27 per cent (8) of the non-chart traditional category and 32 per cent (79) of the total sample claimed that 'income/wealth from composing songs' was among the influential factors. Only 4 per cent (8), 10 per cent (3) and 5 per cent (12) of these respective groupings identified this factor as the most important factor determining their career choice.

Table 3.3: Question 5

Which of the following were influential in encouraging you to become a composer? (Rounded %'s)

	CHARTS	TRAD	TOTAL
A	8	27	9
B	80	83	79
C	25	23	23
D	52	33	51
E	33	27	32
F	76	70	72
G	4	7	4
N/A	1	0	1
# OBS	182	30	248

(A) You like the social scene in the music business.
(B) Enjoy being creative.
(C) Hope of fame.
(D) "I have an urge to compose music/composing is in my blood."
(E) Income /wealth from composing songs.
(F) Enjoy music.
(G) Other reason(s).

Among the non-economic factors, the data tell us that individuals become composers mainly due to the utility they get from creating music rather than enjoying the life-style associated with the music industry. The 'enjoyment of being creative' was identified as

Table 3.4: Question 5

Which of the following was the most influential factor in encouraging you to become a composer? (Rounded %'s)

	CHARTS	TRAD	TOTAL
A	1	0	0
B	26	27	28
C	3	0	2
D	25	23	28
E	4	10	5
F	27	27	24
G	2	7	2
N/A	13	7	11
# OBS	181	30	246

(A) You like the social scene in the music business.
(B) Income/Wealth from composing songs.
(C) Enjoy being creative.
(D) Enjoy music.
(E) Hope of fame.
(F) "I have an urge to compose music/composing is in my blood."
(G) Other reason(s).

an important factor by 80 per cent (146), 83 per cent (25) and 79 per cent (196) of the charts, 'non-chart traditional' and total sample respectively. However, this was only a secondary influence as only 3 per cent (5), 0 per cent (0) and 2 per cent (6) of the same

respective groups identified this as the most important factor. The two primary factors were 'enjoying music' and being 'born composers': 72 per cent (178) of the sample identified the latter as an influential factor, with 24 per cent (58) identifying it as the most important factor. Similarly, 51 per cent (126) of the sample identified 'composing is in my blood' as an important factor and 28 per cent (68) claimed it was the most important factor.

Enjoying the 'social scene' and 'love of fame' are the two main fringe benefits of working in the music industry. However, only 8 per cent (14) of the 'charts' category, 27 per cent (8) of the 'non-chart traditional' group and 9 per cent of the total sample identified 'enjoying the social scene' as a stimulus to becoming a composer. Only 1 per cent (1), 0 per cent (0) and 1 per cent (1) of the same respective groups identified it as the most important factor. The same respective proportions for the 'hope of fame' factor were 25 per cent (45), 23 per cent (7) and 23 per cent (58) of identified factors and 3 per cent (5), 0 per cent (0) and 2 per cent (6) of most important factors.

Question 7 of the questionnaire examines the labour supply behaviour of composers. It is divided into four parts. The first part asks composers to indicate their reservation wage for music composition. The second part of the question requests composers to indicate if they are earning more or less than their reservation wage. The question then sub-divides and those who have indicated that their current income is less than their reservation wage are requested to identify how they generate supplemental income.

Table 3.5: Question 7

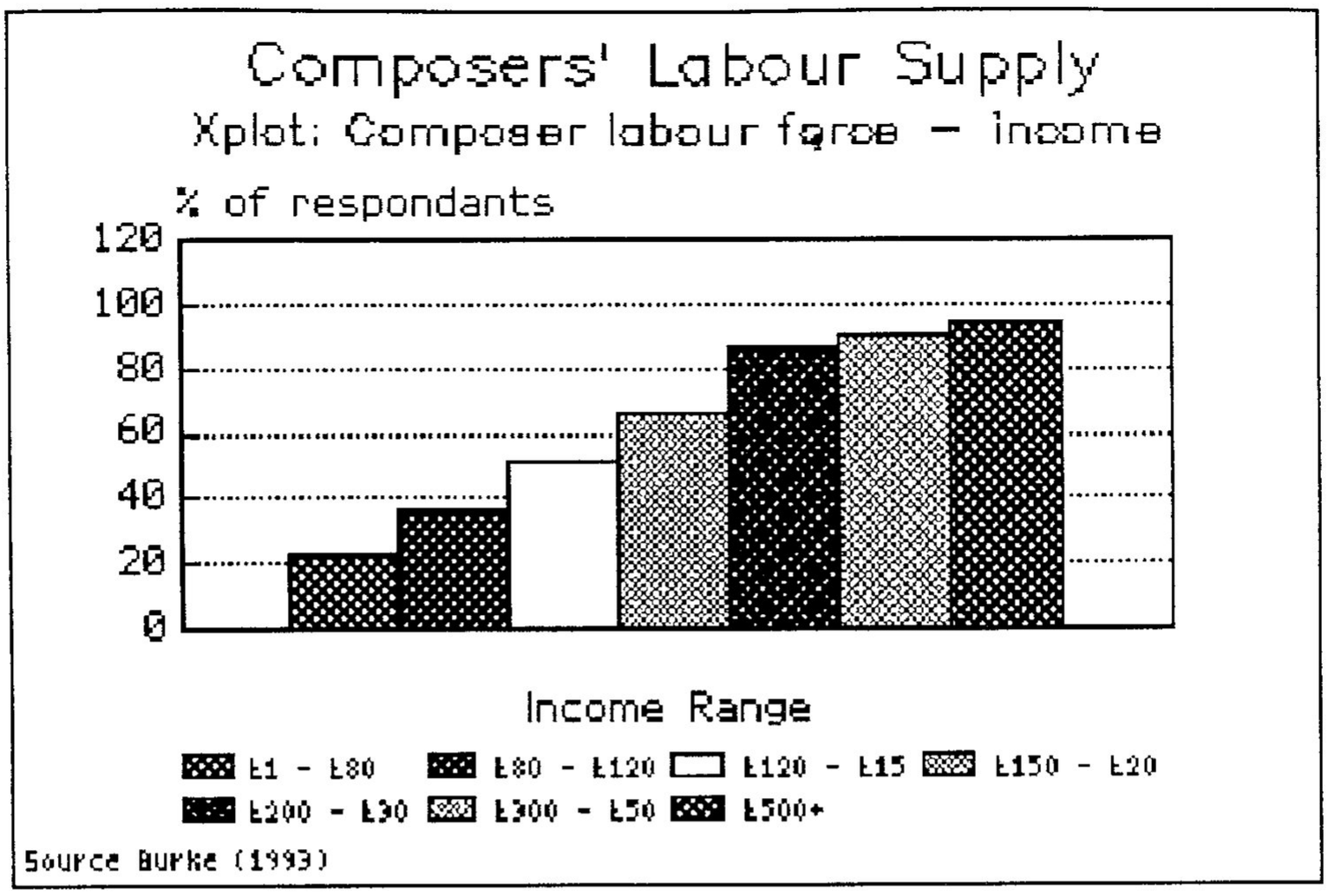
On average what is the minimum weekly net (after deducting tax) income you require to stay in the music business over the next year? (Rounded %'s)

	CHARTS	TRAD	TOTAL
A	23	27	25
B	14	13	14
C	14	7	12
D	15	13	14
E	20	20	19
F	5	10	6
G	3	3	4
N/A	6	7	8
# OBS	182	30	248

(A) Between £1 and £80 per week.
(B) Between £80 and £120 per week.
(C) Between £120 and £150 per week.
(D) Between £150 and £200 per week.
(E) Between £200 and £300 per week.
(F) Between £300 and £500 per week.
(G) Greater than £500 per week.

The data derived from the first part of question 7 is contained in table 3.5: question 7 and is portrayed for charts composers in figure 3.1. The figure portrays a conventional bow-shaped labour supply schedule. The data shows the supply of composers was predominately income elastic up to a net of tax weekly income of IR£150, roughly unit

Figure 3.1



income elastic between a net of tax weekly income of between IR£150 and IR£200 and income inelastic above a net of tax weekly income of £200. It is clear from the data that a significant proportion of composers were willing to remain in the profession in return for a relatively low income. In 1992, the average, net of tax, weekly wage was £176 and yet a quarter of the total sample and just short of a quarter of the charts group were willing to stay in the profession for a net of tax weekly income of up to IR£80 or less. In both groups, 51 per cent of the total supply of composers were willing to stay in the profession for a net of tax income of up to IR£150 or less. Also 86 per cent of the chart group and 84 per cent of the total sample indicated that they would stay in the profession for an income of up to IR£300 or less.

Table 3.6: Question 7

On average is the income you make from royalties and live performances of your music greater or less than your minimum requirement? (Rounded %'s)

	CHARTS	TRAD	TOTAL
GREATER	14	13	13
LESS	82	80	81
N/A	4	7	6
# OBS	182	30	248

However, few composers claim to earn their reservation income from composing and performing music. In table 3.6: question 7 it is evident that 82 per cent (149) of the charts group, 80 per cent (24) of the non-chart traditional category and 81 per cent (201) of the total sample claimed to have made less income from performance and composing than they required to remain in the profession.

In table 3.7: question 7 and table 3.8: question 7 we can see how these individuals made up the shortfall in income in order to continue as composers. The most important source of supplemental income is Social Welfare, i.e. claiming Unemployment Benefit or Assistance. Some 30 per cent (44) of the 'charts' group and 26 per cent of the total sample claimed that it was a source of supplemental income a further 19 per cent (29) and 17 per cent (34) of these respective groups claimed it was their most important source of supplemental income.

Two points arise from these findings. Firstly, Social Welfare appears to be a less important source of supplemental income in non-chart music categories. This may be due to the fact that these groups are more highly skilled musicians and hence, have greater opportunities to teach music. This point is supported to the extent that higher proportions in the non-chart categories state teaching was an important source of supplemental income. Secondly, the amount of composers actually collecting Unemployment Benefit or Assistance, is probably understated in the data due to the fact that this activity is illegal. Although the questionnaire survey is anonymous, it was clear to respondents that the results were to be used for economic analysis which might stimulate policy recommendations.

It is evident from the data that most composers earn their supplemental income in employment within the music industry. The most important of these activities is performing cabaret (of 'well known other artists' compositions'): 24 per cent (36) of the charts group and 22 per cent (44) of the total sample, claimed this was one of their sources of supplementary income (8 per cent and 7 per cent of the same respective categories claimed it was their most important source of income). Outside of cabaret, the data tell us that composers are involved in a wide array of activities within the music industry and that these forms of employment are fairly evenly distributed.

Although most composers earn supplementary income within the music industry, a significant proportion also earn income in non-music industry occupations.

Table 3.7: Question 7

If royalties and live performances income are less than the minimum you require, which of the following help you make up the shortfall? (Rounded %'s)

	CHARTS	TRAD	TOTAL
A	24	21	22
B	14	33	19
C	11	8	11
D	9	4	9
E	18	29	19
F	30	8	26
G	21	21	19
H	14	29	16
I	15	4	14
J	5	8	5
K	7	4	7
L	4	8	7
M	11	4	11
N/A	0	0	0
# OBS	149	24	201

(A) Cabaret performance of well known other artists' compositions.
(B) Teaching music.
(C) Sound production.
(D) Music publishing.
(E) Record production.
(F) Social welfare.
(G) White collar/clerical employment outside of the music industry.
(H) Trade or manual employment outside of the music industry.
(I) Financial support from a patron/friend/family.
(J) Session musician.
(K) Recording engineer.
(L) Music director.
(M) Other (please specify).

Table 3.8: Question 7

Of your supplemental sources of income, which is the main source? (Rounded %'s)

	CHARTS	TRAD	TOTAL
A	8	4	7
B	2	17	6
C	3	8	3
D	1	4	1
E	4	4	4
F	19	4	17
G	18	17	16
H	10	29	11
I	7	0	5
J	1	4	1
K	1	0	1
L	1	0	2
M	9	4	8
N/A	17	4	16
# OBS	149	24	201

(A) Cabaret performance of well known other artists' compositions.
(B) Teaching music.
(C) Sound production.
(D) Music publishing.
(E) Record production.
(F) Social welfare.
(G) White collar/clerical employment outside of the music industry.
(H) Trade or manual employment outside of the music industry.
(I) Financial support from a patron/friend/family.
(J) Session musician.
(K) Recording engineer.
(L) Music director.
(M) Other (please specify).

Some 19 per cent (39) earn income through white collar employment and 16 per cent (32) receive income through manual labour. Most individuals in these forms of employment identify it as their most important source of supplementary income: 16 per cent (33) for white collar and 11 per cent (23) for manual labour.

Question 8 seeks to investigate how an increase in the demand for new music may affect the amount of music produced. The results are presented in table 3.9: question 8 and table 3.10: question 8. The most important factor appeared to be an active interest in the composer's music by a publisher. Some 60 per cent (110) of respondents identified this factor in the charts group and 59 per cent (146) of the total sample did the same. This shows a high degree of income elasticity of tune innovation supply stimulated by an increase in the expected income derived from such activity. Greater broadcasting exposure also appears to be an important factor with 50 per cent of both the charts group and the total sample claiming that this would stimulate more compositions. This is further reflected in the results of question 9 where a significant proportion of composers felt that the imposition of 'national artist airplay quotas' would stimulate the music industry.

Commissions by radio and television were found to be a far more important stimulant to music composition in the non-chart categories than in chart based music. This may reflect the differences in the market for tunes between these groupings. Tax incentives to musicians and music royalty rates appeared to be reasonably important. Just under a third of each group claimed that they would stimulate more tune innovation. These findings are

Table 3.9: Question 8

Which, if any, of the following factors would motivate you to write more music? (Rounded %'s)

	CHARTS	TRAD	TOTAL
A	60	53	59
B	39	67	47
C	50	53	50
D	30	30	30
E	29	20	26
N/A	8	7	7
# OBS	182	30	248

(A) An active interest in your music by a publisher.
(B) Specific commissions by radio or television.
(C) Greater broadcasting exposure to your type of music.
(D) A rise in music royalty rates.
(E) Tax incentives such as those currently available in Ireland for artists and composers.

further supported by the policy recommendations put forward in question 9. Overall, the first part of question 8 demonstrates that an increase in the expected income from composing new music would increase the amount of new music written by existing musicians.

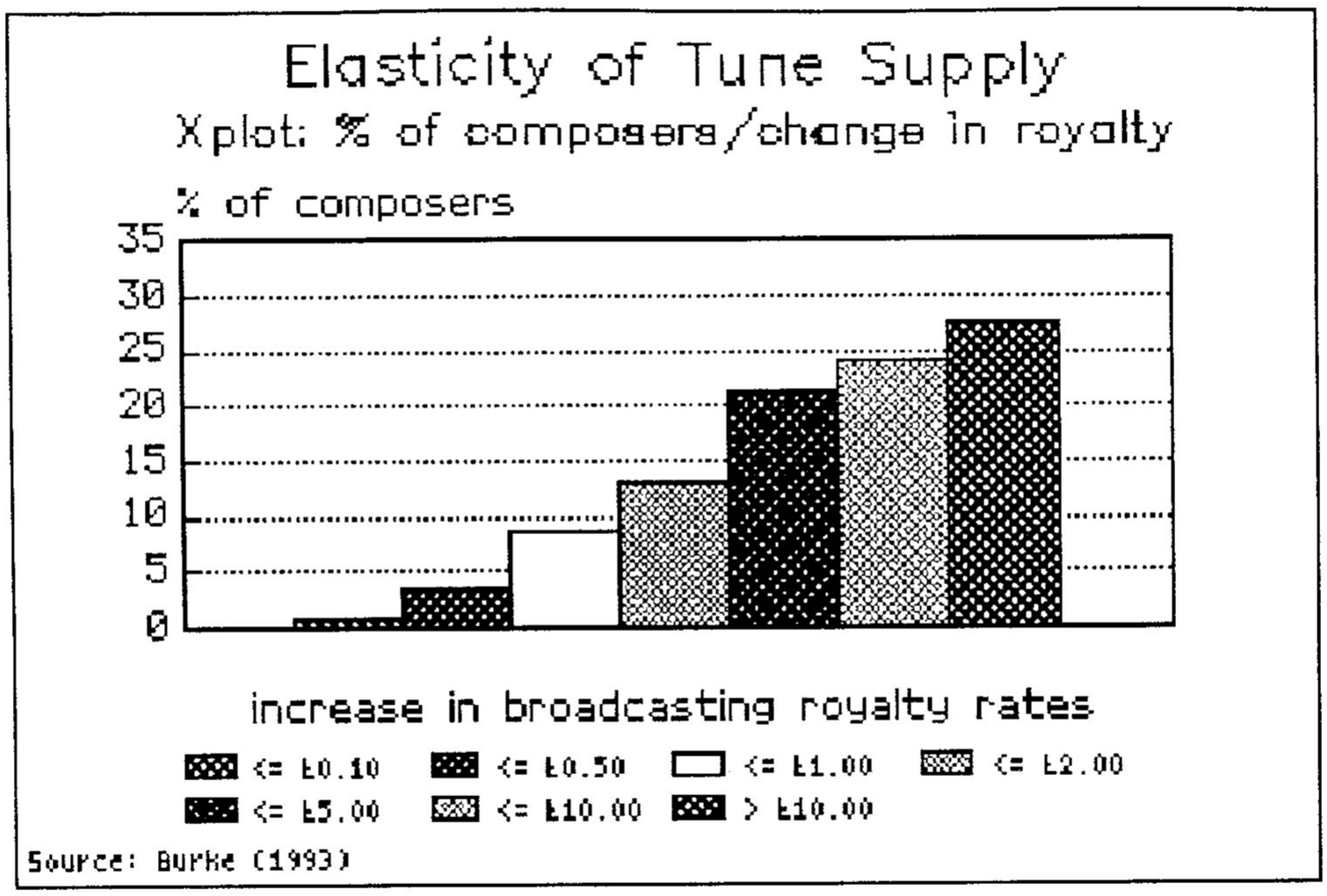
Table 3.10: Question 8

If a rise in royalties was among your answers above, how much would they need to be raised in order to stimulate you to write more music? (Rounded %'s)

	CHARTS	TRAD	TOTAL
A	4	0	3
B	9	11	9
C	15	11	15
D	11	44	16
E	33	11	28
F	7	11	9
G	13	11	12
N/A	9	0	7
# OBS	55	9	74

(A) By at least ten pence per airplay.
(B) By at least fifty pence per airplay.
(C) By at least one pound per airplay.
(D) By at least two pounds per airplay.
(E) By at least five pounds per airplay.
(F) By at least ten pounds per airplay.
(G) By more than ten pounds per airplay.

Figure 3.2



The second part of question 8 takes a closer look at the effect of composer royalty rates payable for the broadcast of a tune, on the supply of new tunes. This question is only applicable to those composers who claimed that a rise in royalty rates would incite them to write more music. The results are presented in table 3.10: question 8. Figure 3.2 illustrates a supply schedule of the percentage of composers who would write more music if broadcast royalties were increased. This is derived by multiplying the cumulative percentages in table 3.10: question 8 by 0.3. The maximum number of composers who would respond to an increase in broadcasting royalties by writing more music is 30 per cent. The bulk of this response (i.e. 71 per cent of it), could be generated by raising broadcasting royalties by £5. This would cause 21.3 per cent of composers to write more

music. The elasticity of new music supply in relation to broadcasting royalty rates is greatest between a range of royalty increases of IR £0.50 and IR £5. Above and below this region, very little new music is generated.

In question 10, we set out to examine factors that might cause composers to abandon particular compositions. The replies are listed in table 3.11: question 10 and table 3.12: question 10. The results indicate that although commercial considerations impinge on the decision to terminate the creation of a tune, composers are mainly guided by their own personal music tastes in the type of music written. The composers who abandoned a tune because it was not 'developing to their personal taste' amounted to 73 per cent (133) of the charts category, 53 per cent (16) of the non-chart traditional group and 70 per cent (173) of the total sample. Of the same groups respectively 53 per cent (91), 44 per cent (11) and 52 per cent (120) claimed it was the most important factor. 'The tune did not seem to have commercial potential' was found to be important by 19 per cent (48) of composers, with only 8 per cent (19) identifying it as the most important factor. Opportunity cost also featured as an important factor with 'became inspired by a better tune' and 'due to other commitments, did not have time to continue', being respectively cited by 39 per cent (96) and 24 per cent (59) of the total sample.

A common view in the industry is that types of music occur in waves e.g. rave/house, punk, disco etc. Due to consumers' love of variety and tendencies to become satiated by the same type of music, it is possible that the demand for music may stimulate such

Table 3.11: Question 10

If you have ever abandoned writing a particular song/tune, which of the following influenced your decision not to continue working on it? (Rounded %'s)

	CHARTS	TRAD	TOTAL
A	43	20	39
B	21	13	19
C	73	53	70
D	23	30	24
E	13	0	10
F	15	17	14
G	13	3	11
H	4	3	4
N/A	5	17	8
# OBS	182	30	248

(A) You became inspired by an alternative better tune/song.
(B) The tune did not seem to have commercial potential.
(C) The tune was not developing to your personal satisfaction.
(D) Due to other commitments, you did not have the time to continue working on the tune.
(E) You have a tendency to start but never finish things.
(F) You received a negative response from others.
(G) Failure of collaboration in song writing with others.
(H) Other reason(s).

Table 3.12: Question 10

Which of the following factors was the most influential in your decision to abandon writing a song? (Rounded %'s)

	CHARTS	TRAD	TOTAL
A	15	12	14
B	10	0	8
C	53	44	52
D	6	28	9
E	2	0	2
F	0	8	1
G	4	0	3
H	2	4	2
N/A	7	4	7
# OBS	173	25	229

(A) You became inspired by an alternative better tune/song.
(B) The tune did not seem to have commercial potential.
(C) The tune was not developing to your personal satisfaction.
(D) Due to other commitments, you did not have the time to continue working on the tune.
(E) You have a tendency to start but never finish things.
(F) You received a negative response from others.
(G) Failure of collaboration in song writing with others.
(H) Other reason(s).

waves. Thus composers in this framework will be split into Schultzian style imitators and Schumpeterian innovators. The imitators write music which is currently in vogue or at an early diffusion stage. Innovators, on the other hand, seek to create a new wave by writing tunes not currently fashionable. This is examined in question 11 and the replies are listed in table 3.13: question 11. The table shows that just over 10 per cent of composers are not influenced by waves. The remaining cohort are divided almost evenly between innovators, 44 per cent (110) and imitators, 43 per cent (106).

Table 3.13: Question 11

Are you more or less likely to write music that is currently, or becoming, popular among record buyers/live audiences? (Rounded %'s)

	CHARTS	TRAD	TOTAL
MORE	52	27	43
LESS	36	67	44
N/A	13	7	13
# OBS	182	30	248

It appears that most of the imitators are concentrated in the 'charts' group which is made up of 52 per cent (94) imitators versus 36 per cent (65) innovators. This balance is reversed in all other sectors of the industry which have a higher proportion of innovators.

Questions 12 and 13 examine the acquisition of skills necessary for a career as a composer. We are interested to know if these were acquired via a 'learning by doing' process so that some of the growth of the music industry may be described as endogenous. We are also interested to ascertain whether initial decisions to acquire relevant human capital, were conscious economic decisions. Question 12 asks composers how they learnt to *play* music and the replies are presented in tables 3.14, 3.15 and 3.16: question 12. From the latter table, it is evident that most composers consciously decided to acquire human capital, as 45 per cent (111) claimed that they consciously chose to learn music. Roughly a third (33 per cent) of the sample acquired the skills in a random manner.

It is obvious from the results that formal education plays an almost negligible role in developing human capital among composers of the total sample. Only 14 per cent (35) and 10 per cent (25) claimed respectively that school and university education contributed to their ability to play music. These figures are much lower when we consider charts composers alone, namely 8 per cent (14) and 3 per cent (6) respectively. When we move onto 'most beneficial' (table 3.15: question 12) means of learning music state education becomes insignificant. Primary/secondary education is identified by only 1 per cent (1) of charts, 3 per cent (1) of non-chart traditional composers, and 2 per cent (5) of the total sample. University education fairs even worse. None of the 'charts' composers, 3 per cent of the non-chart traditional composers and 2 per cent (6) of the total sample identify it as the most important factor. Private lessons easily outperform state education being

Table 3.14: Question 12

How did you learn to PLAY music? (Rounded %'s)

	CHARTS	TRAD	TOTAL
A	8	27	14
B	3	20	10
C	31	47	40
D	20	30	22
E	86	67	77
F	7	23	11
G	68	53	59
H	0	0	0
N/A	3	0	2
# OBS	182	30	248

(A) Secondary/primary school education.
(B) University education.
(C) Private lessons.
(D) Friends/family.
(E) Self-taught.
(F) Music-related work experience.
(G) Through playing in bands.
(H) Other (please specify).

Table 3.15: Question 12

Of the ways in which you learned to PLAY music, which was the most beneficial? (Rounded %'s)

	CHARTS	TRAD	TOTAL
A	1	3	2
B	0	3	2
C	8	17	13
D	6	10	6
E	34	30	32
F	2	3	3
G	40	17	32
H	0	0	0
N/A	8	17	10
# OBS	177	30	242

(A) Secondary/primary school education.
(B) University education.
(C) Private lessons.
(D) Friends/family.
(E) Self-taught.
(F) Music-related work experience.
(G) Through playing in bands.
(H) Other (please specify).

Table 3.16: Question 12

Did you choose to learn to PLAY music in the way that you did or was it accidental? (Rounded %'s)

	CHARTS	TRAD	TOTAL
CHOSE	43	50	45
ACCIDENT	35	30	33
N/A	23	20	22
# OBS	182	30	248

identified by 40 per cent of composers as a source of education and 13 per cent claimed it was the most beneficial mode of learning to play music. These findings seem to imply that if government policy seeks to stimulate the music industry by putting more resources into music education, then the nature of this education needs to be changed radically. In a nutshell, this survey underlies the point that composers almost unanimously believe that the Irish education system has contributed very little to the music industry.

Question 13 asks the composers how they learned to *write* new music. The results are presented in tables 3.17, 3.18, and 3.19: question 13. The data identifies 'self-taught' as the main method of learning, with 67 per cent (165) identifying it as an important factor and 50 per cent (110) as the most important factor. The technical skills involved in writing music are acquired elsewhere. The data shows that this is often through a learning

by doing process with 'through playing in bands' identified as the second most important factor. Also 34 per cent (84) identified it as an important factor and 16 per cent (33) claimed it was the most beneficial mode of learning how to write music. As in question

Table 3.17: Question 13

How did you learn to WRITE music? (Rounded %'s)

	CHARTS	TRAD	TOTAL
A	5	17	9
B	3	17	9
C	16	23	21
D	4	7	6
E	71	60	67
F	6	23	11
G	40	27	34
H	1	0	1
N/A	15	3	12
# OBS	182	30	248

(A) Secondary/primary school education.
(B) University education.
(C) Private lessons.
(D) Friends/family.
(E) Self-taught.
(F) Music-related work experience.
(G) Through playing in bands.
(H) Other (please specify).

Table 3.18: Question 13

Of the ways in which you learned to WRITE music, which was the most beneficial? (Rounded %'s)

	CHARTS	TRAD	TOTAL
A	3	7	5
B	1	7	4
C	8	17	11
D	1	3	2
E	54	48	50
F	3	10	4
G	22	0	16
H	1	0	1
N/A	8	7	9
# OBS	155	29	219

(A) Secondary/primary school education.
(B) University education.
(C) Private lessons.
(D) Friends/family.
(E) Self-taught.
(F) Music-related work experience.
(G) Through playing in bands.
(H) Other (please specify).

Table 3.19: Question 13

Did you choose to learn to WRITE music in the way that you did or was it accidental? (Rounded %'s)

	CHARTS	TRAD	TOTAL
CHOSE	37	47	40
ACCIDENT	30	30	30
N/A	33	23	30
# OBS	182	30	248

12, state education proved to be fairly ineffectual in developing these skills and is easily outperformed by private-lessons.

Questions 14 examines the extent to which geographical location is important in the diffusion of musical styles. The response from composers, listed in tables 3.20 and 3.21: question 14, indicate that global communications have grown to an extent where a vibrant local industry is no longer necessary to stimulate an interest in music. While Irish bands were found to significantly influence composers, international acts were identified as being more important in this role. Some 22 per cent (50) and 34 per cent (77) of composers claimed that U.K. and non-U.K. international acts respectively encouraged them most, while 57 per cent (141) and 71 per cent (177) identified these same respective groups as important influences.

Table 3.20: Question 14

Of the bands/artists that influenced you, which of the following describes their origin? (Rounded %'s)

	CHARTS	TRAD	TOTAL
A	36	57	37
B	41	70	41
C	65	30	57
D	75	53	71
N/A	8	0	8
# OBS	180	27	244

(A) From your home town/city.
(B) From another Irish town/city.
(C) From the U.K.
(D) Non-U.K. International musicians/artists/bands.

Question 15 looks at the importance of role models in stimulating the supply of composers. The replies to question 15 are presented in table 3.22: question 15. The results show that roughly half of the composers were 'inspired' or 'given confidence' to enter the music industry by an individual similar in background to themselves. Question 16 is concerned with composers' attitudes to risk. In the first part of question 16, the composer is asked 'if the income/wealth of either your family, friends or acquaintances increased, would this cause you to revise upwards the amount of income/wealth you

Table 3.21: Question 14

Bands/artists from which origin encouraged you the most? (Rounded %'s)

	CHARTS	TRAD	TOTAL
A	12	23	15
B	9	37	11
C	26	10	22
D	35	17	34
E	2	0	3
N/A	17	13	15
# OBS	168	30	229

(A) From your home town/city.
(B) From another Irish town/city.
(C) From the U.K.
(D) Non-U.K. International musicians/artists/bands.
(E) Other (please specify).

Table 3.22: Question 15

Was there anybody, similar in background to yourself, who inspired you or gave you confidence to enter the music industry? (Rounded %'s)

	CHARTS	TRAD	TOTAL
YES	51	47	49
NO	42	53	44
N/A	7	0	6
# OBS	182	30	248

aim to make ?'. The replies are contained in table 3.23: question 16. Roughly a third of the sample claimed that they would raise their target wealth/income if the income of their peers increased. This amounted to 36 per cent (65) of the charts group, 33 per cent (10) of the non-chart traditional category and 32 per cent (80) of the total sample. This result implies that roughly a third of individuals wealth/income aspirations are interdependent on that of their peers.

The second part of question 16 asked those who answered 'yes' to the first part of question 16, why their wealth/income aspirations are interdependent. The replies are contained in table 3.24: question 16. 'Self-pride' proved to be the most widely cited reason for interdependent wealth/income aspirations, with 48 per cent (31) of the 'charts' group, and 50 per cent (40) of the total sample identifying it as an influential factor. We also found that just under half of these individuals have interdependent leisure and

Table 3.23: Question 16

If the income of your family or friends increased, would you revise upwards the amount of income you aim to make? (Rounded %'s)

	CHARTS	TRAD	TOTAL
YES	36	33	32
NO	57	67	61
N/A	8	0	7
# OBS	182	30	248

consumption habits. These require comparable income/wealth with individuals in the same leisure/consumer acquaintance group. A total of 38 per cent (25) of the 'charts' group and 43 per cent (50) of the total sample identified this factor. Evidence of 'raising the individual's estimate of income earning potential' was also uncovered with 38 per cent (25) of the 'charts' group and 41 per cent (33) of the total sample claiming that they would be stimulated by the belief that 'if they can achieve higher incomes by being more dynamic then so can I'. Inflation also proved to be an important factor, with 36 per cent of the sample claiming that they would view an increase in their peers' income/wealth as an indication that consumer prices were due to rise. Only 15 per cent (12) of respondents claimed that jealousy was a factor.

Table 3.24: Question 16

If you would revise your desired income level upwards, which of the following would be influential in causing this revision? (Rounded %'s)

	CHARTS	TRAD	TOTAL
A	48	50	50
B	38	60	43
C	15	20	15
D	38	40	41
E	34	40	36
F	6	0	5
N/A	6	0	5
# OBS	65	10	80

(A) Self-pride.
(B) The desire to be able to participate in leisure and consumer activities which these higher incomes will allow your friends to pursue.
(C) Jealousy.
(D) A belief that "If they can achieve higher incomes by being more dynamic so can I".
(E) You expect consumer prices to rise.
(F) Other reason(s) (please specify).

In the last part of question 16 we ask composers if they would be willing to take on more risk if they happened to raise their wealth aspirations. The results are presented in table 3.25: question 16. A total of 40 per cent (100) of respondents 'did not know', 21 per cent (52) 'would not be willing to take on more risk' and 39 per cent (96) claimed that they would be willing.

Table 3.25: Question 16

If you did upwardly revise your income goals, would you then be willing to take on more risky employment/self-employment to achieve this goal? (Rounded %'s)

	CHARTS	TRAD	TOTAL
YES	40	47	39
NO	20	23	21
N/A	40	30	40
# OBS	182	30	248

The results of question 16, may indicate that there is an endogenous growth component to the music industry. This arises as an increase in the wealth of some individuals will cause a proportion of other individuals to raise their target wealth, thereby reducing risk aversion and increasing the willingness to undertake risky entrepreneurial endeavours.

Table 3.26: Question 9

Do you believe that government policy could help stimulate the music industry? (Rounded %'s)

	CHARTS	TRAD	TOTAL
YES	78	77	77
NO	19	23	19
N/A	3	0	4
# OBS	182	30	248

In question 9, we investigate composers views concerning scope for government intervention in the music industry. The first part of the question asks composers whether they actually believe government intervention could be helpful. In general, we find that just under 80 per cent of composers have faith in the potential of government policy. We can see this in table 3.26: question 9 where 78 per cent (142) of the charts group, 77 per cent (23) of the non-charts traditional category and 77 per cent (191) of the total sample have confidence in the potential of government policy.

The second part of question 9 asks the proportion of composers who are optimistic about the scope for government policy to outline any ideas they might have in this jurisdiction. Many of the respondents did not reply to this section and a taxonomy of such heterogeneous proposals proved difficult. However, the broad findings, (in order of

popularity), are listed in appendix 2.2. A major theme among these proposals is that the music industry should be treated in the same manner as other commercial industries.

Finally, in order to tease out the key differences in the determinant of career choice, we estimated a multinominal logit of composer genres. This involved transforming the data into discrete form. Each option in the questionnaire was defined as a variable and was assigned the value '1' if it was 'ticked' by a respondent. The value '0' was awarded to 'unticked' boxes. There were three exceptions to this procedure. Firstly, for the multinominal logit a dependent variable was created with the following values: '1' if a classical composer, '2' if a jingles composer, '3' if a commissioned composer,' 4' if a charts composer, '5' if a traditional music composer and '6' if the composer was not in any of these categories. Secondly, a variable was created from question 6 indicating the number of years in which the respondent had been a professional composer. The actual number of years assigned was the average income within each income range. For the 'greater than 15 years' category the value '20' was assigned. Further, in cases where two adjacent income ranges were ticked the intersection value was chosen. Thirdly, the reservation income of composers was defined from question 7 in exactly the same fashion as 'number of years as a professional composer' was evaluated from question 6.

The aim of the multinomial logit was to attempt to ascertain whether the economic characteristics of charts composers were significantly different from those of other composer groups. Thus, charts composers where taken as the comparison group in the

Table 3.27

Multinomial Logit: Charts based composers is the comparison group.

	Classical	Jingles	Commis	Trad	Other
Variables:					
Own Record Company	0.125 (0.08)	-23.06 (0.00)	0.431 (0.57)	0.370 (0.67)	0.399 (0.43)
Reservation Income	0.006 (1.18)	0.220 (0.02)	0.006 (3.17)*	0.002 (1.40)	-0.010 (-1.56)
Unemployed	-39.37 (-0.00)	95.57 (0.02)	-1.226 (-1.05)	-1.31 (-1.6)	-1.234 (-1.00)
Role Model	-42.30 (-0.00)	1.106 (0.61)	0.345 (0.45)	-0.048 (-0.09)	2.216 (1.86)***
Music Trend Imitator	-1.16 (0.68)	94.48 (0.02)	-0.926 (-1.26)	-1.195 (-2.14)**	-1.996 (-1.92)***
University	5.928 (3.04)*	77.38 (0.00)	1.904 (1.61)	1.750 (1.73)***	2.813 (2.24)**
Constant	-4.283 (2.28)**	-246.1 (0.00)	-3.421 (-3.69)	-1.460 (-2.66)*	-2.438 (-2.00)**

CHI 2 ( ) = 72.41*
OBS = 142

* = significant at 1% level, ** = significant at the 5% level and
*** = significant at the 10% level.

estimation procedure. The results are reported in table 3.27. These results indicate that economic characteristics do not appear to differ greatly between charts composers and other composer groups. For each instance, there is no statistically significant difference in the tendency of each composer group to set up their own record company. This may imply that there is significant heterogeneity within the characteristics of each respective group. Similarly, there does not seem to be any statistical difference in the probability of a composer within any particular group being unemployed. The only possible case is the negative coefficient on the unemployment variable of the traditional composers which is just below the 90 per cent significance level. Table 3.8 reveals that this is due to traditional composers being proficient at securing employment outside the music industry.

Apart from composers of commercial music, charts composers do not appear to have different income aspirations to other forms of composers. This would tend to imply that relative income divergences between composer groups might lead to a flow of composers between musical sectors. The results from question 7 indicate that there does not appear to be a great disparity of actual income between composer groups as reservation incomes were similar and the proportions of composers who claimed that they were earning less than their reservation income were also similar. This pattern would tend to indicate income equalisation but without detailed information on the compatibility of artistic skills and labour flows, we cannot be sure that this is the causation.

It is somewhat surprising that the classical groups did not appear to be significantly

different to charts composers. Only in the sphere of university education is there a statistical difference. The 'traditional' musicians, like classical composers, were more likely to have a university education than a charts composer. However, this likelihood is less than that of a classical composer, with a smaller coefficient value. Traditional composers also were distinguished from charts composers to the extent that they were less likely to write music in a style that was currently becoming popular. This was also found to be the case with the 'other' miscellaneous composer groups.

The multinomial logit equation in table 3.27 was derived from a general to specific estimation procedure. The other economic variables deleted, due to insignificance, were interdependent wealth aspirations and pecuniary factors for both starting and terminating a particular music composition.

Section 3.3: New Record Company Formation:

Questions 3 and 4 deal with a composer's decision to release records. She may do this through her own record company or a company owned by a third party. Many artists are believed to initially release music on their own record label in order to secure a satisfactory record contract later on. As a result, the examination of this decision-making process necessitates the distinction between the composer's historical choice and future aspirations. For this reason, the composer is questioned on this issue on two occasions. question 3, refers to historical choices and question 4 relates to future plans. Since Questions 3 and 4 are so similar in content and structure, the questionnaire contains an

advance warning[5] of this characteristic so that the respondent will not neglect question 4. For most part, respondents understood the division between question 3 and question 4: all respondents answered question 3 while only 4 per cent chose not to answer question 4.

The responses to the first part of question 3 are presented in table 3.28: question 3. The vast majority of composers have released their compositions on pre-recorded audio software: 79 per cent (197) claimed to have released either an album or a single in the past. This is mainly concentrated in the chart and non-chart traditional categories with 86 per cent (156) and 90 per cent (27) claiming to have released an album or a single respectively. The small demand for new classical and commissioned tunes in the audio software market is reflected in their corresponding respective percentages, which the B.P.I. (1992) estimates to be 23 per cent and 40 per cent. The classical software market is severely competitive for new composers as they are often competing with existing compositions where property rights have expired. With this cost advantage, it is not surprising that record companies prefer to cater for the classical market through existing composers. Through price competition these releases are usually sold at sale/budget prices. In 1992 in the U.K., 43 per cent of all classical album sales revenue were made up of mid price/budget albums[6]. Given that in the same year only 9.2 per cent of total album sales units were made up of classical albums, the proportion of classical sales

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[5] "Please note: Question 3 and 4 are very similar in content: question 3 deals with past experience and question 4 is concerned with future plans. Please answer both questions."

[6] B.P.I. (1992): Market Information 26 Feb, No 22.

devoted to dead composers implies that there is a severely restricted demand in the album market for new classical composers.

Table 3.28: Question 3

Did you, in the past, release your (and, if applicable, your band's songs) in albums and/or singles? (Rounded %'s)

	CHARTS	TRAD	TOTAL
YES	86	90	79
NO	14	10	20
N/A	0	0	0
# OBS	182	30	248

Table 3.29: Question 3

If yes above, did you set up your own record company to release recordings of these songs? (Rounded %'s)

	CHARTS	TRAD	TOTAL
YES	39	30	37
NO	60	63	62
N/A	1	7	2
# OBS	156	27	197

Of those who had previously released an album and/or a single, 37 per cent (72) chose to do so by setting up their own record company. These results are presented in table 3.29: question 3. In the chart and non-chart traditional categories this figure is 39 per cent (61) and 30 per cent (8) respectively. Thus, most composers have in practice opted to sign record deals with established record companies rather than becoming self-employed. In order to investigate the reasoning behind these choices, we asked both types of respondents their reasons for choosing, or not choosing, to set up their own record company.

Table 3.30 and 3.31: question 3 contain the responses of those who chose to set up their own record company. Table 3.29 depicts the replies when interviewees are permitted to tick *all* influential factors. Table 3.30 gives the responses when respondents were asked to identify *the most important* factor. In both tables only the 'charts' and 'total groupings' are statistically significant. Differences in 'the estimation of the commercial value of the music composed' stands out as the major reason why composers often choose to set up their own record company: 75 per cent claimed it was among the reasons for setting up a record company and 46 per cent claimed it was the most important factor. We identified this factor in the model as $E(P_c^i) > E(P_j^i)$ which implies that creative musicians who thought that their artistic/entrepreneurial ability was undervalued by the corporate sector, opted for self-employment.

Table 3.30: Question 3

If you did set up your own company, which of the following were influential in encouraging this? (Rounded %'s)

	CHARTS	TRAD	TOTAL
A	80	50	76
B	38	25	36
C	30	0	26
D	34	13	32
E	59	38	57
F	75	63	74
G	20	25	21
N/A	0	0	0
# OBS	61	8	72

(A) More control over music.
(B) Higher artist royalties.
(C) Earn higher income (over and above artist royalties) if the records are hits.
(D) More flexible advertising and marketing.
(E) Prefer being independent/answerable to nobody/your own boss.
(F) Existing record companies are unwilling to take the risk involved in releasing your records - you feel they did not perceive the full commercial potential of your music.
(G) Other reason(s).

Table 3.31: Question 3

If you did set up your own company, which of the following was the most influential in encouraging this? (Rounded %'s)[4]

	CHARTS	TRAD	TOTAL
A	21	13	19
B	5	0	4
C	0	0	1
D	2	0	1
E	8	13	8
F	46	50	44
G	5	25	8
N/A	13	0	13
# OBS	61	8	72

(A) More control over music.
(B) Higher artist royalties.
(C) Earn higher income (over and above artist royalties) if the records are hits.
(D) More flexible advertising and marketing.
(E) Prefer being independent/answerable to nobody/your own boss.
(F) Existing record companies are unwilling to take the risk involved in releasing your records - you feel they did not perceive the full commercial potential of your music.
(G) Other reason(s).

The second most influential factor appeared to be 'more control over music': 80 per cent of respondents claimed that it was an influential factor encouraging record company start-up and 21 per cent claimed that it was the most important factor. In economic terms, this factor boils down to differences in opinion on how artistically and commercially the music should be managed. For composers to achieve the final album product they desired, many felt it necessary to set up their own record company.

Many studies of self-employed entrepreneurs argue that they are stimulated into self-employment by the desire to be 'independent/their own boss'. The data confirms that this is also true in the music industry: 59 per cent of composers who chose to set up their own company indicated that part of the stimulus came from a desire for independence. However, the data shows that this is not the primary driving force behind the decision to become self-employed as only 8 per cent of respondents claimed that independence was the most important factor.

We stated in the modelling that if the composer wanted to receive a larger share of her tunes' sales revenue, (over and above that offered by artist royalties), she could achieve this by setting up her own company. Indeed, 30 per cent of respondents claimed that the desire to earn income over and above that offered by potential royalty revenue was an incentive to set up a record company. However, none of the respondents cited this as the most important factor. Similarly, 38 per cent of respondents claimed that they were stimulated to set up their own record company by the opportunity to award themselves

higher artist royalties. In the case of the previous factor, this was not a primary influence as only 5 per cent of respondents claimed that this was the most important factor.

Some 34 per cent claimed that the ability to undertake 'more flexible advertising' was a stimulus in setting up their own record company. This, however, classifies as a secondary influence as only 2 per cent claimed it was the most important factor.

In summing up these results, it appears that the main stimuli for composers to start a record company are an underestimation of their artistic/entrepreneurial ability and how the use of their music ought to managed.

Table 3.32 and table 3.33: question 3 give the responses of those who did not to set up their own record company. Table 3.32 gives the responses where interviewees are permitted to tick *all* influential factors. Table 3.33 gives the responses when composers were asked to identify the *most important factor* that discouraged them from setting up their own record company. Only the 'charts' and 'total' categories are statistically significant. There is no overwhelming factor that accounts for the decision of these individuals not to set up their own record company. While some were restrained by lack of capital and relevant experience, others were attracted into the corporate sector through record company advances. Also many viewed record production and marketing to be best executed by large corporate enterprises. 'Unable to raise enough financial capital to set up a record company' was claimed to have been an influential deterrent among 50 per

cent (47) of the 'charts' group and 49 per cent (60) of the total sample. When enquiring whether this is the most influential factor, these percentages drop to 18 per cent (17) and 16 per cent (20) respectively. Thus capital availability appears to act as an active but not universal restraint on record company start-up.

The view that economies of scale exist in record production and marketing acted in many spheres as a stimulant for individuals to choose to release their records through the corporate sector. The following responses indicate this:

'Better management expertise in an established record company,' was cited by 37 per cent (35) of the charts group and 40 per cent (49) of the total sample as a deterrent to setting up one's own record company. Furthermore, 5 per cent (18) of the charts group and 7 per cent (16) of the total sample claimed that this was the most important factor.

'Major record companies have more marketing clout', was found to be important among 50 per cent (47) of the charts group and 48 per cent (59) of the total sample. A total of 11 per cent of both cohorts found this to the most important deterrent to setting up their own record company.

'Distribution of records is more efficiently executed by large established record companies', was cited as a deterring factor among 53 per cent (50) of the charts category and 58 per cent (71) of the total sample: A total of 16 per cent of both cohorts claimed

Table 3.32: Question 3

If you did not set up your own company, which of the following were influential in deterring you? (Rounded %'s)

	CHARTS	TRAD	TOTAL
A	50	59	49
B	37	65	40
C	50	47	48
D	23	35	27
E	53	88	58
F	32	35	32
G	12	24	13
H	36	59	38
I	2	29	7
J	5	6	6
N/A	0	0	1
# OBS	94	17	122

(A) Unable to raise enough financial capital to set-up a record company.
(B) Better management expertise in an established record company.
(C) Major record companies have more marketing clout.
(D) Unwilling to take the financial risk associated with releasing a record.
(E) Distribution of records is more efficiently executed by large established record companies.
(F) You do not have enough expertise to run a record company.
(G You do not have relevant education to set-up a record company.
(H) You were offered a financial incentive/advance by an established record label.
(I) Technical and artistic resources are superior in a major record label.
(J) Other reason(s).

Table 3.33: Question 3

If you did not set up your own company, which of the following was the most influential in deterring you? (Rounded %'s)

	CHARTS	TRAD	TOTAL
A	18	12	16
B	5	12	6
C	11	12	11
D	10	0	8
E	13	29	16
F	9	6	8
G	1	0	2
H	17	24	18
I	2	0	2
J	2	0	2
N/A	13	6	12
# OBS	94	17	122

(A) Unable to raise enough financial capital to set-up a record company.
(B) Better management expertise in an established record company.
(C) Major record companies have more marketing clout.
(D) Unwilling to take the financial risk associated with releasing a record.
(E) Distribution of records is more efficiently executed by large established record companies.
(F) You do not have enough expertise to run a record company.
(G) You do not have relevant education to set-up a record company.
(H) You were offered a financial incentive/advance by an established record label.
(I) Technical and artistic resources are superior in a major record label.
(J) Other reason(s).

it was the most influential factor.

'Technical and artistic resources are superior in a major record label' was identified as a deterring factor among 2 per cent (2) of the charts group and 7 per cent (8) of the total sample suggesting that this was not a significant element in the decision making process - only 2 per cent in both cohorts claimed that it was the most important factor.

Among 'information' factors, experience was found to be more important than education as deterrent from setting up one's own record company. A total of 32 per cent of both the 'charts' and 'total' cohorts cited experience as a significant factor and 9 per cent (8) of the charts group and 8 per cent (10) of the total sample found this to be the most important 'off-putting factor'. For education, these percentages are lower: only 12 per cent (11) of the charts group and 13 per cent (16) of the total sample claimed that lack of education discouraged them from setting up a record company. Only 1 per cent and 2 per cent of these cohorts respectively cited education as the most important factor.

Attitudes to risk played a significant, though not overwhelming, role in the decision not to set up one's own record company. Some 23 per cent (22) of the charts category and 27 per cent (33) of the total sample claimed to be 'unwilling to take financial risk associated with releasing a record'. Of those citing this as the most important factor, the percentages were respectively 10 per cent and 8 per cent.

Finally, an offer of an advance by a major record label was found to be an important factor in choosing the corporate sector by 36 per cent (34) of the charts group and 38 per cent (46) of the total sample. 17 per cent (16) and 18 per cent (22) of these groups respectively claimed that it was the most important factor.

We mentioned earlier, and have now found statistical evidence to suggest that some musicians may set up their own company on a short term basis until they secure a record contract from a major label. This was also supported by the fact that many composers who opted for the corporate sector, did so because they believed that major record labels exhibited economies of scale, to an extent that composers would maximise their income by licensing their music to record companies. To get a further insight into this issue, we asked composers whether they hoped to release records through their own company or through the corporate sector. This is undertaken in question 4 and contained in tables 3.34 to 3.39: question 4.

Apart from classical and commissioned composers, virtually all respondents claimed to aspire to release a record in the future: 94 per cent (171) of charts, 97 per cent (29) of non-chart traditional and 88 per cent (219) of the total sample claimed to hope to release a record in the future. Only 46 per cent (6) of classical and 53 per cent (8) of commissioned composers had the same aspirations; defining the differences in the nature of economic activity between these and the other sectors. These results are presented in 3.41:.question 4.

Table 3.34: Question 4

Do you, in the future, hope to release your (and, if applicable, your band's songs) in albums and/or singles? (Rounded %'s)

	CHARTS	TRAD	TOTAL
YES	94	97	88
NO	3	3	8
N/A	3	0	4
# OBS	182	30	248

Turning to table 3.35: question 4, it is apparent that most composers would hope to secure a record contract in the corporate sector: 64 per cent (110) in the charts category, 52 per cent (15) in the non-chart traditional grouping and 61 per cent (134) of the total sample, claimed that they did not intend to set up their own record company. These are virtually the same proportions as the replies given in question 3 when composers were asked what they had actually done in the past.

To test this inertia, we estimated a logit equation, iterating future plans to set up a record company or whether the composer had set up a company in the past. The results are portrayed in table 3.40. The coefficient is positive and highly significant, but the low pseudo R-squared gives an indication that there is significant volatility over time in the

Table 3.35: Question 4

If yes above, do you intend to set up your own record company to release recordings of these songs? (Rounded %'s)

	CHARTS	TRAD	TOTAL
YES	29	45	33
NO	64	52	61
N/A	7	3	6
# OBS	171	29	219

choice to start-up a record company. This is in fact the case, as 44 per cent (32) of the composers who set up a record company in the past, did not aspire to do the same in the future. A much greater degree of inertia exists in the group who decided not to set up a record company in the past, as only 7 per cent of this group hoped to set up their own company in the future.

Table 3.36: Question 4

If you intend to set up your own company, which of the following are influential in encouraging this? (Rounded %'s)

	CHARTS	TRAD	TOTAL
A	65	46	64
B	35	31	35
C	41	8	36
D	29	8	25
E	57	62	58
F	51	62	50
G	16	31	21
N/A	0	0	0
# OBS	49	13	72

(A) More control over music.
(B) Higher artist royalties.
(C) Earn higher income (over and above artist royalties) if the records are hits.
(D) More flexible advertising and marketing.
(E) Prefer being independent/answerable to nobody/your own boss.
(F) Existing record companies are unwilling to take the risk involved in releasing your records - you feel they do not perceive the full commercial potential of your music.
(G) Other reason(s).

Table 3.37: Question 4

If you do intend to set up your own company, which of the following is the most influential in encouraging this? (Rounded %'s)

	CHARTS	TRAD	TOTAL
A	20	15	17
B	4	0	3
C	4	0	4
D	0	0	0
E	16	15	18
F	22	31	25
G	6	23	10
N/A	27	15	24
# OBS	49	13	72

(A) More control over music.
(B) Higher artist royalties.
(C) Earn higher income (over and above artist royalties) if the records are hits.
(D) More flexible advertising and marketing.
(E) Prefer being independent/answerable to nobody/your own boss.
(F) Existing record companies are unwilling to take the risk involved in releasing your records - you feel they do not perceive the full commercial potential of your music.

Table 3.38: Question 4

If you do not intend to set up your own company, which of the following are influential in deterring you? (Rounded %'s)

	CHARTS	TRAD	TOTAL
A	55	60	55
B	37	47	40
C	55	67	55
D	33	33	33
E	55	80	59
F	34	27	35
G	5	7	8
H	15	20	14
I	17	27	20
J	3	0	4
N/A	0	0	1
# OBS	110	15	134

(A) Unable to raise enough financial capital to set-up a record company.
(B) Better management expertise in an established record company.
(C) Major record companies have more marketing clout.
(D) Unwilling to take the financial risk associated with releasing a record.
(E) Distribution of records is more efficiently executed by large established record companies.
(F) You do not have enough expertise to run a record company.
(G) You do not have relevant education to set-up a record company.
(H) You were offered a financial incentive/advance by an established record label.
(I) Technical and artistic resources are superior in a major record label.
(J) Other reason(s).

Table 3.39: Question 4

If you do not intend to set up your own company, which of the following is the most influential in deterring you? (Rounded %'s)

	CHARTS	TRAD	TOTAL
A	25	13	23
B	5	7	5
C	13	20	13
D	11	0	10
E	12	33	14
F	5	0	5
G	0	0	1
H	5	13	5
I	3	0	2
J	2	0	2
N/A	20	13	20
# OBS	110	15	133

(A) Unable to raise enough financial capital to set-up a record company.
(B) Better management expertise in an established record company.
(C) Major record companies have more marketing clout.
(D) Unwilling to take the financial risk associated with releasing a record.
(E) Distribution of records is more efficiently executed by large established record companies.
(F) You do not have enough experience to run a record company.
(G) You do not have relevent education to set-up a record company.
(H) You were not offered a financial incentive/advance from an established record label.
(I) Technical and artistic resources are superior in a major record company.
(J) Other reason(s)

Table 3.40

Logit dependency variable: composers who plan to set-up a record company in the future.

Variable	
Set-up record company before	1.766 (5.48)*
Constant	-1.311 (-6.48)*
Chi 2 (1) =	32.05*
Pseudo R 2	0.12
# OBS	213

* = significant at the 1% level

Comparing question 3 to question 4 the weight of importance attached to most of the variables seems to remain fairly consistent. The most notable exception is a fall in the importance attached to record contracts. Among the reasons influencing the decision to set up a record company, the percentage of composers who cite an unsatisfactory record contract as a push factor falls from 46 per cent in question 3 to 22 per cent in question 4. Similarly, among the reasons encouraging composers not to set up a record company, the number claiming that a record company offer of an advance on artist royalties was a determining factor falls from 36 per cent in question 3 to 15 per cent in question 4. These results may indicate that composers have long-run optimistic expectations.

To test the significance of the survey proportions in a more rigorous manner, we decided to estimate the factors that affect the probability of a composer choosing to start-up a record company. In conducting such an analysis it was not possible to use a dependent variable from question 3 iterated against independent variables from question 3. This is the case because the second part of question 3 divides the sample, allowing each group access to an exclusive set of options (this is true for question 4 also). Therefore, a logit estimation would, by definition, assign spurious significance to the group of replies available to 'yes' and 'no' respondents respectively. In order to avoid this outcome we decided to divide the sample into the 'yes' and 'no' respondents of question 3. In other words, we separated the sample into composers who had and had not set up a record company in the past.

This generated two databases where the respondents in each respective group had access to the same variables in question 3. This characteristic thereby overcame the 'automatic significance' problem in the unified data set. We then proceeded to estimate the probability of a composer aspiring to set up a record company in the future for both data sets.

The estimation procedure is based on the intuition that the decision to set up a record company in the future is determined by factors that influenced the same decision in the past. This implies that the insignificance of an independent variable is due to the fact that either it does not play a major role in influencing this decision, or that the characteristics

of a composer have changed over time so that the variable is no longer active. An example of the latter may be the composer's access to capital, which is likely to fluctuate over time.

The analysis involved a general to specific estimation process where the independent variables included: the options from question 3 (in both 'influential factors' and 'most important factors' forms) and all options which indicated that the composer was motivated by monetary reward, education, unemployment, risk-taking, composer genre, role models, number of years in the industry and, finally, whether the composer is a tune imitator or a tune innovator.

The estimated specific form for the cohort of composers who had set up a record company in the past is presented in table 3.41 as equation 2. The results indicate that the desire to control usage of one's own music is an important stimulus to record company formation. The results also find a significant negative relationship between composers who in the past set up a record company in the hope of reaping financial rewards over and above music royalties and future plans to start-up a record company.

Table 3.41

Logit Dependent Variable: Composers who plan to set-up a record company in the future and who previously set-up a record company

Variable	1	2
Control of Music	1.521 (1.94)***	1.171 (1.74)***
Higher Profits	-1.403 (-2.16)**	-1.174 (-2.01)**
Unemployed	-0.935 (-1.511)	
Constant	-0.019 (-0.03)	-0.009 (-0.02)
CHI 2( ) =	8.58**	5.99**
# OBS	58	64

* = Significant at the 1% level, ** = significant at the 5% level and *** = significant at the 10% level.

This result seems to indicate a certain naivety on the behalf of some composers. Composers whose profit expectations from starting up a record company proved to be overly optimistic would be unlikely to aspire to setting up a record company in the future. This interpretation would also be supported by the results of questions 3 and 4, where

and was found to have a negative coefficient which might indicate that it is capturing a deficiency in human capital and/or financial capital.

Table 3.41 presents the results of the general to specific analysis of composers who did not set up a record company in the past. In this sample a significant proportion of composers claimed to be earning an income above their reservation level and hence would not have answered the third part of question 7. This implies that the inclusion of the unemployment variable generates a significant proportion of missing variables, and hence reduces the sample size by approximately 30 per cent. Therefore, we conducted two general to specific estimations, the first excluded unemployment and the second included unemployment. The results are presented in table 3.42 and indicate that the inclusion of the unemployment variable does not affect the significance of the specific variables.

Both equations find the profitability of firm start-ups to be negatively correlated with the belief that managerial expertise is superior among established record companies, the offer of an advance and record contract, and whether the composer writes chart music. Unemployment is found to positively increase the likelihood of starting up a record company.

The significance of the 'managerial expertise' variable is consistent with the negative coefficient found on the 'own company profit expectations' variable in table 3.40. It supports the hypothesis that incumbent record companies have a first mover advantage

expectation of greater profits than those available in the corporate sector seem to revise this view to the extent that they opt for a record contract in the future.

The results indicate access to capital, education and a willingness to take risks are not important determinants of new record company formation when one controls for the offer of a record contract. Since most composers appear to want record contracts, this implies that record companies created by composers are, in the phraseology of Foreman-Peck (1985), likely to be 'chaff' rather than 'seedcorn'.

Section 3.4: Successful tune innovation

At the beginning of the chapter we advanced the argument that composers are entrepreneurial to the extent that they innovate new music. We acknowledged that a possible objection to this classification was the argument that some composers are not motivated by pecuniary reward. We countered this argument by maintaining that it was likely that many successful composers were not primarily motivated by monetary reward and hence it created scope to have enterprise in a market without an entrepreneur. We now want to test the extent to which pecuniary motivation is an important determinant of successful tune innovation. Our proxy for 'success' is the offer of a record contract from an established record company. An indication of an offer from a record company is portrayed in question 3 through 3(f) in the 'Yes' replies and through 3(h) of the 'No' replies.

In order to carry out a logit equation with these two proxies as the dependent variable, we created two sub-datasets consisting of composers who respectively had, and had not, set up their own record company in the past. We employed a general to specific estimation procedure using all of the variables that indicated any pecuniary motivation on behalf of the composer. Table 3.43 cites the final few equations in arriving at the final form for composers who had set up their own company in the past. In the final form, equation 3, the logit does not find any statistically significant pecuniary motivation variable. However, equation 2 finds a statistically significant negative coefficient for composers who claimed that they sometimes abandoned work on a particular composition because it did not appear to have commercial potential. Since the dependent variable takes on the value of one if the composer was not offered a satisfactory record contract, the negative coefficient implies a positive correlation between pecuniary motivation and successful tune innovation.

However, equation 2 fails the chi-squared test which indicates that it is statistically insignificant. Taking this result alongside the finding that the final specific form does not find any pecuniary variable to be significant, the results indicate that composers who do not get satisfactory record contracts are not predominately among composers who are motivated by non-monetary rewards.

We conduct the same style of analysis among the cohort of composers who did not set up a record company in the past. This time the dependent variable takes on the value of

one if the composer did not set up a record company because of an offer of a satisfactory record contract. These results are presented in table 3.44.

In this sample we find evidence that composers with higher reservation incomes have a greater probability of securing a satisfactory record contract. However, we also find that composers who abandoned work on a tune because it did not appear to have commercial potential are less likely to secure a record contract. Similarly, composers who claimed that they 'are more likely to write music that is currently, or becoming, popular', (i.e. music trend imitator), were not more likely to secure a record contract. The same was also true of composers who claimed that they had abandoned a tune because it did not seem to have commercial potential (i.e. commercial deterrent). It is possible that these results could indicate 'business stealing effects', as music trend imitators are almost by definition attempting to identify a music market niche, where the style of music is *already* commercially successful.

The results of this section, therefore, illustrate that the performance of the intermediate market for new music is significantly determined by non-monetary determinants. It indicates that in order to account for the level of enterprise in this market, one cannot ignore the role played by those composers who are motivated by non-pecuniary factors. In terms of the demand and supply framework for enterprise outlined by both Schultz (1980) and Casson (1982), it implies that in the intermediate market for new music the supply schedule for entrepreneurship is upward sloping (with respect to reward for

enterprise) but is subject to significant shift parameters.

Table 3.43

Dependent Variable: Composers who in the past were not offered satisfactory contracts and who set up a record company.

Variables:	1	2	3
Reservation Income	0.0002 (0.09)		
Commercial Deterrent	-1.895 (-2.05)**	-1.813 (-1.99)***	-1.217 (-1.59)
Music Trend Imitator	0.555 (0.70)	0.889 (1.18)	
Constant	1.356 (2.09)**	1.03 (2.26)**	1.44 (3.89)*
CHI 2 ( ) =	4.40	4.40	2.41
# OBS =	51	53	56

* = significant at 1% level, ** = significant at 5% level
and *** = significant at 10% level

Table 3.44

Dependent Variable: Composers who in the past were offered and accepted, a record contract.

	1	2	3
Variables:			
Reservation Income	0.002 (1.50)	0.003 (1.66)***	0.003 (1.71)***
Pecuniary Entrant	-0.363 (-0.39)		
Commercial Deterrent	-1.601 (-2.20)**	-1.681 (-2.35)**	-1.489 (-2.19)**
Music Trend Imitator	0.549 (1.17)	0.438 (0.97)	
Constant	-0.886 (-2.03)**	-0.899 (-2.15)**	-0.679 (-1.94)***
CHI 2 ( ) =	8.63***	9.82**	8.56**
# OBS =	91	100	107

* = significant at 1% level, ** = significant at 5% level
and *** = significant at 10% level

Section 3.5: Survival in the intermediate market for new music:

In this section we focus on the survival of composers. Question 6 asks composers how long they have been professional composers. The results from question 6 are presented in table 3.45: question 6. The results show that the membership requirements of the P.R.S. are such that most transitory composers are excluded. Most composers have been

writing music for a significant period: 81 per cent of the total sample have been writing music on a professional basis for more than three years, 17 per cent have been composers between one and three years, and only 1 per cent have pursued this career for less than a year.

We use the replies from question 6 to generate a variable for survival in this sector of the industry. For each of the six replies we took the mean average number of years for the group. Thus, for example, we assign a value of 1.5 for the group of composers who claimed to have been at this activity for between one and three years. In cases where composers ticked two adjacent groupings we used the intersection value of the two groups. To avoid possible spurious/automatic correlation problems we divided the sample into composers who had, and had not set up a record company in the past. However, in order to gauge whether composers who set up a company in the past are more likely to survive in the industry we estimated an equation, regressing survival on whether the composer had set up a company in the past. The results, reported in table 3.46, found record company formation in the past to be unrelated to the likelihood of survival among composers.

Table 3.46 portrays the last few steps in the general to specific estimation. The general equation contained the same independent variables as in the firm start-up general equation of section 3.3. It is clear from the result that the factors that keep a composer in the music business are not the same factors that would encourage a composer to set up a record company. However, this is what we would expect as the results of section 3.3

Table 3.45: Question 6

For how many years have you been writing music on a professional basis? (Rounded %'s)

	CHARTS	TRAD	TOTAL
A	1	0	1
B	19	17	17
C	22	17	20
D	16	13	16
E	23	23	23
F	16	27	22
N/A	2	3	2
# OBS	182	30	248

(A) For less than 1 year.
(B) Between 1 and 3 years.
(C) Between 3 and 6 years.
(D) Between 6 and 9 years.
(E) Between 9 and 15 years.
(F) For more than 15 years.

indicated that most record companies were 'chaff' rather than 'seedcorn'. The final specific equation indicates that composers who are highly motivated by pecuniary reward are more likely to survive in the music industry, than those who are motivated by non-pecuniary factors. The specific equation 3, identifies reservation income and the willingness to abandon the development of a tune if it does not appear to have commercial potential (commercial deterrent) as the two significant determinants of composer survival.

It is interesting to note that specific equation 3 assigns a positive coefficient to the 'commercial deterrent' variable for composer survival, while in the previous section we noted that the probability of securing a record contract was negatively related to the willingness to abandon an apparent non-commercial tune. A possible explanation for this apparent inconsistency is that securing a record contract does not automatically guarantee that the composer will be successful. In other words, as we noted in the model of section 2.2 record companies pass some impure risk onto creative musicians in the form of artist royalties on audio software sales. Thus, even though a creative musician may be apparently successful in the intermediate market for music, she is not guaranteed to be successful unless her music sells well in the audio software market.

On average for every ten records a record company releases, only one makes a profit (Denisoff 1986). This immediately implies that a significant proportion of artists who had record contracts will be released from their contract by the record company. There is significant anecdotal evidence to support the notion that most bands who receive a

contract are very shortly released by the record company.[7] The questionnaire survey reveals evidence to suggest that this is indeed the case. If we compare table 3.32 to table 3.38 we observe that the number of composers citing an offer of a record contract as a reason not to set up a record company drops from 38 per cent to 14 per cent as we move from question 3 to question 4. Similarly among 'most important factors' the same proportions drop from 18 per cent to 5 per cent. Thus, if the durability of record contracts is low then we would not expect record contracts and survival of composers to be correlated.

The results of the general to specific estimation procedures for the survival of the cohort of composers who did not set up a record company in the past are represented in table 3.48. Here we again find that composers with relatively high financial motivations are more likely to survive in the profession. Reservation income is positive and significant. Also jingles composers are more likely to survive whilst charts composers are less likely to survive. This finding is partly explained by the multinomial equation of section 3.2 to the extent that jingles composers were found to be significantly more motivated by monetary rewards than charts composers. In addition, we would also expect the significance of these variables to reflect the volatility of the jingles and charts markets. The latter encounter a greater level of peer competition and volatility among consumer tastes and would, therefore, affect income and hence the probability of survival in the same manner.

---

[7] For example, the covering letter for the questionnaire survey contained a newspaper article by Colin Kerr of the Sunday Tribune citing some Irish examples of bands that recently were released from record contracts.

Table 3.48

Regression dependent variable: number of years as a professional composer - composers who did not set-up a record company in the past.

Variables	
Jingle composer	7.639 (2.41)**
Charts composer	-3.184 (-2.18)**
Managerial expertise	2.515 (1.94)***
Reservation income	0.010 (2.07)**
Music trend imitator	-2.897 (-2.21)**
Role model	2.779 (2.11)**
Risk averse (M.I.F.)	6.428 (2.18)**
Lack of education (M.I.F.)	-12.25 (-2.11)**
Constant	8.063 (4.23)
R^2	0.35
F-Stat	5.17*
# OBS	86

* = significant at the 1% level, ** = significant at the 5% level, and *** = significant at the 10% level.

The results find that role models are an important determinant of survival. The results seem to indicate that composers who realise that incumbent record companies have a competitive advantage are more likely to survive. The specific equation found a positive correlation between composers who felt that managerial skills were superior in established record companies as being more likely to survive. Similarly, those who indicated (as a 'most important factor') that they were not willing to take the risk associated with the creation of a record company seem to have 'hedged their bets' the right way, as they appeared more likely to survive.

Interestingly, those who claimed to attempt to write music that is currently coming into vogue were less likely to survive. This would suggest that composers who create a new style of music in a Schumpeterian manner are more likely to survive than those who 'jump on the bandwagon'.

Finally, composers who claimed that their education level was not sufficient for record company managerial requirements may have assessed their ability accurately. We found a statistically significant negative coefficient between survival and this variable.

In sum, the survival regressions suggest that economically motivated composers are more likely to survive than, ceteris paribus, those who are less motivated by receiving reward. A successful composer does not appear to be the archetypal aesthetic musician but rather aesthetic musician with a strong motivation for financial gain. The results appear to

Appendix 3.1: The Questionnaire

IRISH MUSIC RIGHTS ORGANISATION
15 Herbert Street, Dublin 2, Phone: 614844. Fax: 763125
In association with Service Industries Research Centre, UCD.

23 December 1992

Dear Colleague,

Wherever you go in Ireland, you will hear music, be it in a pub, shop, hairdresser, hotel, disco, concert, national radio, local radio, telephone, jukebox or television – both live and recorded music. Somebody worked at writing that music – some of it is your music.

Since 1989 when IMRO was set up, we have rigorously sought to ensure that all those people who use your music have:

(a) a licence from us to use your music, and
(b) paid their fair share of royalties for the use of your music.

However, despite our quite spectacular success in collecting royalties:

Gross Revenue	*2.8m*	*1989*
Gross Revenue	*6.0m*	*1992*

Ireland still has one of the lowest 'per head of population' payments for music royalties in Europe. It seems that people here just do not put the value on the use of music that we, as writers and composers, could rightly expect that they should.

We need to change these attitudes.

One of the things that we have done with this in mind is to sponsor for three years a Newman Scholar to research, and seek to quantify, the value of music to the person using it. (See accompanying press story).

ROCK'N' ROLL HIRES OXFORD ECONOMIST TO ASSESS WORTH

— *By Colin Kerr* —

IMRO, the Irish Music Rights Organisation, has commissioned an Oxford University economist to undertake a major survey of the 100m per annum Irish music industry.

Under the scheme IMRO, which collects royalties for Irish songwriters, will hire an economics lecturer for three years who will assess the value of the music industry to the Irish economy. Andrew Burke (27) a graduate of UCD, the University of London and a lecturer in economics at Oxford University will conduct the survey which will be the first economic analysis not only of the record industry in Ireland but of the record industry anywhere.

The Irish Trade Board estimate that the industry is worth £100 million but Mr Derry O'Brien of the board's International Services department believes that the figure is probably even greater.

Recently, the ITB met representatives of the music industry to discuss the various promotional openings available for Irish bands. Among the issues that were discussed were the effects of the recession on the American and British music industries and the number of bands that had lost their record deals in the last few months.

The Forget-Me-Nots are one of a number of high-profile Irish bands that have been dropped by their record labels in the last few months. However, Mr McEvoy said that too much emphasis is placed on the signing and dropping of bands.

The Forget Me Nots signed to Sony Records in August 1990 and released four singles and an album with the label. However, following the release of the band's first album in July, Sony decided that they would not be re-signing them.

"We were a band before we had a record deal," said spokesman Mr McEvoy, "and we're still a band now. The record company only gives you money to do records and videos and so on. If you can get your own money together, which we can through gigging or whatever, you can be your own short-term record company.

Sunday Tribune
18th October 1992

Part of Newman Scholar Andrew Burke's research includes an analysis of songwriters and composers in Ireland, and why they create music and song.

To this end, I would ask for your full co-operation in completing the accompanying questionnaire, drawn up by Andrew Burke. Please complete the questionnaire fully following the guidelines enclosed, and return it in the reply paid envelope as soon as possible.

Although this questionnaire looks quite lengthy, it will not take more than five minutes to fill out. All replies are strictly confidential therefore please do not put your name anywhere on the questionnaire.

Many thanks,

Brendan Graham

Brendan Graham, Chairman

Irish Music Rights Organisation Limited. Registered in Ireland number 133321

Directors: Peter Bardon, John D'Ardis, Brendan Graham, Shay Hennessy, John Lappin, Michael O'Riordan, Peter Sherry, Bill Whelan. British Directors: Robert Abrahams, Sarah Burn, Michale Freegard, Marshall Lees, Donald Mitchell, James Wilson.

IRISH MUSIC RIGHTS ORGANISATION

imro Questionnaire

QUESTION 1

What is the main type of music you write ?

(a) Serious classical ❐

(b) Jingles ❐

(c) Commissioned ❐

(d) Album/singles chart-based music e.g. rock, rap, pop, trad-rock/pop, new style etc. ❐

(e) Non-chart traditional (including arrangement) ❐

(f) Other; please specify ❐

QUESTION 2

Do You perform your own tunes ?

(a) Yes ❐ (b) No ❐

Please note: Question 3 and 4 are very similar in content: question 3 deals with past experience and question 4 is concerned with future plans. Please answer both questions.

QUESTION 3

Did you, in the past, release your (and if applicable your band's) songs in albums and/or singles ?

(a) Yes ❐ (b) No ❐

IF NO: Go immediately to question 4.

IF YES: Did you set up your own record company to release recordings of these songs ?

(a) Yes ❐ (b) No ❐

IF YES:
Tick the following factors which were influential in encouraging you to set up your own record company
[You may tick more than one option]

(a) More control over music ❐

(b) Higher artist royalties ❐

(c) Earn higher income (over and above artist royalties) if the records are hits ❐

(d) More flexible advertising and marketing ❐

IF NO:
Tick the following factors which were influential in deterring you from setting up your own record company
[You may tick more than one option]

(a) Unable to raise enough financial capital to set-up a record company. ❐

(b) Better management expertise in an established record company. ❐

(c) Major record companies have more marketing clout. ❐

(d) Unwilling to take the financial risk associated with releasing a record. ❐

(e) Prefer being independent/answerable to nobody/ your own boss ☐

(f) Existing record companies unwilling to take the risk involved in releasing your records - you feel they did not perceive the full commercial potential of your music. ☐

(h) Other reason(s): Please specify:

1.....

2.....

3.....

Which of the above was the most influential factor ? ☐

(e) Distribution of records is more efficiently executed by large established record companies

(f) You do not have enough experience to run a record compan

(g) You do not have relevant education to set up a record compa

(h) You were offered a financial incentive/advance by an established record label.

(i) Technical and artistic resources are superior in a major record label

(j) Other reason(s): Please specify:

1.....

2.....

3.....

Which of the above was the most influential factor ?

QUESTION 4

In the future, do you hope to release your (and if applicable your band's) songs in albums and

(a) Yes ☐ (b) No ☐

IF NO: Go immediately to question 5.

IF YES: Do you intend to set up your own record company to release recordings of these songs ?

(a) Yes ☐ (b) No ☐

IF YES:
Tick the following factors which are an influence in encouraging you to plan to set up your own record company
[You may tick more than one option]

(a) More control over music ☐

(b) Higher artist royalties ☐

(c) Earn higher income (over and above artist royalties) if the records are hits ☐

(d) More flexible advertising and marketing ☐

(e) Prefer being independent/answerable to nobody/ your own boss ☐

(f) Existing record companies unwilling to take the risk involved in releasing your records - you feel they do not perceive the full commercial potential of your music ☐

IF NO:
Tick the following factors which are an influence in deterring you from planning to set up your own record compa
[You may tick more than one option]

(a) Unable to raise enough financial capital to set-up a record company

(b) Better management expertise in an established record company.

(c) Major record companies have more marketing clout.

(d) Unwilling to take the financial risk associated with releasing a record.

(e) Distribution of records is more efficiently executed by large established record companies

(f) You do not have enough experience to run a record compan

QUESTION 10

If you have ever abandoned writing a particular song/tune, tick the following factors which influenced your decision not to continue working on it. [you can tick more than one option]

(a) You became inspired by an alternative better tune/song ☐

(b) The tune did not seem to have commercial potential ☐

(c) The tune was not developing to your personal taste ☐

(d) Due to other commitments, you did not have time to continue working on the tune ☐

(e) You have a tendency to start but never finish things ☐

(f) You received a negative response from others ☐

(g) Failure of collaboration in song writing with others ☐

(h) Other(s): please specify.....

Which of the above listed factors was the most influential ? ☐

QUESTION 11

Are you more or less likely to write music that is currently, or becoming, popular among record buyers/live audiences ?

(a) More likely ☐ (b) Less likely ☐

Why did you choose (a) or (b) ? .....

QUESTION 12

How did you learn to **play** music ?

(a) Secondary/primary school education ☐

(b) University education ☐

(c) Private lessons ☐

(d) Friends/family ☐

(e) Self-taught ☐

(f) Music-related work experience ☐

(g) Through playing in bands ☐

(h) Other(s): Please specify .....

Which of the above was the most beneficial ? ☐

Did you choose to learn music this way or was it accidental ? .....

QUESTION 13

How did you learn to **write** music ?

(a) Secondary/primary school education ☐

(b) University education ☐

(c) Private lessons ☐

(d) Friends/family ☐

(e) Self-taught ☐

(f) Music-related work experience ☐

(g) Through playing in bands ☐

(h) Other(s): Please specify .....

Which of the above was the most beneficial ? ☐

Did you choose to learn to write music this way or was it accidental ? .....

On average is the income you make exclusively from royalties and live performances of your band's compositions greater or less than this amount ?

(a) Greater ☐ (b) Less

IF LESS: Tick the following income sources that help you make up the shortfall and hence remain in music business [you can tick more than one option]

(a) Cabaret performance of well known other artists' compositions. ☐
(b) Teaching music ☐
(c) Sound production ☐
(d) Music publishing ☐
(e) Session musician ☐
(f) Social welfare ☐
(g) White collar/clerical employment outside of the music industry ☐
(h) Trade or manual employment outside of the music industry
(i) Financial support from a patron/friend/family
(j) Session musician outside of the music industry
(k) Record Engineer
(l) Music director
(m) Other: Please Specify.....
.....

Which of the above is your main source of income ?

QUESTION 8

Which, if any, of the following factors would motivate you to write more music.

(a) An active interest in your music by a publisher
(b) Specific commissions by radio or television
(c) Greater broadcasting exposure to your type of music
(d) A rise in music royalty rates.
(e) Tax incentives such as those currently available in Ireland for artists and composers.

If (d) was among your answers by how much would airplay royalties have to be raised in order to stimulate you to write more music

(a) by at least ten pence per airplay ☐
(b) by at least fifty pence per airplay ☐
(c) by at least one pound per airplay ☐
(d) by at least two pounds per airplay ☐
(e) by at least five pounds per airplay
(f) by at least ten pounds per airplay
(g) by more than ten pounds per airplay

QUESTION 9

Do you believe that government policy could help stimulate the music industry?

(a) Yes ☐ (b) No ☐

IF YES: In what areas do you think government intervention could be beneficial ?

.....

(h) Other reason(s): Please specify:

1 .....
2 .....
3 .....

Which of the above was the most influential factor ? ☐

(g) You do not have relevant education to set up a record company. ☐
(h) You have been offered a financial incentive/advance by an established record label. ☐
(i) Technical and artistic resources are superior in a major record label. ☐
(j) Other reason(s): Please specify:

1 .....
2 .....
3 .....

Which of the above was the most influential factor ? ☐

QUESTION 5

Tick the following factors which were influential in encouraging you to become a composer [you can tick more than one option]

(a) You like the social scene in the music business ☐
(b) Enjoy being creative ☐
(c) Hope of fame ☐
(d) "I have an urge to compose music/composing is in my blood" ☐
(e) Income/Wealth from composing songs ☐
(f) Enjoy music ☐
(g) Other reason(s), please specify:

1 .....
2 .....
3 .....

Which of the above is the most important factor ? ☐

QUESTION 6

For how many years have you been writing music on a professional basis ?

(a) For less than 1 year ☐
(b) Between 1 and 3 years ☐
(c) Between 3 and 6 years ☐
(d) Between 6 and 9 years ☐
(e) Between 9 and 15 years ☐
(f) Greater than 15 years. ☐

QUESTION 7

On average what is the minimum weekly net (after deducting tax) income you require to stay in the music business over the next year ?

(a) Between £1 and £80 per week ☐
(b) Between £80 and £120 per week ☐
(c) Between £120 and £150 per week ☐
(d) Between £150 and £200 per week. ☐
(e) Between £200 and £300 per week ☐
(f) Between £300 and £500 per week ☐
(g) More than £500 per week ☐

QUESTION 14

Of the bands/artists that influenced you, were they [you can tick more than one option]:

(a) From your home town/city ❒

(b) From another Irish town/city ❒

(c) From the U.K. ❒

(d) non-U.K. International musicians/artists ❒

(e) Other(s): Please specify .....

.....

.....

Which of the above encouraged you the most ? ❒

QUESTION 15

Was there anybody, similar in background to yourself, who inspired you or gave you confidence in the music industry ?

(a) Yes ❒ (b) No ❒

QUESTION 16

If the income/wealth of either your family, friends or acquaintances increased, would this cause you to revise upwards the amount of income/wealth you aim to make ?

(a) Yes ❒ (b) No ❒

IF YES: tick the following factors that you think might be influential in this revision of your aspirations:

(a) Self-pride

(b) The desire to be able to participate in leisure and consumer activities which these higher incomes will allow your friends to pursue

(c) Jealousy

(d) A belief that "if they can achieve higher incomes by being more dynamic so can I".

(e) You expect consumer prices to rise.

Other reason(s): Please Specify.....

.....

If you did upwardly revise the amount of income/wealth you hope to make, would you then be willing to take on more `risky-income' style employment/self-employment in order to achieve this goal ?

(a) Yes ❒ (b) No ❒

Appendix 3.2: Composer's Policy Proposals

(A.1) Capital Grants: Treating bands in a similar manner to firms and, thereby, allowing access to I.D.A (the Irish Industrial Development Authority) capital grants appeared as the most popular theme: 38 such proposals were put forward by charts composers, 3 from the non-chart traditional category, 1 from commissioned and classical composers respectively, and 5 from the 'other' category. Some respondents stressed that the capital grants should be made available exclusively to artists with export potential.

(A.2) Income Tax: Artists residing in Ireland are exempt from income tax and a significant proportion of music composers benefit from this tax break. Most respondents wanted this policy to continue and to be extended to 'traditional' and 'country' musicians who appear to have difficulty in meeting the eligibility requirements. However, the main income tax proposal was to extend the tax break to other sectors of the music industry.

(A.3) Broadcasting Airplay Quotas: This was the third most popular policy proposal aimed at stimulating the Irish music industry. Most composers believed that a statutory requirement should be imposed on all Irish-based radio and television stations, obliging them to play a fixed proportion of Irish composed and/or performed music as part of their total music playlist.

(A.4) Training and Education: Government intervention in the realm of industry and artistic expertise proved to be a popular proposal. Composers stressed, in particular, that managerial and technical expertise was a necessary form of human infrastructure in the industry and an area where training schemes might help. The idea of a third-level interdisciplinary degree in Music Performance, Recording and business was also mooted by a number of composers. To a lesser extent, respondents argued that music could be taught on a more practical level in secondary education.

(A.5) Musicians' Workfare/Artistfare: As we noted earlier, just under a third of composers claimed to be collecting Social Welfare. A common issue raised within the policy proposals was that the Ministry of Social Welfare should allow composers to collect unemployment assistance. Possibly 'unemployed' composers could be treated as individuals on a workfare programme where composing is dealt with as workfare labour duties.

(A.6) Rehearsal/Recording Facilities: Composers claimed that recording and rehearsal facilities were scarce and often expensive. They felt that the government could play a direct role in building such infrastructure.

All of the above proposals were put forward by at least thirty composers. Five other policies were mooted by, on average, ten composers and are outlined in B.1 - B.6 below.

(B.1) Arts Council Support: Many composers felt that government support for the work of the Arts Council should be increased. Some, however, linked the increase in support to a stipulation requiring the Arts Council to make its activities more relevant to the charts/commercial sector of the music industry.

(B.2) Reduction in V.A.T: Some composers claimed that Value Added Tax rates were excessive for audio software and live performance of music. These respondents argued that reductions in these rates would greatly boost the industry. Some composers argued that cabaret bands should pay higher V.A.T. than bands who played their own compositions. Other composers demanded direct unqualified discrimination against cabaret/cover bands.

(B.3) Performance and Broadcasting Royalties: An increase in the price and scale of enforcement of I.M.R.O./P.R.S. and M.C.P.S. licences also appeared as a common theme. Many felt the government could be more supportive in this sphere.

(B.4) College/Independent Radio: Composers also felt that there is a need to increase the number of radio stations committed to broadcasting new tunes. It was felt that the government could facilitate this by issuing licences with new music

airplay quotas.[8]

(B.5) Blank Tape Levy: A number of composers put forward the case that the imposition of a blank tape levy would further stimulate record sales and enhance the music industry.

The remaining proposals had the backing of between one and four composers. They were mainly idiosyncratic and not particularly innovative e.g. a state-owned record company, alcohol prices, pensions, insurance guarantee etc.

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[8] This may be particularly relevant to College radio which is usually run on a non-profit basis. The growth in Ireland of classic hits radio is believed to have generated a degree of inertia in the type of music sold. This is the case in the U.S.A. where the 'cutting edge' of tune innovation is diffused through college radio and only later finds support from the major stations. College radio has been the main channel though which many, now established acts, (such as U2), have broken into the American market.

4: The Audio Software Market

Introduction

This chapter extends the analysis of the previous chapter by looking at the performance of the audio software market. Thus, it examines the sale of recorded music after record companies have made further marketing and managerial innovations to the raw tune innovation provided by the creative musician. The final audio software product that reaches consumers is, therefore, a combination of enterprising actions of record companies and creative musicians.

The audio software market is in fact made up of two markets; a singles market and an albums market. The chapter sets out to examine the interaction between these markets. In particular, does success in one market imply that success is guaranteed in another market?

The chapter is divided into three sections. Section 1 investigates the relationship between successful tune innovation in the singles and albums markets. It examines the correlation between the success of a particular artist and tune in the singles market, and of the same tune and artist in the albums market. It also investigates the temporal dynamics of such a relationship. Section 2 analyses the importance of tune innovation at the firm level. It examines the correlation between company market share in the singles and albums markets. It also tests for causality i.e. whether positive market

externalities spill over from the singles market into the albums market, or vice versa.

Finally, section 3 analyses the importance of tune innovation at the industry level. It estimates the demand for vinyl albums and attempts to account for the impact of tune innovation on the demand for audio software. The chapter closes with an estimate of the variance of industry demand due to tune innovation. It attempts to examine whether fluctuations of firm performance due to variations in tune innovation are accentuated or pacified at the industry level i.e. to find out whether successful tune innovation is generally positively or negatively correlated across firms over time.

Section 1: The Interrelationship Between the Audio Singles and Albums Markets

A casual inspection of the weekly singles and albums 'Top 100' selling titles will generally reveal that many artists are featured in both charts simultaneously. However, while it is a common perception that when an artist is successful in the singles market she will also be successful in the albums market (and vice versa), there has been no quantification of this possible relationship. In particular, issues such as the consistency of cross-correlation between the markets, the dynamics of such spillovers and the related aspects such as durability of tunes and artists have not been examined. The explanation for this appears to be the fact that while music charts are available, the tedious process of cross referencing artists and tunes has not occurred, so that relevant data do not exist. In this section we generate this data and conduct the necessary analysis.

The first step in the data generation process was to trace the cross-correlation between artists in the singles market and in the albums market on an annual basis. The data was produced using annual Top 100 singles and albums charts from the B.P.I. yearbooks for the available years 1983 - 1990. The data collection process involved cross-checking each artist featured in the singles market of a particular year against the albums charts of the previous two years, the present year and the subsequent years. If an artist featured in the singles charts had more than one album in the albums charts only one entry was counted. On the other hand, if the artist had two singles in the charts then the value assigned was 2, as long as she had at least one album in the

Table 4.1

The proportion of artists featured in the annual Top 100 singles charts who had at least one album in the annual Top 100 albums charts.

Album	*Singles Charts*							
Charts	1983	1984	1985	1986	1987	1988	1989	1990
1983	74	-	-	-	-	-	-	-
1984	65	77	-	-	-	-	-	-
1985	36	45	72	-	-	-	-	-
1986	27	28	59	65	-	-	-	-
1987	25	23	38	54	63	-	-	-
1988	10	6	9	19	49	62	-	-
1989	27	20	27	27	26	53	75	-
1990	18	16	41	35	25	38	63	64
'One Hit Wonders'	30	33	41	45	44	37	29	53
Various Artists	0	2	1	0	0	0	2	1

albums chart. Thus, the aim was to identify the proportion of artists featured in the singles chart who were also featured in the albums chart with an album.

The data is presented in table 4.1. On average, over the period 1983 - 1989, 69 artists featured Top 100 singles also featured on an album that reached the Top 100 in its respective chart in that same year. This illustrates that an artist who is successful in one audio software market is very likely to be successful in the other market. In the following year the number of artists featured in the Top 100 is still significant and is generally between 20 and 30% lower than the previous year. In the second year the number drops by similar proportions and thereafter becomes more erratic when one compares various years. Thus, the data indicates that there is a significant level of

durability among artists to the extent that some (18) artists featured in the 1983 Top 100 singles and albums charts are still in these charts up to seven years later. The time span of the data is not sufficiently lengthy to estimate the actual proportion of artists that survive more than five years, but for the years that there is data (1983 - 1985) this appears to be 32%.

The next step of the analysis was to examine the actual cross-correlation between a specific version of a song featured in the annual Top 100 singles charts and the annual Top 100 albums charts. In this case the actual song featured in the singles charts was referenced in the Music Master 'Tracks Catalogue' to identify the name of the album (or albums) which featured the song. Then a search was conducted to locate this album in the albums charts. Since we were interested to know whether singles were generally released before albums, or vice versa, cross referencing was also carried out for earlier years.

The data is presented in table 4.2. It is immediately apparent from the table that singles are only exceptionally released a year after their album has been in the Top 100 charts. In all the years most of the singles featured in the Top 100 singles charts were featured on albums that were in the Top 100 albums charts. The number is still significant in the subsequent year, but drops dramatically in the next year and almost without exception is zero thereafter. These results indicate that a particular tune has in general a commercial life of about 2 years in the audio software market. It highlights the low durability of a particular tune and the persistent need for successful tune innovation in order to survive in this market. This result indicates that the finding

Table 4.2

The number of titles in the annual Top 100 singles charts that also featured in the annual Top 100 albums charts

Album Charts	*Singles Charts* 1983	1984	1985	1986	1987	1988	1989	1990
1983	42	4	0	-	-	-	-	-
1984	21	44	6	0	-	-	-	-
1985	7	19	37	3	0	-	-	-
1986	1	2	26	41	3	0	-	-
1987	0	0	4	25	39	3	1	-
1988	0	0	0	1	3	29	37	2
1989	0	0	0	2	6	22	55	4
1990	0	0	0	0	0	4	31	31

of the previous chapter which indicated that charts composers were less likely to survive than non-charts composers, is probably due to the fact that the commercial durability of their output is low.

Since table 4.2 indicated that successful tunes tend to be released in both singles and album form during the same year, we decided to examine the cross-correlation on a quarterly basis in order to get a better understanding of the dynamics of the markets. The data generation process involved the construction of quarterly singles and albums charts. This was carried out by listing all titles featured in the New Musical Express weekly Top 30 singles charts over a year. This usually amounted to a quarterly singles chart of around 200 titles. Four quarterly singles charts were constructed for quarter three 1985 through to quarter two 1986. We decided not to take quarters for a calender year because it would prevent the abberation of singles in the fourth quarter being featured in the subsequent quarter. We felt that this was necessary since roughly

40 per cent of annual record sales occur in the Christmas quarter and hence this quarter encounters a significantly high level of new record releases.

Quarterly album charts were constructed in the same manner as the singles charts except that the 50 best selling albums were counted from the New Musical Express Top 50 albums charts each week. The Top 50 were chosen because the album market entailed more inertia than the singles market. Therefore it was necessary to include the titles from positions 31 - 50 in order to generate a quarterly album chart of a similar size to the singles charts. The cross referencing procedure was the same as that for table 4.2.

Table 4.3

The number of titles featured in the quarterly cumulative Top 30 singles charts that also featured in the quarterly cumulative Top 50 albums charts.

		1985				1986			
	Albums:	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Singles:									
1985	Q3	10	26	39	31	22	16	10	7
	Q4	8	13	26	48	31	21	17	11
1986	Q1	5	13	19	36	44	36	25	14
	Q2	2	5	7	15	14	38	43	21

The cross referencing data for the quarterly charts are presented in table 4.3. The data illustrate that the cross correlation between tunes featured in both charts mainly occurs in the same quarter. Comparing subsequent and preceding quarters, it is apparent that success in the singles charts generally precedes that of the albums charts. This would tend to suggest that if there is a positive market externality, that the flow is stronger

from the singles to the albums market than vice versa.

In sum, the data collected in this section illustrate that there is a high degree of correlation among both artists and tunes that are successful in both the singles and the albums markets. Artists tended to be more durable than their tunes and hence the values in table 4.2 were lower than those of table 4.1. The data also illustrated that most tunes were successful in both markets in the same period be it annually or quarterly. The annual data illustrated that the tunes were generally successful in the singles market either before, or in the same year, as the albums market. The quarterly data found a similar pattern, although a significant number of successful singles were released from albums that were successful in previous quarters. The data, therefore, suggests there might be a causation from success in the singles market to success in the albums market. However, in a definitive fashion, the data identified that a significant proportion of titles that were successful in the singles market were also successful in the albums market (and vice versa). This empirical finding is important as it greatly facilitates analyses of tune innovation at the firm and industry level. It is to these analyses that we now turn.

Section 2: Tune Innovation and Record Company Performance

We have established that there is a significant coincidence of successful artists and tunes in the singles market who are also successful in the albums market. However, this does not necessarily imply that record company market share in the two markets

should be correlated. The data in the previous section also illustrated that a significant number of artists and tunes are unique to each of the singles and albums markets. This implies that record company performance would only be expected to be correlated across markets if a significant proportion of their record releases featured artists and tunes with commercial potential in both markets. The aim of this section, therefore, is firstly to identify record companies whose tune innovation strategies are predominantly based on artists with commercial potential in both markets, and then to use this cohort of companies to identify the interaction between the singles and the albums markets.

In order to carry out this analysis, we used data on record company albums and singles market share. The procedure initially entailed a test to see if there was a correlation between a company's market share in both markets. We then used company market share for companies where a correlation did exist, to conduct Granger causality tests between the singles and albums markets. For these responses we used quarterly record company market share data extracted from issues of Music Week magazine over an available period of 1983 to 1993. We used data from the six largest record companies over the sample period. Summary statistics are presented in table 4.4. Over the sample period the six firm concentration ratio accounted for an average of 71% of the albums market and 69% of the singles market. In each of the top six firms, record company album market share was of similar magnitude to the same company's singles market share.

Table 4.4

The top 6 record companies market share in the U.K. Albums and singles market: 1983 Q1 - 1993 Q4.

Record Company	Mean	Std. Dev.
B.M.G. Albums	7.58	2.27
B.M.G. Singles	9.01	3.43
Sony Albums	13.26	2.84
Sony Singles	12.77	2.80
Virgin Albums	7.68	1.85
Virgin Singles	8.16	2.58
PolyGram Albums	17.93	4.79
PolyGram Singles	16.88	5.17
W.E.A. Albums	12.31	2.72
W.E.A. Singles	11.18	2.85
E.M.I. Albums	12.57	2.13
E.M.I. Singles	10.50	2.88
Total Albums	71.34	3.66
Total Singles	68.50	5.06

Source: Calculated from data in Music Week magazines 1983 - 1984.

Tables 4.5 and 4.6 illustrate the results of single regressions, where record company album market share is regressed against the same company's singles market share in the same quarter and the three previous quarters. The results indicate that all of the top six firms, apart from B.M.G., sell music which has commercial scope in both markets simultaneously. It also appears that most of this music is successful in both markets within the same quarter. The singles share variable is significant at the 1%

Table 4.5

Dependent Variable: Record company album market share 1983 Q1 - 93 Q4

Variables:	PolyGram	W.E.A.	E.M.I.
Constant	3.331 (2.34)**	2.06 (0.83)	7.61 (3.81)*
Singles Share	0.439 (3.81)*	0.473 (4.07)*	0.352 (3.05)*
Singles Share (-1)	0.350 (2.76)*	0.217 (1.82)***	0.016 (0.13)
Singles Share (-2)	0.010 (0.07)	0.154 (1.32)	0.012 (0.10)
Singles Share (-3)	0.086 (0.70)	0.082 (0.71)	0.089 (0.76)
R^2	0.78	0.41	0.23
F - Stat	31.61*	6.15*	2.72**
D.W.	1.37	1.13	1.71

* = significant at 1%, ** = significant at 5% level and
*** = significant at 10% level.

level for Polygram, W.E.A., E.M.I. and Virgin and is significant above the 5% level for Sony. The lagged singles share variables are not as influential. In the cases of E.M.I. and Virgin they appeared insignificant. However, they were significant at the 1%, 10% and 5% levels for Polygram, W.E.A. and Sony respectively. None of the two period lagged singles share variables were significant and only in the case of Sony, is a three period lagged singles market share variable significant.

Table 4.6

Dependent Variable: Record company album market share 1983 Q1 - 93 Q4

Variables:	B.M.G.	Sony	Virgin
Constant	4.522 (3.78)*	-0.433 (-0.18)	5.015 (4.10)*
Singles Share	0.115 (0.96)	0.308 (2.33)**	0.352 (3.22)*
Singles Share (-1)	0.141 (1.08)	0.283 (2.14)**	0.100 (0.92)
Singles Share (-2)	0.081 (0.61)	0.168 (1.27)	-0.059 (-0.53)
Singles Share (-3)	-0.012 (-0.10)	0.300 (2.38)**	-0.044 (-0.41)
R^2	0.18	0.47	0.29
F - Stat	2.01	8.06*	3.60**
D.W.	0.93	1.37	1.80

* = significant at 1%, ** = significant at 5% level and
*** = significant at 10% level.

Although the regression results identify a correlation, this does not necessarily imply causation. The results merely indicate that when music sells well in one market, it is likely to perform well in the other market in the same quarter. An interesting feature of the audio software market is that record companies are apparently willing to sell singles even though they make negative profits from this activity. The British Phonographic Industry (1989) estimate that, on average in 1988 record companies lost twenty pence on each single sold. This behaviour would seem to imply that there is

some external benefit derived from selling singles and this is most likely to be in the albums market. There are two, not necessarily competing, explanations:

1. *Advertising externalities:* A common view in the industry is that the release of singles generates media attention (particularly radio airplay) and hence promotes the sale of albums featuring the same tunes and artists. For example, Leadbeater (1994) claims: "At the moment, singles sales make up only 12% of a record companies business. They do, however, encourage LP/CD sales. So, companies release singles, hoping that they will be played on the radio and provide publicity for albums."[1]

2. *Information costs:* As we explained in the model of chapter 2, record companies can only estimate the demand for music in the audio software market. Since, on average, only 10% of album releases are profitable, it implies that record companies have great difficulty in forecasting consumer tastes. Since the cost of producing an album is greater than the cost of producing a single and since artists who perform well in the singles market are likely to succeed in the albums market, it might be prudent to incur information/forecasting costs in the singles, rather than the albums market. If this is the case then we would not be surprised to learn that record companies continue to sell singles at a loss.

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[1]Leadbeater (1994): p39

These two explanations for a spillover from the singles to the albums market might differ in terms of the timing of the spillover. The 'advertising' explanation implies that singles are being sold as a promotional device to promote albums sales. They aid album sales mainly by generating radio and television airplay and would, therefore, be most effective when the album itself is on sale. Thus, the advertising explanation would tend to imply that a spillover from the singles to the albums market would occur in the same time period.

On the other hand, the 'information costs' explanation might suggest that an intertemporal relationship exists between the singles and albums market. The purpose of the information costs strategy is to avoid incurring the costs of recording and manufacturing an album before the record company is sure that the album will be profitable. Thus, in this process, a particular artist would only get the 'green light' to release an album once she has had a success in the singles market. Since recording, manufacturing, and marketing design take a significant time to complete (on average five months), one would expect a lagged effect between success in the singles market and success in the albums market.

The differences in the timing of the market spillovers suggested by the 'advertising' and 'information costs' theories, implies that we can at least test the relative importance of information gathering behaviour, using Granger causality tests on record company market share. If information gathering is important, then one would expect company share in the singles market to Granger cause company share in the albums market.

Granger causality tests were carried out for E.M.I., Polygram, W.E.A., Virgin and Sony record companies and the results are presented in tables 4.7 to 4.9. The Wald tests clearly indicate that for all of the record companies, market share in the singles market did not Granger cause market share in the albums market. In other words, in the case of these record companies, current album market share is not a function of market share in the singles market in earlier periods. Thus, the results do not find intertemporal evidence of record companies concentrating information costs in the singles market.

However, the Granger tests also reveal why information costs do not appear to be important. The results indicate that there is not much evidence of inertia in the singles and albums markets. Among the albums equations, the Wald statistic indicates that a record company album market share in previous quarters has very little impact on its current album market share. In the case of E.M.I., Polygram, and Virgin records, album market share in the current period was found not to be determined by album market share in earlier periods. In the case of W.E.A. and Sony, the Wald test found album market share in earlier periods to determine current album market share at the 5% and 10% significance levels respectively.

There also appeared to be little evidence of inertia in the singles market. In the case of all of the record companies, except Virgin, the Wald test indicated that record company singles market share in previous quarters did not significantly affect the company's singles market share in the current quarter. In the case of Sony, the results indicated that albums market share Granger causes singles market share.

Table 4.7

Granger tests for causality between the albums and singles markets: E.M.I. record company.

Company	E.M.I.	
Dependent	Albums	Singles
Regressors:		
Constant	9.102	8.257
	(2.78)*	(1.99)***
Singles (-1)	0.120	0.434
	(0.76)	(2.17)**
Singles (-2)	-0.063	-0.208
	(-0.36)	(-0.94)
Singles (-3)	0.043	-0.102
	(0.27)	(-0.49)
Albums (-1)	0.068	-0.189
	(0.33)	(-0.72)
Albums (-2)	0.137	0.331
	(0.62)	(1.19)
Albums (-3)	-0.012	-0.065
	(-0.06)	(-0.24)
R^2	0.05	0.17
F - Stat	0.31	1.13
D.W.	1.97	1.95
Wald Singles	0.59	5.94
Wald Albums	0.65	1.63

* = significant at 1% level, ** = significant at 1% level and
*** = significant at 10% level.

Thus, the evidence suggests that there is a reasonably fast turnover of tunes in the singles and albums markets and that the popularity of particular tunes occurs in both markets simultaneously.[2] Therefore, the audio software market illustrates a great deal

[2]In section 1 we observed that most artists and tunes who were successful in both markets, were so in the same quarter. In the regressions of Tables 4.5 and 4.6 we saw a strong correlation between record company performance in the singles and albums market within the same quarter. Finally, the Granger causality tests found

of volatility in terms of tunes which are commercially valuable. In such a market, record companies would need to be as flexible as possible in terms of corporate

Table 4.8

Granger tests for causality between the albums and singles markets: PolyGram and W.E.A. record companies.

Company	PolyGram		W.E.A.	
Dependent	Albums	Singles	Singles	Albums
Regressors:				
Constant	2.579	0.628	4.943	10.213
	(1.40)	(0.27)	(2.02)***	(3.15)*
Singles (-1)	0.302	0.379	0.095	-0.001
	(1.73)***	(1.73)***	(0.61)	(-0.01)
Singles (-2)	0.050	-0.077	-0.035	-0.025
	(0.27)	(0.34)	(-0.22)	(-0.12)
Singles (-3)	0.062	-0.079	-0.139	-0.064
	(0.36)	(0.37)	(-0.90)	(-0.32)
Albums (-1)	0.358	0.002	0.265	0.162
	(1.77)***	(0.01)	(1.29)	(0.60)
Albums (-2)	-0.119	0.325	0.268	0.158
	(0.56)	(1.22)	(1.42)	(0.59)
Albums (-3)	0.253	0.096	0.130	-0.146
	(1.36)	(0.41)	0.69	(-0.58)
R^2	0.73	0.65	0.32	0.04
F - Stat	15.01*	10.51*	2.67**	0.24
D.W.	1.96	1.93	1.73	1.95
Wald Singles	3.71	3.83	1.19	0.11
Wald Albums	4.57	2.50	9.36**	0.94

* = significant at 1% level, ** = significant at 1% level and
*** = significant at 10% level.

that there was in general little inertia between or within these markets.

strategy. In other words, when a record company realises that a particular artist's tunes are in demand, it needs to exploit this promptly before consumer demand changes and the tunes lose their value. Therefore, in this environment, record companies are not afforded much of an opportunity to conduct a 'wait and see' approach in using the singles market to test out the value of an artist at a low cost.

Table 4.9

Granger tests for causality between the albums and singles markets: Virgin and Sony record companies.

Company	Virgin		Sony	
Dependent	Albums	Singles	Singles	Albums
Regressors:				
Constant	10.922	7.213	1.034	5.891
	(3.86)*	(1.94)***	(0.45)	(2.21)**
Singles (-1)	0.175	0.401	0.193	0.063
	(1.25)***	(2.19)**	(1.31)	(0.37)
Singles (-2)	0.202	0.394	0.026	-0.220
	(1.37)	(2.03)**	(0.18)	(-1.30)
Singles (-3)	0.020	-0.182	0.240	0.029
	(0.12)	(-0.86)	(1.68)	(0.18)
Albums (-1)	-0.312	-0.537	0.365	0.193
	(-1.56)***	(-2.04)**	(2.11)**	(0.96)
Albums (-2)	-0.343	0.137	-0.000	0.068
	(-1.35)	(0.41)	(-0.00)	(0.31)
Albums (-3)	-0.176	-0.131	0.098	0.363
	(-0.77)	(-0.44)	0.59	1.88***
R^2	0.16	0.33	0.49	0.29
F - Stat	1.11*	2.73**	5.41*	2.33***
D.W.	1.62	1.91	2.00	2.10
Wald Singles	5.36	12.52*	3.92	1.82
Wald Albums	3.39	5.27	6.36***	7.42

* = significant at 1% level, ** = significant at 1% level and
*** = significant at 10% level.

If an artist is successful in the singles market the album ought to be available at the same time. In practice, this is evidenced by the fact that virtually all artists who are signed to record companies are awarded an advance on royalties to finance the recording of an album.

Summary of Section 2: The analysis of company market share data illustrated that record companies exhibit little inertia in company market share, even over quarterly time periods. The company data was consistent with the analysis of section 3.1 to the extent that the performance of companies was most strongly correlated across the singles and albums markets within the same quarter. (The results, therefore, indicate that the willingness of record companies to sell music in a loss-making singles market is more likely due to publicity externalities than the minimisation of information search costs). Scope for the latter seemed to be greatly restricted by the high turnover of tune popularity. Evidence for the former seemed to be supported by the fact that the company market share was correlated across markets within the same quarter, in the absence of similar intertemporal correlations.

Section 3: Tune Innovation and Industry Demand

In this section we want to examine the audio software market at the industry level. We set out to estimate the demand for audio software. This analysis is novel and hence interesting in its own right, however, it also sheds important light on other issues. In particular, we hope to capture the impact of tune innovation on industry

demand. In this sphere, we are interested to learn whether tune innovation by record companies has, in general, competition or multiplier effects for the industry as a whole. Competition or 'Business stealing effects' arise if a record company releases tunes that superannuate those of other artists so that audio software sales gained by the new tunes occurs at the expense of lost sales of existing tunes. Multiplier effects may occur if the new tunes draw a new set of consumers and/or expenditure into the market so that similar existing tunes also benefit from increased expenditure. We aim to test this proposition in relation to tune innovation which has commercial scope in both the singles and albums markets.

A second aim of the analysis is to assess the degree of inertia in the sales of a particular format of audio software e.g. vinyl, cassette etc. Since a movement between incompatible formats entails switching costs for consumers, we would expect the diffusion of a software format to have an effect on current purchases. This proposition has important consequences for the analysis of audio systems innovations in the next chapter.

The structure of the section is as follows: sub-section 3.1 outlines a survey of the data and this is followed in sub-section 3.2 by the derivation of an index for tune innovation. Sub-section 3.3 surveys the econometric results and sub-section 3.4 interprets the coefficient values.

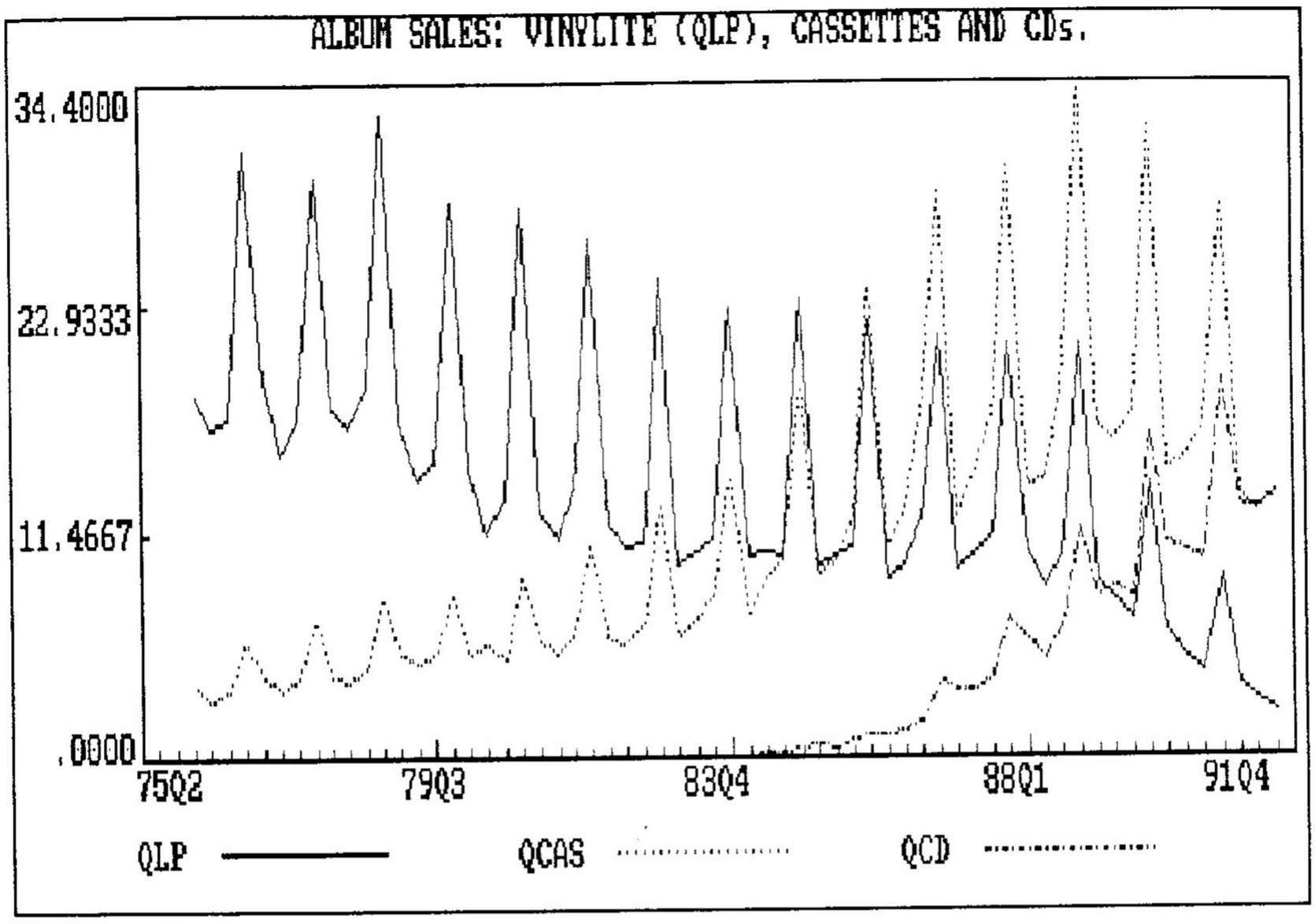
Sub-section 3.1: The Data.

The collection of sales data for the audio software market has been sporadic with data

collected for isolated years and regions. This scenario began to alter somewhat in the 1970s when the British Phonographic Industry (BPI) began to collect increasingly comprehensive data for the U.K. Only recently has the possibility of using this information for time series econometric analysis arisen due to the recent availability of data in quarterly form over a statistically meaningful period.

Pre-recorded audio software is available on many formats. We intend to model the demand for the vinylite 12 inch 'L.P.' using quarterly data. There are a number of reasons why we chose to focus exclusively on the vinylite format. Firstly, data are not available over a statistically meaningful time period for the 8-track Cartridge, 78 rpm Shellac Disc and Compact Disc formats. This narrows the examination of the album format down to either 12 inch discs or 2-track cassettes. However, over the early years of the sample (1976-1979) the range of tunes available on cassette was restricted due to low levels of demand for this specific format. The same was not true for the 12 inch vinylite disc which had a full range of tune selection. This provides our second reason for choosing to focus on the vinylite disc format, namely that we can be sure that the effects of tune innovation on L.P. sales will not be buffeted by the non-availability of such innovation on this format. We have to be sure that this innovation is fully exhibited on the album format. With long playing vinylite records this is the case; but not with the cassette format which had only a restrictive range of tunes available up until the early 1980s. It is also for this same reason that we truncate the sample period around 1988 when the selection of tunes on vinylite began to become restricted as the compact disc had reached significant diffusion levels. The sales of vinylite, cassette and C.D. album formats are portrayed in figure 4.1.

Figure 4.1: Album Sales in Millions of Units



Source: B.P.I.

The retail value of U.K. audio software sales generally amounts to around 3 per cent of consumers' leisure expenditure and just under 0.4 per cent of total consumers' expenditure. Table 4.10 illustrates the size of the U.K. retail record market relative to the U.S., Japan, France and West Germany over the sample period 1975 - 1988. The data are annual and are measured in millions of current U.S. Dollars. The data account for all forms of pre-recorded audio software. Over the same period the U.K. market was roughly 20% the size of the U.S. market, just over half the size of the Japanese market and of comparable size to market in France and West Germany. Therefore, on an international level the British record market is certainly significant.

Table 4.10: Relative Size of the U.K. Audio Software Market

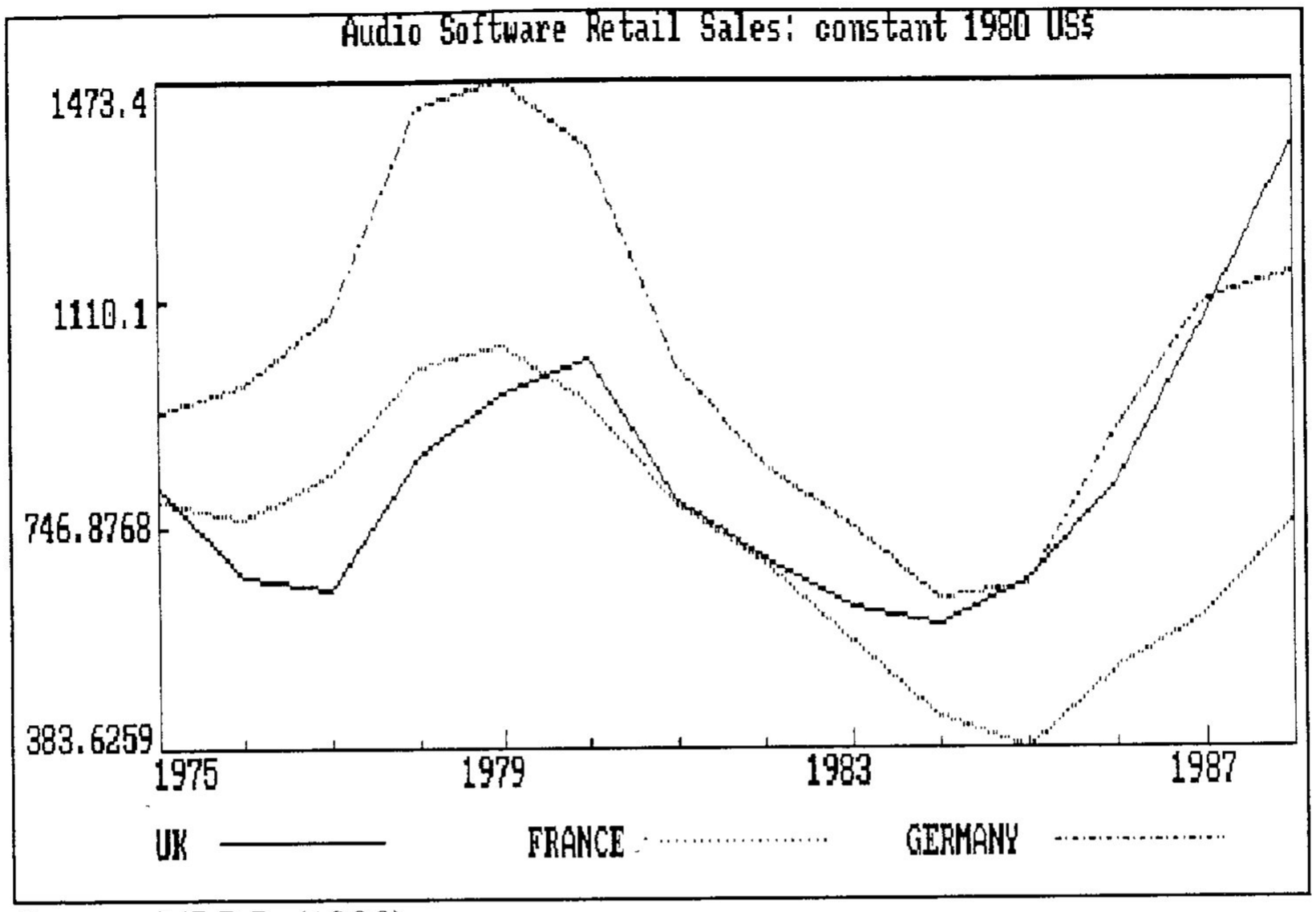
The U.K. retail audio software market as a percentage of the respective markets of the U.S., Japan, former West Germany and France, over the period 1975 - 1988.

	U.S.	Japan	Germany	France
Mean	21.5	61.4	82.9	121.2
Max	31.6	76.7	119.1	182.1
Min	13.6	51.6	59.0	77.8
Std.Dev.	4.8	7.3	17.1	37.5

Source: Calculated from I.F.P.I. (1990).

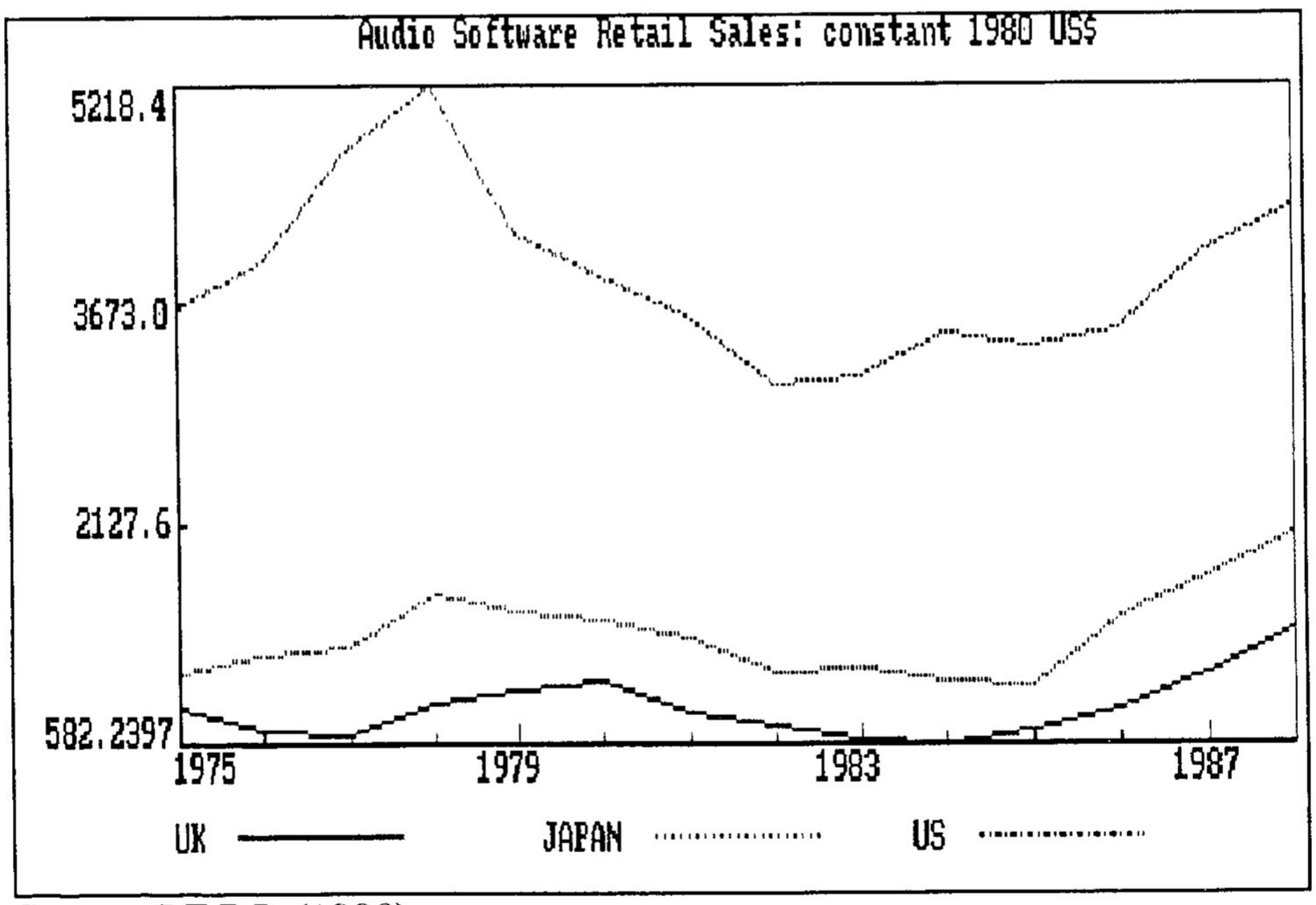
In figures 4.2 and 4.3 we have plotted the constant 1980 million U.S. Dollar value of the U.K. retail audio software market along with that of France and Germany (figure 4.2) and Japan and the U.S. (figure 4.3) respectively. The figures illustrate the high correlation of the real values of these respective markets which indeed gives an indication that economic variables are likely to play a significant role in determining the sales value of these cultural goods. This is particularly striking when we consider that the major downswing in the graphs coincides with the 1979 world recession, while the upswing coincides with the mid 1980s world recovery. These features highlight that the foregoing analysis of the U.K. market is likely to identify determinants that have-similar impacts in other developed countries.

Figure: 4.2



Source: I.F.P.I. (1990)

Figure: 4.3



Source: I.F.P.I. (1990)

We now move on to inspect the likely independent variables determining the demand for pre-recorded audio software. These are listed below and we examine data

availability and trends sequentially:

(1) *Income.*

(2) *Price of pre-recorded and blank audio software.*

(3) *Tune Innovation/Imitation.*

(4) *Selection of tunes on compatible pre-recorded audio software.*

(5) *Price of complements - audio hardware.*

(6) *Demography - youth population.*

(7) *Durable good factors.*

(8) *Seasonal factors - Christmas presents.*

(1) *Income:* Most economic models of demand assume that the consumer uses either current or permanent income in deciding whether a purchase is affordable or not. Assuming no money illusion, real GDP (1985 prices) may be used as a proxy for the former. The latter varies depending whether one has an 'adaptive' or 'rational' perspective on the manner in which the individual forms expectations about future income. We use a five period moving average of current real income (YPER) as a proxy for permanent income in its adaptive form. We augment this into a 'rational' form by incorporating the rate of change of current income (DLGDP) as a proxy of future changes in current income. We also generated a 'Koyck' lagged version of real permanent income (YPER2) by using a weighted average of the last four periods real national income [i.e YPER2 = .4(GDPt) + .3(GDPt-1) + .2(GDPt-2) + .1(GDPt-3)].

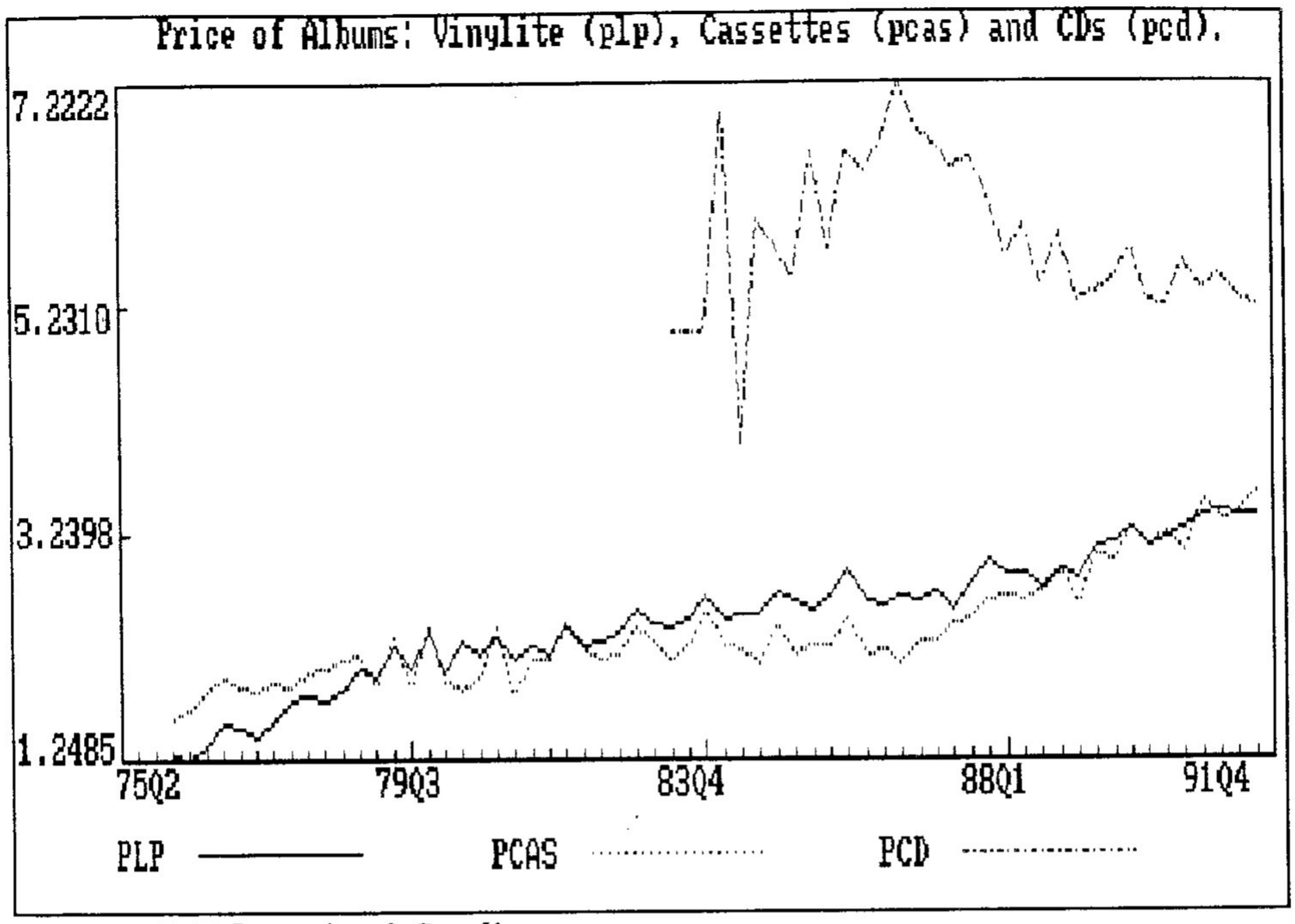
Some analysts are unhappy with the use of GDP as an estimate of aggregate income

as it assumes that the consumer base receives the full proportionate benefit of growth in demand. This concern may be warranted given that income has not grown proportionately in the U.K. over the 1980s. We also use a more direct measure of aggregate consumer income, namely the real average wage times the level of employment ('RWL' = (w/(R.P.I.)) *times* employment)). This is also represented in log form as 'LRWL'. A permanent income version is constructed using a five period moving average similar to that constructed for permanent GDP, resulting in the variable RWLPER and its log form LRWLPER. All the above income data are extracted from the CSO's Annual Statistical Bulletin.

(2) *Price of pre-recorded and blank audio software:* There are no price data available for blank tapes. The price data for pre-recorded audio software are generated from B.P.I. statistics, dividing the value of sales by the number of units sold. The resulting prices data are wholesale prices and, given that the retail price mark-up is fairly constant over the period, these prices give a reasonably accurate description of the movement of audio software retail prices over the period. The prices of album audio software are presented in figure 4.4.

Two features are notable from figure 4.4. Firstly, the price of vinylite and cassettes are closely correlated both in variation (correlation coefficient = 0.84) and actual levels. This is likely to present multicollinearity difficulties in the econometric analysis. Secondly, compact discs have been roughly double the price of other album formats since their introduction.

Figure 4.4.



Source: B.P.I.; units £ Sterling.

(3) *Tune Innovation/Imitation:* The quality of music (as judged by consumers) available on pre-recorded software is very likely to affect the quantity of records bought. However, given that music tastes appear to be strongly fashion orientated, such tune innovation/imitation in the current period would be expected to have a very large influence in determining the size of the 'stock' of tunes that appeal to the current set of consumers. Its actual influence on this 'stock' will depend on whether competition or multiplier effects dominate.

Given tune innovation's intangible nature, no data exists for this form of enterprise. However, given the scale of anecdotal evidence citing the cause of various sales booms being due to such innovation (for example, see Denisoff 1986), a credible proxy is necessary if one hopes to estimate a meaningful demand equation for records. The key

to deriving such a proxy is to use the finding that a proportion of tune innovation which is successful in both the singles and albums markets. Later, in section 3.2 we will estimate the demand for singles. This will generate a residual which, in the absence of a variable for tune innovation, will include the impact of tune innovation on the sale of singles. Using this as a monotonic proxy for tune innovation/imitation we then estimate the demand for vinylite album sales.

(4) *Selection of tunes on compatible pre-recorded audio software:* The technological qualities of particular software prevents hardware compatibility between formats e.g. vinyl cannot be played on a cassette player. This often constrains the choice of tunes available to a consumer if she is 'tied' to a specific format. Since consumers like to avoid switching costs associated with the movement from one format to another, they tend to prefer formats that have an extensive range of tunes available. Therefore, the demand for the vinylite format would be expected to be affected by the range of vinylite albums available. To pick out this influence we generated a variable (DIFLP) measuring the four period moving average percentage market share of vinylite albums in the previous period [DIFLP = (4 period moving average of quantity of L.P. sales)/(four period moving average of the quantity of vinylite, cassettes, cartridges and compact discs sales) lagged one period][3]. The primary data are sourced from the B.P.I.

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[3] The variable DIFLP might be considered endogenous to the estimated demand equations of section 3 if it was determined by movements in the relative price of L.P.s and cassettes. However, the relative price of these two products remain fairly constant over the sample period and are highly correlated (correlation coefficient = 0.84). Therefore, there is little scope for L.P. album market share to be affected by the relative price of L.P.s and cassettes. Further, removing DIFLP from the demand equations in section 3 and replacing it by a series of audio software relative prices resulted in insignificant relative price variables. These variables were also insignificant when DIFLP was included.

(5) *Price of Complements:* Unfortunately, no data exist for the price of audio hardware over the sample period. This omission will lead to a certain degree of mis-specification.

(6) *Durable good factors:* Audio software, not being immediately diminishable, is likely to be influenced by qualities associated with consumer's considerations of durable goods. Once a durable good is purchased it is often expected that this will pacify the desire for more of the product for a certain duration. Thus, we will test for such influences using lagged dependent variables. Often it is claimed that if consumers 'splurge' on a durable product in a particular period that they will attempt to compensate for this 'above average expenditure' by reducing consumption below the average in subsequent periods. We test for these effects using an error correction mechanism model [for example, Davidson et al (1978)].

We also test for the significance of traditional real and nominal interest rate effects. The interest rate chosen is the CSO's Selected Retail Bank Short Term Deposit Account Interest Rate which is arguably the most relevant interest rate to the youth population who form the backbone of the audio software market consumer base.

(7) *Demographic factors:* Demography is commonly cited as a significant driving force behind the sales of audio software (see Denisoff 1986 and BPI Market Information: Quarterly Reports). The vast majority of the market for audio software is essentially made up of young buyers between the ages of ten and thirty five. The most recent survey undertaken by Gallup for the BPI (cited in BPI 1992 Statistical Handbook)

found that 61% of album sales and 78% of single sales were purchased by individuals under the age of thirty five. The BPI estimates show men buying roughly 8.5% more albums, but an equal number of singles as women. Given the broad stability of gender shares in the U.K. population over the period 1976 to 1988, we can ignore sex in the statistical analysis.

While annual data of population by age category exist, the same is not true on a quarterly basis. Consequently, we had to derive our own data for quarterly population by age group. This data was derived from the CSO's Monthly Digest of Statistics (all data is measured in thousands of population). The age groups are divided into cohorts of five years: 10-14, 15-19, 20-24, 25-29 and 30-34. The procedure we pursued for each group was the same. The CSO estimates the population of each group in June each year, and we used their 1975 estimate as our initial period, i.e. 1975 quarter two. Our aim was to adjust this figure for net births, deaths and migration for each subsequent period in order to arrive at a quarterly population data set for each group. Therefore, we first adjusted our initial observation (1975q2) for birthdays. In other words, in each subsequent quarter we subtracted out the number of individuals who were now too old to be in this age group classification and added in those whose recent birthday qualified them for inclusion in the age group. Thus, for the 10-14 year old age group, we subtracted the number of births 60 quarters earlier and added in the number of births for 40 quarters earlier [i.e. 1975q3 = 1975q2 + Z14(t) where Z14(t) = - births(t-60) + births (t-40) and 1975q4 = 1975q3 + Z14(t+1) where Z14(t+1) = - births(t-59) + births (t-39) etc.] For age groups 15-19, 20-24, 25-29 and 30-34 the birthday adjustments were Z19, Z24, Z29, and Z34 where Z19(t) = - births(t-80) +

births(t-60), Z24(t) = - births(t-100) + births(t-80), Z29 = - births(t-120) + births(t-100), and Z34 = - births(t-140) + births(t-120).

The next step involved adjusting the data for deaths and net migration. We managed this by subtracting the birth adjusted quarterly data for the second quarter each year from the C.S.O.'s estimate as calculated each June. The resulting residual gave us the net migration and deaths that had taken place each year (June to June) in each age group. We wanted to add this residual to the birth adjusted data in the most realistic sense possible. In other words we wanted to avoid adding it in four equal quarters to each quarterly period. We attempted this by creating a weighting system based on the number of deaths in each quarter. Thus we broke the total number of deaths in each year (June to June) down to percentage shares attributable to each quarter. We then added the net migration and deaths residual to each quarter according to its percentage share of total deaths in the particular year (June to June). This gave us the our final estimate of quarterly population by age group. In log form these are labelled LPOP14, LPOP19, LPOP24, LPOP29, and LPOP34 for age groups 10-14, 15-19, 20-24, 25-29, and 30-34 respectively.

(8) *Seasonal Factors:* Seasonal factors are very likely to play a significant role in determining the demand for records. In particular we would expect the popularity of albums as a form of gift to increase the demand for the product at Christmas. The British Phonographic Industry, in their 1991 Yearbook, claim that on average 40 per cent of retail sales occur in the Christmas quarter. To examine this and other propositions we will test for the significance of seasonal dummy variables.

Section 3.2: Derivation of Tune Innovation Indices.

In this sub-section, we want to derive an index for tune innovation. We utilise the findings of section 1 where we observed that a significant proportion of tunes that are successful in the singles market were also successful in the albums market. Since a proportion of tune innovation is consistent across these two markets it may be possible to use the singles market to generate an index of tune innovation that may be used in the albums market. The procedure involves estimating a demand equation for singles, which in the absence of a tune innovation variable will generate a residual which will contain tune innovation in the singles market and an error term. Formally:

$$U_t = I_t + e_t \qquad (3.1)$$

where I_t is actual tune innovation, e_t is the real error term, and U_t is the actual error term.

Assuming that the real error term has a mean of zero, the residual from the singles equation will approach a true estimate of tune innovation as time approaches infinity i.e

$$U_t = I_t^s \qquad (3.2)$$

However, the tune innovation variable of (3.2) will include successful tunes that do not have scope in the albums market. This implies that the tune innovation variable is a proxy rather than an actual variable. Thus, it is likely to be most effective if tune

innovation unique to the singles market is positively correlated with tune innovation with scope in both markets, and most ineffectual if negatively correlated. Magnitudes also matter if the index is to be reliable, and the fact that virtually 70 per cent of artists who were successful in the Top 100 singles charts within a given year were also featured in the Top 100 albums charts of the same year gives us reason to believe that the tune innovation proxy is largely made up of tunes with commercial scope in both markets.

We adopt two approaches in our estimation of a tune innovation index. The first approach is a general to specific co-integration estimation procedure. This is based on a supposition of a stable long-run relationship between dependent and independent variables. It allows for the fact that variables may be off their long-run paths due to short-term disequilibrium. In order to avoid such deviations from the long-run relationship generating unreliable regressor coefficients, this approach is usually associated with an error correction model (ECM). In terms of the albums market we intend to use such an ECM. However, in order to generate a tune innovation variable from a singles equation, such an approach would inevitably capture the effect of tune innovation within the error correction term, so that the residuals of an ECM would have already been filtered of the impact of tune innovation. Thus, in the case of the singles equation we attempt to avoid the spurious regression problem, but do not proceed to an error correction model. In effect, the error correction term is the tune innovation proxy.

The second approach is a theoretical specific to general model. This is not an

approach that we would generally advocate, but it seems prudent to conduct such an analysis given that a significant proportion of economists either reject or are sceptical of the unit root approach. The two main criticisms are firstly, if one does not accept the equilibrium concept (e.g. Austrian School of Economics), then one regards the economic intuition of the unit root approach as a vice rather than a virtue. Secondly, it is often argued that avoiding spurious correlation through differencing of variables actually discards information as one moves from levels to differences, and hence may generate a spurious rejection of a correlation. Resolving this debate is well beyond the realm of this thesis and, therefore, we avert the issue by carrying out both analytical procedures.

Co-integration approach:

Since the data are quarterly, the Dickey-Fuller and Augmented Dickey-Fuller tests are not appropriate since a unit null is often not rejected when a seasonal root is resident in the data. Therefore, we carried out OCSB tests outlined by Osborne et al (1988). The test procedure involves regressing each variable in the following manner:

$$\begin{aligned}(1-L)\ (1-L^4)y_t \;=\; & \alpha_1 D_{1_t} + \alpha_2 D_{2_t} + \alpha_3 D_{3_t} + \alpha_4 D_{4_t} \\ & +\beta_1\ (1-L^4)y_{t-1} + \beta_2\ (1-L)y_{t-4} \\ & + \sum_{j=1}^{p} \phi_j\ (1-L)(1-L^4)y_{t-j} + \varepsilon_t \qquad (3.3)\end{aligned}$$

Where y is the variable being tested and D_1 to D_4 are four seasonal dummy variables.

The last term of the equation is similar to the last term in the Augmented Dickey-Fuller tests and additional lags of this variable may be added to the equation in a bid to test for unit roots. The null hypotheses are as follows:

$B_1 = 0$ (cannot reject the existence of a non-seasonal unit root) t - Statistic.

$B_2 = 0$ (cannot reject the existence of a seasonal unit root) t - Statistic.

B_1 and $B_2 = 0$ F - Statistic (variable deletion tests).

The critical value for the t-statistics and the F-statistics are given in Osborne (1990). Thus, if B_1 and/or B_2 are found to have insignificant t-statistics then we can reject the non-seasonal and/or seasonal null. However, if both are found to be insignificant a variable deletion test is carried out on both B_1 and B_2 simultaneously. If this turns out to be significant then individual variable deletion tests are carried out on B_1 and B_2, and if either of these are significant, we reject the null in the relevant case.

In carrying out the OCSB tests we included a lagged dependent variable, lagged to the fourth order. We found that most variables were most susceptible to fail to reject the unit nulls with the inclusion of dependent variables lagged to the fourth order. In table 4.11 we report the t-ratios for B_1 and B_2, the F-statistic for B_1 and B_2, for the OCSB tests where the dependent variable is lagged to the fourth order. The table also summarises the results of the OCSB tests by identifying the existence of unit roots in the brackets, where the first term takes on a value of unity if a non-seasonal root cannot be rejected, and where the second term does likewise if a seasonal root cannot be rejected.

Table: 4.11

Variables:	Order	B_1 t-stat	B_2 t-stat	B_1 and B_2 F-stat
LGDP	(1.0)	-0.54	-2.65	5.12*
LYPER	(0,0)	3.49*	-5.33*	16.44*
LYPER 2	(1,0)	1.63	-3.42***	7.16*
LRWL	(0,0)	3.56	-5.41*	16.77*
LRWLPER	(0,0)	5.74*	-6.05*	19.53*
LPSIN	(1,0)	-0.77	-3.33***	8.32*
LRELPSL	(1,0)	-1.00	-2.95	5.98*
LPSINI	(1,0)	-1,46	-3.27***	10.05*
LSUBPLP	(1,0)	-1.28	-3.97***	11.25*
LPLP	(1,0)	-1.22	-3.76**	10.19*
LRELPLC	(1,0)	-0.37	-4.55*	12.84*
LQLP	(1,0)	1.48	-2.96	4.49*
TUNE A	(0,1)	-3.46*	-2.85	16.93*
TUNE B	(0,1)	-5.08	-1.68	19.59*
LPOP14	(0,1)	2.14**	-2.57	4.84*
LPOP19	(0,1)	2.70**	-2.65	3.64**
LPOP24	(0,0)	3.25*	-3.33	5.55*
LPOP29	(0,0)	2.85*	-3.48***	17.12*
LPOP34	(0,0)	3.37*	-3.86**	9.73*
DIFLP	(1,0)	1.66	-3.75**	10.33*
NOMINAL r	(1,0)	-0.44	-4.69*	15.61*
REAL r	(1,0)	-0.43	-4.34*	13.09*
RESSUR	(0,1)	-2.88*	-2.00	10.62*
RESTOT	(0,1)	-3.04*	-2.04	11.75*

* = significant at 1% level, ** = significant at 5% level, and
*** = significant at 10% level.

The results of the general to specific co-integration approach are outlined in table 4.12.

The dependent variable is the sale of all formats of singles. Equation A estimates a cointegrating regression and finds singles to be a normal good, negative cross-price inelastic with respect to vinyl albums and positively related to the Christmas quarter. Inclusion of time dummy variables were necessary to derive sensible results. The equation passed the Engle-Granger cointegrating Durbin-Watson test. The residual

from this equation generated our first tune innovation proxy which we denoted TUNE A.

Table 4.12

Dependent Variable: (A) log of the quantity of singles and (B) the change in the log of the quantity of singles. Regressors are in levels in equations (A) and first differences in equation (B). Sample: (A) 1976 Q2 - 1990 Q2 and (B) 1976 Q2 - 1989 Q2.

Variables:	A	B
CONSTANT	-16.27	
	(-2.240**	
TIME DUMMY	0.032	
	(7.20)*	
$(TIME\ DUMMY)^2$	-0.001	
	(-6.77)*	
LGDP	1.627	2.421
	(2.47)**	(5.14)*
LREL	-0.558	-0.432
	(-3.11)*	(-1.74)***
XMAS	0.091	0.104
	(1.98)***	(2.83)*
LPOP14		4.631
		(2.81)*
LPSINI		0.673
		(1.87)***
R^2	0.72	0.72
Adj - R^2	0.69	0.69
F - Stat	26.66*	30.33*
CRDW	1.23	2.76

* = significant at 1% level, ** = significant at 5% level. and
*** = significant at 10% level.

We also adopted a first differences approach where all the variables were stationary. This permitted the inclusion of the population variables. Equation B in table 4.12 is

the specific equation identified. For an equation in differences it exhibits a reasonably high R squared, it also passes the cointegrating Durbin-Watson tests and does not need time dummy variables. The regressors identify singles as a normal good, cross-price inelastic with respect to vinyl albums, increasing in the Christmas quarter and positively related to the 10 - 14 year old population. The equation finds a positive coefficient on the real price of singles variable (LPSINI) which is likely to be due to unaccounted for demand shift parameters e.g. price of audio hardware. An increase in demand due to unaccounted factors would be expected to be correlated with an increase in the price of singles and hence generating a positive coefficient. The residuals of equation B gave us our second tune innovation proxy which we denoted as TUNE B.

The results of the specific to general theoretical singles equations are presented in table 4.13. In this table, and throughout the rest of the chapter 'Substitution Price' and 'Total Price' equations refer to equations where the price of the dependent variable is, respectively, its nominal value and its nominal value divided by the non-food retail index. The equations give similar results to the unit root approach in that GDP, the 10 - 14 year old population and the Christmas quarter are all determinants of singles demand. As in equation B, LPSINI is found to be positive and significant in the Substitution Price equation. In the Total Price equation, the nominal price of singles is also found to be positive and significant. We felt it important to include these variables as their purpose was to attempt to filter out of the error term as much noise as possible. We also included a term to capture a durable good quality of singles. Namely, if singles buyers are young then singles purchases might account for a

significant proportion of their income. Hence, it is possible that above average

Table 4.13

Dependent variable: LQSIN = The log of the quantity (units) of singles sold. *Regressors*: LGDP = log of real GDP, Lpop14 = log of 10-14 year old population, XMAS = quarter 4 dummy, DQSIN = durable good error correction mechanism, LPSIN = log price of singles, LSUBPSIN = log of PSIN divided by non-food R.P.I., *Sample:* 45 observations: 78q2 - 89q2.

Variables:	Sub-Price	Tot-Price
CNT	-14.45	-21.89
	(-1.58)	(-1.79)***
LGDP	0.6765	0.9823
	(1.21)	(1.47)
LPOP14	1.31	1.6602
	(3.36)*	(2.78)*
XMAS	0.1957	0.1803
	(5.45)*	(4.49)*
DQSIN	-.0079	-.0114
	(-1.66)	(-2.66)**
LSUBPSIN	0.2513	
	(1.37)	
LPSIN		0.1553
		(1.22)
Statistics:		
R-Squared	.8548	.8534
R Bar-Squared	.8362	.8346
F	45.92*	45.40*
D.W.	2.40	2.40

* = significant at 1% level, ** = significant at 5% level, and
*** = significant at 10% level.

expenditure in one period may be expected to retard above average in the following time period. To account for this we included the variable DQSIN which identified

whether expenditure in the previous period was below average.[4] This was found to be positive and significant. The residuals from the singles Substitution Price and Total Price equations were used as two further proxies of tunc innovation and were respectively denoted as RESSUB and RESTOT.

Table 4.14

Correlation coefficients of tune innovation variables. RESSUB: residuals from substitution price singles equation. RESTOT: residuals from total price singles equation. TUNE A: residuals of singles equation A. TUNE B: the residuals of the singles equation B.

	RESUB	RESTOT	TUNE A	TUNE B
RESUB	1	-	-	-
RESTOT	0.996	1	-	-
TUNE A	0.720	0.750	1	-
TUNE B	0.847	0.852	0.819	1

All of the tune innovation variables were found to be fairly similar in magnitude and variation. Table 4.14 portrays the correlation coefficients matrix for these variables. The lowest correlation is that between TUNE A and RESSUB at 0.72 while the highest is between RESSUB and RESTOT at 0.996. OCSB tests of the four tune innovation proxies are presented in table 4.11 and find these variables not to exhibit a non-seasonal unit root but not to reject a seasonal unit root.

[4] $DQSIN = [(((QSN_{t-5}) + (QSIN_{t-q}))/2) - (QSIN_{t-1})]$

Section 3.3: The demand for vinyl albums:

The cointegration approach implies that the tune innovation variables cannot be regressed against the sale of albums in levels. We, therefore, differenced the variables so that they were stationary and conducted a general to specific analysis. The resulting specific equation is presented in column A in table 4.15. The equation does not find any of the tune innovation variables to be significant. The equation identifies vinyl albums to be normal goods, cross-price elastic with respect to albums on a cassette format and positively affected by the Christmas quarter. The equation also identifies the variable DIFLP as a positive and significant determinant of album sales, which supports the notion that switching costs are important in a market with non-compatible formats. The cointegration approach argues that two variables should be integrated of the same order if a long-run relationship is to exist. However, a possible justification for the inclusion of a stationary independent variable in an equation with a non-stationary dependent variable is suggested by Johansen and Juselius (1992) and applied by Wright (1994). The intuition of this argument is that in cases where the sample period is reasonably short, the stationary variable acts like an error correction mechanism when the remaining variables are non-stationary. In other words, although there may be no long term stable relationship between the dependent variable and the stationary independent variable, the latter may play a role in determining the dependent variable's adjustment to equilibrium. Thus, in terms of the albums equation the actual long-run relationship between the non-stationary independent variables and the non-stationary albums variable may be distorted if short-run shocks have not been accounted for. Therefore, a significant tune innovation variable would indicate that a stationary tune innovation variable may have an impact on a non-stationary variable

if these effects are small i.e. not sufficient to generate a stationary dependent variable.

In order to test this approach, we included the tune innovation variables and conducted another general to specific analysis in levels. The results are presented in column B of table 4.15. The results are similar to column A except that the tune innovation variable TUNE A is positive and significant, and the relative price of vinyl albums over cassettes is superseded by the nominal price of vinyl albums. Column C conducts a Davidson and Hendry (1978) style re-estimation of the equation, deleting the last eight observations. The equation continues to hold and it is notable that the tune innovation variable becomes more significant. The latter is probably due to the fact that the scale of tune innovation transfer from the singles to the albums market was beginning to become inhibited in the latter years of the sample as the Compact Disc started to replace the vinyl format.

Column D conducts an error correction model of equation B. The ECM deprives the tune innovation variable of its significance but this is not too surprising given that the tune innovation was effectively acting as an error correction mechanism in equation B.

In table 4.16 the annual income substitution price equation appears to give the best fit to the data as it is the only equation to pass the Durbin-Watson test. The other three equations exhibit negative autocorrelation. The substitution Price tune innovation proxies are significant at the 5% level while the total price versions are significant at the 10% level.

Table 4.15

Dependent variable: (A) and (D) first difference of the log of the quantity of vinyl albums, (B) and (C) the log of the quantity of albums. Regressors: in levels in (B) and (C) and in first differences in (A) and (D). Sample (A), (B) and (D) 1977 Q2 - 1988 Q1, and (C) 1977 Q2 - 1986 Q1.

	A	B	C	D
CONSTANT		-21.356	-13.359	-0.057
		(-4.03)*	(-2.37)**	(-1.27)
LGDP	6.739	2.140	1.415	8.673
	(7.10)*	(4.65)*	(2.86)*	(9.673)*
DRELPLC	-1.1223			
	(-2.85)*			
DIFLP	17.467	1.077	1.059	15.853
	(7.05)*	(4.10)*	(4.08)*	(4.68)*
XMAS	0.551	0.694	0.740	0.671
	(7.36)*	(19.23)	(21.04)*	(8.98)*
TUNE A		0.444	0.497	0.010
		(3.98)*	(4.865)*	(0.04)
LPLP		-0.917	-0.828	-0.880
		(-7.49)*	(-6.23)*	(-1.77)***
B Residuals (-1)				-2.293
				(-5.68)
R^2	0.88	0.97	0.98	0.92
Adj - R^2	0.87	0.96	0.97	0.91
F - Stat	97.34*	237.32	347.82	75.43
CRDW	2.39	2.58	2.46	2.03

* = significant at 1% level, ** = significant at 5% level, and
*** = significant at 10% level

Summarising the cointegration estimates, the results indicate that there is no long-run relationship between the tune innovation variables and album sales. This implies that tune innovation has been adequately captured by the proxies, then competition effects dominate multiplier effects so that tune innovation is seen to have little effect on

industry demand; even though it may play a significant role in determining demand at the firm level.

We now move on to derive the best fit using theoretical guidelines. We aim to test Total Price and Substitution Price equations under both quarterly an annual income estimates. Thus we will have four equations. The results are presented in table 4.16 for the sample 1978q2 to 1988q1 and in table 4.17 for period 1978q2 to 1986q1.

Turning to table 4.17 for re-estimation of the same equations excluding the last eight observations we notice that all the equations hold up reasonably well. The Substitution Price permanent income equation continues to pass the Durbin-Watson test and the D.W. statistic for the Substitution Price current income model now is greater than the Durbin-Watson upper bound. The Total Price equations, unfortunately, again exhibit negative autocorrelation both failing the Durbin-Watson test. Notably, however, the deletion of the last eight observations ensures that the Total Price tune innovation proxies are now significant at the 95% level. It also reduces the significance of the Total Price permanent income variable from the 95 to the 90% level. In all equations the signs on the regressors are theoretically sensible. All equations pass the heteroscedasticity tests.

Similar to the General to Specific equations, the deletion of the last eight observations seems to improve the fits for all equations with enhanced R-bar squared values. This is most likely due to the aforementioned argument that in the latter half of the 1980s the vinylite album was being gradually superannuated by the compact disc and cassette

Table 4.16

Dependent Variable: LQLP. *Regressors* (previously unidentified): YPER2 = Koyck lag style estimate of (real GDP) permanent income, RWL = real aggregate average wage times employment, LRWL = log of RWL, RESTOT = Total Price estimate of tune innovation, LYPER = Log of five period moving average of real GDP. *Sample:* 78q2 to 88q1: 40 observations.

Variables:	Sub-Pr C-I	Sub-Pr P-I	Tot-Pr C-I	Tot-Pr P-I
CNT	-52.70	-87.76	-26.07	-35.25
	(-6.32)*	(-5.99)*	(-4.21)*	(-4.72)*
RESSUB	0.3336	0.3329		
	(2.28)**	(2.00)**		
RESTOT			0.2661	0.2813
			(1.78)***	(1.82)***
XMAS	0.8023	0.7858	0.8051	0.8027
	(29.79)*	(26.32)*	(27.21)*	(26.10)*
DIFLP	3.995	5.0121	1.2961	1.7092
	(8.49)*	(6.87)*	(3.24)*	(4.16)*
LPOP29	5.854	6.0678	2.2852	2.3197
	(6.43)*	(5.96)*	(2.69)**	(2.55)**
LSUBPLP	-.9573	-1.0172		
	(-3.82)*	(-3.20)*		
LPLP			-.7874	-.8603
			(-3.29)*	(-3.50)*
RWL	.0000001			
	(4.43)*			
YPER2		2.9951		
		(2.98)*		
LRWL			0.5941	
			(2.61)**	
LYPER				1.6339
				(2.19)**
Statistics:				
R-bar Squared	.9747	.9682	.9726	.9756
F-Statistic	251.2*	198.67*	231.55*	219.55*
D.W.	2.5899	2.2586	2.6193	2.5378

* = significant at the 1% level, ** = significant an the 5% level, and
*** = significant at the 10% level

Table 4.17

Dependent Variable: LQLP. *Sample:* 78q2 to 86q1: 32 observations.

Variables:	Sub-Pr C-I	Sub Pr P-I	Tot Pr C-I	Tot Pr P-I
CNT	-56.87	-93.03	-20.85	-28.03
	(-7.31)*	(-6.31)*	(-3.64)*	(-3.75)*
RESSUB	0.4137	0.4648		
	(3.03)*	(3.14)*		
RESTOT			0.3339	0.3567
			(2.32)**	(2.45)**
XMAS	0.8423	0.8248	0.8487	0.8470
	(32.4)*	(30.56)*	(28.37)*	(28.07)*
DIFLP	4.3033	5.4639	0.9993	1.3336
	(10.02)*	(8.18)*	(2.47)**	(3.41)*
LPOP29	6.2360	5.9372	1.9275	1.8176
	(7.52)*	(6.76)*	(2.66)**	(2.38)**
LSUBPLP	-1.1523	-1.2402		
	(-4.74)*	(-4.33)*		
LPLP			-1.0097	-1.0700
			(-4.04)*	(-4.18)*
RWL	.0000001			
	(4.28)*			
YPER2		3.4635		
		(3.60)*		
LRWL			0.4756	
			(1.99)***	
LYPER				1.3941
				(1.90)***
Statistics:				
R-bar Squared	.9840	.9817	.9819	.9817
F-Statistic	317.85*	278.21*	280.73*	277.40*
D.W.	2.1475	1.9295	2.3469	2.2780

* = significant at 1% level, ** = significant at 5% level, and
*** = significant at 10% level.

formats. This characteristic, while not necessarily requiring a re-specification of the demand equations, does imply that the alteration of the market must be expected to cause a re-evaluation of the values of the regressor coefficients[5]. In general, the specific to general theory equations find the demand for albums to be positively affected by the Christmas quarter, the 25 - 29 year old population, the share of vinyl in the entire album market over previous quarters (i.e.DIFLP) and income. The demand for albums was also found to respond more to annual rather than quarterly fluctuations in income.

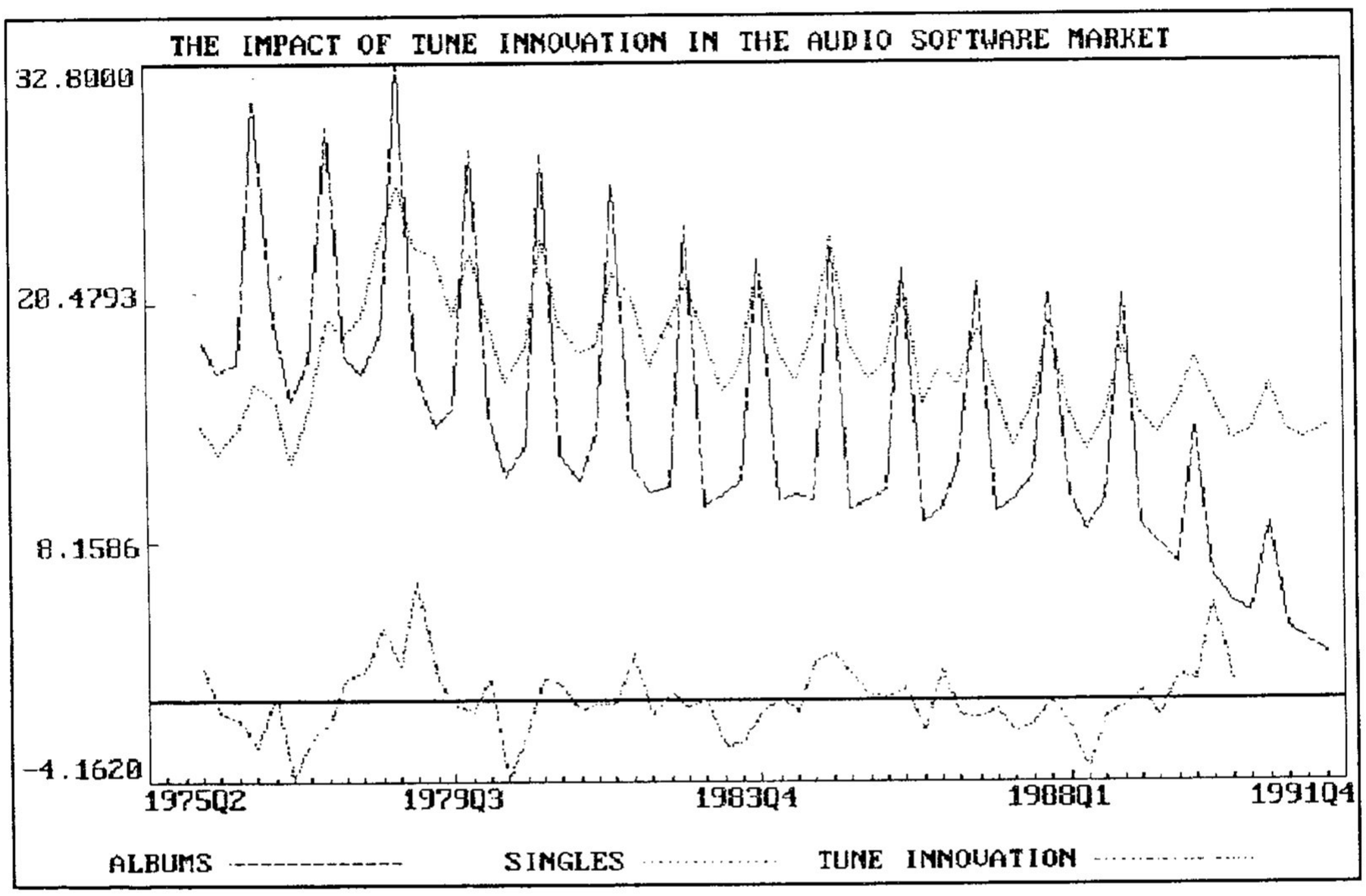
An interesting finding of the theory equations is that the tune innovation variables seem to play a similar role to that identified by the unit root approach. (A consistent finding of both procedures was that the deletion of the last eight observations caused the value and significance of the tune innovation proxies to increase). The scale of the impact of tune innovation on the sale of vinyl albums was also similar across all estimated equations. In short, tune innovation was found to play a peripheral role in the determination of industry demand for albums. The coefficients on the tune innovation proxies range from a minimum of 0.27 in 3.16 to a maximum of 0.50 in table 4.15. Even if we take the highest coefficient and simulate the effect of tune innovation on deviations in the vinyl album market, we find that tune innovation plays a very small role. Such simulations find that the TUNE A proxy has a mean impact

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[5] This view gets some, though not overwhelming, support from the Chow and Predictive Failure tests. For the Substitution Price current income equation the L.M. version of these tests predicts a structural break while the F-tests reject such a break. The predictive Failure tests on both the F and L.M. criterion accept a structural break for the Substitution Price permanent income equation. The related Chow tests accept it for the L.M. test and reject it with the F-tests. The Total Price equations seem less prone to exhibit such a break; it only being accepted by the L.M. version of the Predictive Failure tests rejecting it in all other cases except the F-test for the Predictive Failure test of the Total Price permanent income equation which is inconclusive.

of -0.005 per cent deviation in the percentage of album sales with a standard deviation of 1.86. The simulation for the 0.5 TUNE A coefficient is plotted in figure 4.5 along with the quantity (in millions of units) of singles and vinyl albums sales. It is reasonably clear from the figure that tune innovation was only active in

Figure 4.5



isolated periods. The most notable period was in the late 1970s when tune innovation appeared to have been at its zenith. Interestingly, this is a period when music innovation was considered to have been exceptionally successful. For example, the I.F.P.I. (1990) in its commentary on world record sales in the 1970's and 1980's stresses:

" The year 1978 was the peak year for disco music with international 'hits' such as 'Saturday Night Fever' and 'Grease' and sales in most countries

reached record heights."[6]

Summarising the analysis of tune innovation in section 3.3 we find that tune innovation appears to generally play a sporadic random shock effect on the demand for albums so that a long-run relationship between these variables would not be expected. In other words, tune innovation plays a secondary role to other economic variables (such as income, prices and switching costs) to the extent that it does not determine the long-run path of album sales, but merely deviations from this path. This would seem to suggest that in terms of industry demand for albums, tune innovations by artists and record companies generally have competition effects and only isolated cases multiplier effects.

Conclusion

The chapter investigated the role of tune innovation in the audio software market. In this market tune innovation is composed of 'raw' tune innovation by creative musicians and marketing and production innovations by record companies. The chapter confirmed a general belief in the industry that a high proportion of artists and titles that are successful in the singles market are also successful in the albums market. Examining the charts of top selling records most of this cross-correlation was found to occur in the same quarter.

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[6] I.F.P.I. (1990) p 64.

With this premise the chapter then focused on a quarterly company market share in the singles and albums market. Since prices are generally homogeneous across record companies, record company share would expected to be predominately determined by product differentiation i.e. tune innovation. Therefore, using company market share data the analysis found that for five of the six largest record companies, singles and albums market share were correlated in the same quarter. Conducting Granger causality tests the analysis found little inertia in the market which suggests a fairly high turnover of tune innovation. Thus, tune innovation appeared to play a significant role in determining company market share. The fact that record companies were willing to sell singles at a loss appeared to be more likely due to an advertising effect for album sales than minimising search costs. Scope for the latter appeared to be severely constrained by the rapid depreciation rate of tunes.

Finally, section 3 estimated the role of tune innovation at the industry level. Proxies for tune innovation were generated from demand for singles equations and these variables appeared to indicate that tune innovation played a minor role at the industry level. Tune innovation did not determine the long-run equilibrium path of album sales but acted like an error correction mechanism in that it explained short-term deviations from the long-term path. Thus, the industry analysis suggested that tune innovation by artists and record companies mainly has competition rather than multiplier effects. In other words, a business stealing effect: a successful album by one artist and record company more usually occurs at the expense of a reduction in another artists' and, most likely, another record company's record sales.

5 Audio Hardware and Systems Innovation

Introduction

In this chapter we move the focus of analysis from tune innovation to systems innovation. Thus we investigate the behaviour of audio hardware producers and assess the interrelationship between audio software and hardware companies. In the previous chapter we found that there was a degree of inertia in the vinyl market, to the extent that the demand for current album sales was positively related to the average market share of vinyl in the audio software market over the previous four quarters. We suggested that this was most likely due to switching costs associated with idiosyncratic investment [see Tirole (1988) for a survey].

Switching costs create an impediment for systems innovations as the demand for new hardware formats is strongly correlated with the variety of compatible software available. Thus, hardware innovators need considerable support from the software companies if a new systems innovation is to have a reasonable chance of success. In chapter one we noted that prior to the Compact Disc, all audio format innovations failed except those that were launched by hardware companies that owned, or had interests in, record companies.[1]

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[1] The importance of software support for hardware innovation is not of course unique to the music industry. For example, Graham (1986) identifies this as a major factor influencing the outcome of format competition in the video industry. At a general level, the importance of network compatibility has been initially modelled in a monopoly setting by Oren and Smith (1981) and extended into a competitive oligopoly framework by Katz and Shapiro (1985).

We also noted a tendency for the industry structure to be more vertically integrated in periods when systems innovations were relatively high. Such features are common in other industries with switching costs [for example, the video industry, see Graham (1986)] and have been modelled at a general level by Oren and Smith (1981), Katz and Shapiro (1985) and Arthur (1989). The main focus of these analyses has been to address the issue from a welfare perspective. In this chapter we intend to analyse these aspects in relation to the music industry but to do so from an entrepreneurial perspective. Thus, we are interested in assessing the importance of switching costs to innovating firms and how this affects systems innovation activity.

The chapter is structured as follows. Section 1 models the impact of switching costs in a market with product differentiation in order to identify the exact manner in which firms profits are affected by 'selection' or 'range' constraints on systems innovations. Section 2 conducts an empirical analysis of the launch of the Compact Disc, The Digital Compact Cassette and the Mini-Disc. It estimates whether switching costs affected the rate at which these innovations were launched in various international markets and how this was affected by competition.

Section 1: A Model of Switching Costs and Systems Innovations

In this section, we model a record company's choice of format and its choice of the level and range of software to produce. Given this behaviour, we then examine the extent to which audio hardware firms can affect software companies' format and

output decisions. Thus, we are interested in the externalities involved in producing a particular output on a specific format. The analysis will examine three software output spillover effects: (1) spillover effects to other compatible software producers, (2) spillover effects to other incompatible software producers and (3) spillover effects to hardware producers.

Section 1.1: Spillover effects to other compatible software producers

We assume that output in the industry can be classified according to format compatibility 'a...n'. Thus q_a represents the vector of outputs compatible with format 'a'. We assume that each output is compatible with only one format which prior to the launch of DCC represented the state of the audio market. The number of elements 'i...z' in each $q_{a..n}$ vector reflects the range of software available on each format e.g. the range of albums available on Compact Disc format. Each element of a particular vector is produced at levels determined by the firm so that q_{ai} is the level of output of the 'i'th element of the 'a'-compatible software output vector. For simplicity of analysis we will only focus on two formats 'a' and 'b'. It is assumed that the market is monopolistically competitive with firms selling differentiated products and facing downward sloping demand curves for each element of their output vector. In light of the fact that musicians have copyright of their music and that these are licensed to individual firms, we assume that each 'i' element is specific to a particular firm and a firm may (and in reality does) produce more than one 'i' element.

We also assume that consumers face switching costs and therefore, will tend to demand audio software in a format that is likely to minimise these costs. Since

switching formats are affected by the selection of software available on each format, the demand for a particular software unit will partly depend on availability of the range of compatible software compared to the range of incompatible software. Thus, we assume that the Chamberlinian demand function also has the range of software available on the 'a' and 'b' formats among its arguments:

$$q_{ai} = q_{ai}(P_{ai}, P_{a-i}, P_b, q_{a-i}, q_b, Y,...) \qquad (5.1)$$

where Y = consumer's disposable income, P_{a-i} = the price of all 'a' compatible software other than 'i' and q_{a-i} = all quantities of 'a' compatible software other than 'i'. Inverting the demand function we get the price function

$$P_{ai} = P_{ai}(P_{a-i}, P_b, q_{ai}, q_{a-i}, q_b, Y,...) \qquad (5.2)$$

with the derivative qualities (all second derivatives are decreasing in their arguments):

$$\frac{\partial P_{ai}}{\partial P_{a-i}} >,=,< 0 \quad , \quad \frac{\partial P_{ai}}{\partial P_b} > 0 \quad , \quad \frac{\partial P_{ai}}{\partial q_{ai}} < 0$$
$$\frac{\partial p_{ai}}{\partial q_{a-i}} <,> 0 \quad , \quad \frac{\partial P_{ai}}{\partial q_b} < 0 \quad , \quad \frac{\partial P_{ai}}{\partial Y} > 0 \qquad (5.3)$$

This price equation is of conventional form except that it incorporates the consumer's preference for a format that allows her access to a wide selection of compatible products. This factor will be very influential at early stages of diffusion but of less significance when a format has diffused to a level where selection of compatible products is great and taken for granted. We can see this effect with the derivative $P_{ai}'(P_{a-i})$. Looking first at the standard *substitution effect* of the price change, we observe that an increase in the price of other outputs on the same format has two

effects. The first is due to the substitutability between q_{ai} and q_{a-i} and the second due to their complementarity. As the price of q_{a-i} increases, consumers would tend to substitute out of q_{a-i} and into q_{ai}, thereby pushing up the price of q_{ai} and causing the derivative to be positive. However, the complementarity of q_{ai} and q_{a-i}, (which stems from the fact that the consumer has the option to substitute between formats), may mean that an increase in the price of outputs in vector q_{a-i} reduces the appeal of format 'a'. This causes substitution into format 'b', thereby reducing the demand for q_{ai} and causing a negative sign on the derivative.

So which effect dominates? The answer seems to depend on the stage of the diffusion of format 'a'. If it is at an early stage, then much of the demand for q_{ai} will be from consumers considering entry to format 'a' and hence, we would expect a strong cross-price elasticity of demand between format 'a' and format 'b'. At more mature levels of 'a's diffusion, individuals are already strongly pre-committed (via hardware purchases and an existing collection of complementary 'a' compatible software) to format 'a', so that cross-price elasticities between formats 'a' and 'b' would be expected to be low. These considerations imply that as far as the price substitution effect is concerned $P_{ai}'(P_{a-i})$ is more likely to be negative at early stages of diffusion and positive at more mature levels, when flexibility for format switching is weaker.

The *income effect* of price changes is more predictable. A rise in P_{a-i} will reduce the consumer's budget set and reduce the demand, (assuming normality given the income coefficients of chapter 4) and hence price, of q_{ai}. This effect, however, is likely to get stronger the larger the share of audio software market format 'a' commands. This will

only output the firm produces then it will produce up to the point where marginal revenue equals marginal costs. However, if the firm produces other outputs on format 'a', which we have assumed to be the case for firm 'f', then it will take spillover effects into account. Therefore, it will examine the cross-quantity derivatives on its other output. For output 'k' these are

$$\frac{\partial \pi_{ak}}{\partial q_{ai}} = \underset{\substack{(+)\\(-)}}{\frac{\partial P_{ak}}{\partial P_{ai}}} \underset{(+)\ (-)}{\frac{\partial P_{ai}}{\partial q_{ai}}} q_{ak} + \underset{\substack{(+)\\(-)}}{\frac{\partial P_{ak}}{\partial q_{ai}}} q_{ak} \qquad (5.7)$$

The signs on these derivatives are already explained in the interpretation of equation (5.2). Apart from $P_{ai}'(q_{ai})$ which is always negative, we argued that the signs on the remaining two variables are likely to depend on the stage of diffusion of format 'a'. At early stages of diffusion, we argued that $P_{ak}'(P_{ai})$ is most likely negative, since we would tend to expect $P_{ak}'(q_{ai})$ to be positive at early diffusion stages. Therefore, at early diffusion stages an increase in the supply of products on a specific format will most likely have positive profit spillover effects on other outputs in the same format. Thus, we have the plus sign (+) on the first row of the left hand side of (3.7). When the format has diffused more fully, these effects are likely to diminish and even become negative as the sign on $P_{ak}'(P_{ai})$ tends towards a positive value if the substitution effect (which is now positive) dominates the income effect. Similarly $P_{ak}'(q_{ai})$ is likely to become negative as an increased selection of output reduces the demand for individual differentiated outputs. Thus, as far as more mature diffusion levels are concerned, the properties of the derivatives tend to suggest that $\pi_{ak}'(q_{ai})$

becomes negative. Intuitively this is more attractive for stability reasons.

These properties imply that a firm maximising profits across all its outputs does not necessarily produce at the point where an output's *internal* marginal revenue is equal to its marginal costs. Rather the firm will take into account any profit spillover effects from one output to another. Therefore, we get three possible outcomes of profit maximising output (q_{ai}**) for a firm producing an output tied to a particular format compared to the normal textbook case of a firm producing the profit maximising output (q_{ai}*) where formats are perfectly compatible. For firm 'f' these are

$$(a.1)\quad q_{ai}{**} > q_{ai}{*} \quad if \sum_{j}^{k} \left(\frac{\partial \pi_{a-i}}{\partial q_{ai}}\right) > 0 \quad at\ q_{ai}{*}$$

$$(a.2)\quad q_{ai}{**} = q_{ai}{*} \quad if \sum_{j}^{k} \left(\frac{\partial \pi_{a-i}}{\partial q_{ai}}\right) = 0 \quad at\ q_{ai}{*}$$

$$(a.3)\quad q_{ai}{**} < q_{ai}{*} \quad if \sum_{j}^{k} \left(\frac{\partial \pi_{a-i}}{\partial q_{ai}}\right) < 0 \quad at\ q_{ai}{*}$$

We note that firm 'f' has only '100k/z' percentage share of the 'a' compatible software output market. Therefore, its own profit maximising output strategy is not necessarily the industry's optimal output strategy given that it does not take into consideration the spillover effects on outputs $q_{al...z}$. Again we get three possible configurations comparing firm optimal output (q_{ai}**) with optimal industry output(q_{ai}***).

$$(b.1)\quad q_{ai}{***} > q_{ai}{**} \; if \sum_{l}^{z} \left(\frac{\partial \pi_{a-i}}{\partial q_{ai}}\right) > 0 \; at\; q_{ai}{**}$$

$$(b.2)\quad q_{ai}{***} = q_{ai}{**} \quad if \sum_{l}^{z} \left(\frac{\partial \pi_{a-i}}{\partial q_{ai}}\right) = 0 \quad at \quad q_{ai}{**}$$

$$(b.3)\quad q_{ai}{***} < q_{ai}{**} \quad if \sum_{l}^{z} \left(\frac{\partial \pi_{a-i}}{\partial q_{ai}}\right) < 0 \quad at \quad q_{ai}{**}$$

Conditions (a.1) and (b.1), where output is below its optimum, are more likely to occur at early stages of format diffusion since the profit spillover effects are likely to be positive. Conversely, at more mature levels of diffusion these spillover effects are likely to be negative resulting in outcomes (a.3) and (b.3). We note that horizontal integration can move the industry towards its profit maximising output in either case by allowing firms, via mergers, to internalise the spillover effects.

Section 1.2: Spillover effects to non-compatible software producers

We now examine the impact of an the increase in a format's output on the profitability of other formats. We continue along the current path of examining the effects of an increase in q_{ai}. we examine the impact on format 'b'. Summing the effects of a rise in q_{ai} from equation (5.6) and (5.7) and aggregating these to the industry level, we note four channels of impact on the profit function π_{bi}: q_{ai}, P_{ai}, q_{a-i}, P_{a-i}.

$$\pi_{bi} = P_{bi}(P_{b-i}, P_{ai..z}, q_{ai..z}, q_{bi}, q_{b-i},..).q_{bi} - c(q_{bi},..) \qquad (5.8)$$

$$\frac{\partial \pi_{bi}}{\partial q_{ai}} = \underset{(-)}{\frac{\partial p_{bi}}{\partial q_{ai}} q_{bi}} + \underset{(+)\ (-)}{\frac{\partial P_{bi}}{\partial p_{ai}} \frac{\partial P_{ai}}{\partial q_{ai}} q_{bi}}$$

$$+ \left(\underset{(-)\ (+)}{\frac{\partial P_{bi}}{\partial q_{a-i}} \frac{\partial q_{a-i}}{\partial P_{a-i}}}\right)\left(\underset{(-)\ (-)}{\frac{\partial P_{a-i}}{\partial P_{ai}} \frac{\partial P_{ai}}{\partial q_{ai}}} + \underset{(+)}{\frac{\partial P_{a-i}}{\partial q_{ai}}}\right) q_{bi}$$

$$\begin{matrix} (-) & (+) & (-) & (-) & (+) \\ (0) & (+) & (+) & (-) & (-) \end{matrix}$$

$$+ \left(\underset{(+)}{\frac{\partial P_{bi}}{\partial P_{a-i}}}\right)\left(\underset{(-)\ (-)}{\frac{\partial P_{a-i}}{\partial P_{ai}} \frac{\partial P_{ai}}{\partial q_{ai}}} + \underset{(+)}{\frac{\partial P_{a-i}}{\partial q_{ai}}}\right) q_{bi} \qquad (5.9)$$

$$\begin{matrix} (+) & (-) & (-) & (+) \\ (+) & (+) & (-) & (-) \end{matrix}$$

The first two elements of equation (5.9) show the *direct output effect* on q_b of an

increase in q_{ai}. $P_{bi}'(q_{ai})$ is negative as an increase in q_{ai} widens the selection of output on format 'a' causing an increase in the demand for 'a' at the expense of 'b'. As 'a' diffuses, the marginal impact of q_{ai} on q_b via this route will decline so that as q_a increases in the limit $P_{bi}'(q_{ai})$ approaches zero. The second element also reduces the profitability of 'b'. In this case the increase in q_{ai} pushes the price of q_{ai} down, causing a substitution out of q_{bi} into q_{ai}.

The third and fourth elements in equation (5.9) represent the *'indirect range effect'* (of compatible software) of q_{ai} on π_{bi} through spillover effects on the 'a' compatible output. These effects will vary depending on the stage of 'a' format's diffusion. The third element is the equivalent indirect route of q_{ai} to π_{bi} as the first direct element i.e. the effect coming through q_a (selection of differentiated 'a' compatible products). Thus, the third element tells us how q_{ai}, by affecting P_{a-i}, causes changes in the quantity supplied of q_{a-i} and hence the price of q_{bi}. These effects will be more significant at early stages of 'a's diffusion since $P_{bi}'(q_{a-i})$ is likely to decline in absolute value as q_{a-i} increases; since at these higher levels the selection of output on the 'a' format is already great so that additions will have only a marginal impact on the demand for q_{bi}. Looking first at early diffusion effects in the third element (by removing the bracket) we see firstly that an increase in q_{ai} causes a fall in P_{ai} which pushes up the demand and hence price of P_{a-i} causing an increase in the quantity and range of q_{a-i} supplied, thereby reducing the demand and price of P_{bi}. Secondly, a rise in q_{ai} causes an increase in P_{a-i} directly via the selection effect which increases the supply of q_{a-i} thus reducing the demand and price of q_{bi}. Therefore, the combined spillover effects tell us that at early diffusion stages an increase in q_{ai} reduces the

profitability of q_{bi} by enhancing the relative selection of outputs available on format 'a' over 'b'. At more mature levels of 'a's' diffusion these effects have a high probability of being reversed as the signs on $P_{a\text{-}i}'(q_{ai})$ and $P_{a\text{-}i}'(P_{ai})$ are likely to change: the former becoming negative and the latter positive. However, these effects are likely to be negligible when 'a' has effectively matured as $P_{bi}'(q_{a\text{-}i})$ will be near zero in value.

Turning to the fourth element in equation (5.9) we have the *'indirect spillover price effects'* from P_a to q_b. Removing the brackets and focusing first on the early diffusion stage of format 'a' the first multiplicative element shows an increase in q_{ai} reducing p_{ai} which pushes up the price of $P_{a\text{-}i}$ making q_b more attractive to consumers, thereby pushing up the price of q_{bi}. The second multiplicative term shows q_{ai} causing an increase in $P_{a\text{-}i}$ via a selection effect, which again causes an increase in P_b. Thus, the fourth element of equation (5.9), unlike the previous three, shows a positive impact of q_{ai} on the profitability of q_{bi}.

We now need to assess the net effect of an increase of q_{ai} on π_{bi} at early stages of format 'a's diffusion. The first three elements show a fall in π_{bi} and intuitively one would expect this not to be offset by the relative price movements since these are driven by an *increase in demand* for q_a. Therefore, we have two propositions:

Proposition 1: If consumer's budget for software (a+b) is fixed, then a profit maximising increase of q_{ai} for its producer **must** *imply a fall in π_{bi} since there has been an overall increase in expenditure on q_a.*

Proposition 2: If consumer's budget for software (a+b) increases the effect of an increase of q_{ai} on π_{bi} is ambiguous since although total expenditure on q_a has increased, this may be more or less offset by a possible increase in expenditure resulting from changes in the consumer's software budget.

The likelihood of a positive net impact of q_{ai} on π_{bi} may seem counter intuitive and, therefore, it is worth clarifying how this might occur. Namely, if an increase in q_{ai} enhances 'a' so much that the demand for 'a' increases substantially then both 'a' and 'b' might benefit. The 'a' format's total expenditure increases as new consumers enter the market, and that of format 'b' increases as former 'a' consumers switch to 'b' as the price of q_a is driven up by new consumer entrants. This might have happened in the audio software market where the launch of the Compact Disc is often claimed to have enhanced the size of the audio software market.

At more mature levels of the 'a' format's diffusion, the fourth element of equation (5.9) is likely to become negative so that the net effect of an increase in q_{ai} is a reduction in the profitability of producing q_{bi}. This occurs because $P_{a-i}'(P_{ai})$ may become positive and $P_{a-i}'(q_{ai})$ becomes negative. Thus again removing the brackets, the first multiplicative term tells us that an increase in q_{ai} pushes the price of q_{ai} downwards which causes a substitution out of q_{a-i} into q_{ai}. This forces P_{a-i} downwards, reducing the demand and price of q_{bi}. The second multiplicative element tells us that the rise in q_{ai} directly pushes the price of q_{a-i} downwards by increasing the selection of q_{a-i} substitutes. The resulting fall in P_{a-i} then pushes the price P_{bi} downwards, reducing the profitability of q_{bi}. Therefore, at mature levels of 'a's diffusion an

increase in q_{ai} reduces the profitability of q_{bi}.

Section 1.3: Spillover effects to hardware companies

In the light of analysis of audio software spillovers, we now examine how a hardware company may form a strategy to facilitate the diffusion its own format. We have seen that in the presence of switching costs, innovators are likely to face a low level of demand for their output as the variety of compatible software is likely to be small during the early stages of their launch. Such reluctance on the part of software companies to be 'first adopters' of a potentially superior format technology, may mean that the format never reaches the market.

In the knowledge of the manner in which spillover effects affect software companies' format choice, it may be optimal from a hardware company's perspective to 'back' its own format. This may occur through the provision of subsidies for compatible software production or through vertical integration with a software company to achieve the same end. As we saw in equations (5.6), (5.7) and (5.9), any increase in output on a particular format at early diffusion stages will enhance the profitability of producing software on the format, and reduce the profitability of competing formats. Thus, through this channel a hardware company can induce more firms to adopt its format and so increase the probability of the format's successful diffusion.

To see how much the hardware company can afford to subsidise per unit output of compatible software, we must examine its profit function. We take a representative hardware company 'h', producing 'a' compatible hardware q_{ha} at price P_{ha} and

licensing the production of 'a' compatible software $q_{sa} = q_a$ at price P_{sa}. c_h and c_s are the respective cost functions for q_{ha} and q_{sa} and R+D are research and development costs associated with the development of the 'a' format.

$$\pi_h = P_{ha}(q_{ha},\ldots)q_{ha} + P_{sa}(q_{sa},\ldots)q_{sa} - c_h(q_{ha},\ldots) - c_s(q_{sa},\ldots) - (R+D) \qquad (5.10)$$

$$\frac{\partial \pi_h}{\partial q_{ai}} = \frac{\partial P_{ha}}{\partial q_{ha}}\frac{\partial q_{ha}}{\partial q_{ai}}q_{ha} + \frac{\partial P_{sa}}{\partial q_{sa}}\frac{\partial q_{sa}}{\partial q_{ai}}q_{sa} - \frac{\partial c_s}{\partial q_{sa}} - \frac{\partial c_h}{\partial q_{ha}}\frac{\partial q_{ha}}{\partial q_{ai}} \qquad (5.11)$$

$$where \frac{\partial q_{sa}}{\partial q_{ai}} = 1.$$

We immediately see from the first derivative that R&D expenditure does not affect the hardware company's reservation subsidy level for a per unit output increase in 'a' compatible software. This is the standard sunk cost argument in favour of vertical integration. Its implication here is that if software producers force the hardware company to pay its reservation subsidy, the hardware company will only cover its variable costs and hence make a loss. Thus, in cases where the hardware company is facing strong format competition, (so that software companies are only marginally interested in its format), it could easily be forced to subsidise software companies close to its reservation subsidy price, thereby increasing the likelihood of negative profits. Therefore, in these cases it may be optimal for the hardware company to vertically integrate into software production to avoid exploitation by independent software

companies[2].

However, there is another benefit to hardware companies from vertical integration. If a hardware company buys a software company and produces compatible output, then if it subsidises another software company's output, it will itself receive some of the positive profit spillover effects of that same subsidy. Therefore, if hardware company 'h' owned a software subsidiary producing output $q_{a...p}$, then the rate of increase in profit 'π' it would receive from a per unit increase in 'a' compatible software would be:

$$\frac{\partial \Pi}{\partial q_{ai}} = \frac{\partial \pi_h}{\partial q_{ai}} + \sum_{m}^{p} \frac{\partial \pi_a}{\partial q_{ai}} \qquad (5.12).$$

where the first element of (5.12) is equation (5.11) and the second element is the same effect as that represented in equation (5.7) except examined over the range $q_{am...p}$. Equation (5.12) implies that if a hardware company expects to be involved in a format war, then it will be in a stronger position to fight such a battle if it is vertically integrated. This occurs because the level of subsidy it can offer software companies increases since equation (5.12) is greater than equation (5.10) i.e. its reservation subsidy rises. It is noteworthy that a software company which has pre-committed itself to a particular format, (by for example accepting an output subsidy from a hardware company), could itself capture some of the positive spillover effects by

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[2] As we will see in the next section this is consistent with the merger pattern actually observed. When the Compact Disc format was launched it had weak format competitors and, therefore, there was little 'hardware to software' subsidies or vertical integration. Conversely, with the announcement of launch dates for many formats in the early 1990s competition became intense thus leading to significant 'hardware to software' subsidies and vertical integration.

taking over another software company; especially one which is already pre-committed to the same format.

We finally close this section by representing the model in game theoretic form in order to draw attention to some of the dynamics of the 'hardware-software' bargaining process. We assume that the game is being played by a hardware company promoting a new system innovation, 'a', and software companies acting independently. The hardware company (h) has two moves, Ah, implies embracing the 'a' format's early diffusion costs (i.e. subsidising software companies or vertically integrating with a software company), or Rh - reject them. The software companies' moves are either to adopt a's format in their software, A, or reject it, R. We assume that the hardware company moves first and then, in the knowledge of this move, the software companies move simultaneously - ignorant of each others move.

The payoffs are presented in Table 5.1 in the form (software, hardware). Examining the hardware firm's payoffs first: if 'a' diffuses successfully then the hardware company receives a payoff of 8 if it initially embraced the early diffusion costs, or 10 if it passes these onto the software companies. Alternatively, if the new technology fails to diffuse, the hardware firm minimises losses by having rejected diffusion costs, with a payoff of -2, than having incurred them, with a payoff of -4. Therefore, the hardware firm has a dominant strategy not to adopt early diffusion costs. The expected payoffs for the software companies are based on equation (5.4). Thus, the expected gain from adopting 'a' is enhanced by the extent to which hardware companies incur early diffusion costs and the expected number of other software firms

who support 'a' by supplying a plentiful range of compatible software.

Table 5.1: Format Diffusion Game

	Matrix 1.		Matrix 2.	
	Ah	Rh	Ah	Rh
A:	(6,8)	(4,10)	(6,8)	(4,10)
R:	(2,-4)	(2,-2)	(5,-4)	(5,-2)

We present two possible payoff matrices, 1 and 2, both of which have the same payoffs for the hardware company but differ for software companies. Matrix 1 represents the decision to adopt a highly attractive format i.e. a format which is likely to increase industry demand. Its promising features incite software firms to adopt it, and also leads them to believe that it is very likely to diffuse. This ensures that a software firm's dominant strategy is to adopt the new format since it maximises profits through this strategy regardless of who bears the early diffusion costs. Thus, it makes sense for both software and hardware companies to pursue their dominant strategies and the hardware firm is free to collect its maximum payoff of 10 as (4, 10) is the Nash equilibrium.

Matrix 2 represents the case where the technology is of marginal benefit to software companies and where the issue of who bears the diffusion costs plays a significant role

in determining the Nash equilibrium. Here, software companies do not have a dominant strategy. If the hardware company refuses to bear the early diffusion costs, then the format will fail. Therefore, in the light of these payoffs, the hardware company's optimal strategy is to adopt the early diffusion costs, thereby ensuring that the software companies optimise by adopting 'a'.

Section 2: The Evidence

In the model of section 1 it was shown how switching costs generated inertia in the audio software market so that demand for software on a particular format was positively related to the format's market share. This was shown to reduce the profitability of systems innovators, as low demand in the early diffusion stages generated set-up costs. Thus, the model is based on three stylized assumptions that can be tested:

1. There is inertia in the demand for a particular format.
2. Low demand for a format generates 'early diffusion' or set-up costs.
3. Demand induced set-up costs are sufficiently significant to affect systems innovations.

We have, in fact, already found evidence to support the first two assumptions. Firstly, inertia in the demand for a particular software format was identified through significance of the variable DIFLP in the co-integrating vinyl albums equation of

chapter 3. In the second case the evidence suggests that deficient demand does cause set-up costs. The analysis in chapter 3 identified a fairly high level of turnover of tunes in the audio software market. Therefore, since the rate of depreciation of a particular title is high, new format innovators who produce audio software in a new format would generally find that unsold software in the early stages of diffusion will not find a demand in later periods, even if the format is then popular. In this respect, it is notable that software products on new formats usually contains a high proportion of titles that have relatively low depreciation rates i.e. pop classics such as the Beatles, classical music, opera etc.

Finally, the third assumption of the model may be tested to some extent by looking at the date of launch of new format innovations across countries. If firms attempt to avoid set up costs associated with low demand they would tend to prioritise software larger markets for the launch of the software innovations.

In order to test the third assumption we conducted a cross section international analysis of the launch of Compact Disc, Digital Compact Cassette and Mini-Disc formats. We used a ten year average (measured in U.S. Dollars) of the value of the audio retail market to represent market size. This data, along with international launch dates of CD, DCC and MD formats are presented in table 5.2. The table also includes the share of these markets that are accounted for by pirate counterfeit software. As we will see in the next chapter, piracy seriously erodes the profitability of audio software production. A high piracy level would indicate a serious threat to the future demand for legitimate software and hence would also be expected to deter the launch of a new

audio format.

In table 5.3 we list the results of regressing the i'th year in which a format is launched in a particular country (e.g. in the case of the CD: if launched in the first year, 1982, we set a value = 1, if launched in the second year, 1983, the value = 2, etc.) against market size and piracy. The first column, A, portrays the results for the launch of CD. The regression finds market size significantly affects the date of launch of a new format at the 10% level. Piracy is found to be an even more important impediment to the launch of the CD, being significant at the 1% level.

As table 5.2 shows, the date of launch of the DCC is identical to that of the Mini-Disc for the years available. Thus, one equation suffices for both formats and is represented in column B of table 5.3. The equation finds that the date of launch of DCC and Mini-Disc were negatively affected by market size, being significant at the 1% level. Similar evidence was not found for piracy.

Thus, the third assumption of the model seems to be supported by the evidence. We turn now to the conclusions of the model, notably the determinants of the audio hardware companies embracing early diffusion costs. As we noted in the history of audio technology innovations in chapter 1, the experience of the CD seems reasonably unique in that it was readily adopted by software producers. Therefore, unlike virtually all other format innovations in the post-war period, hardware companies did not actually embrace the software companies' set-up costs. In other words, the market appeared to resemble pay-offs similar to matrix 1 in table 5.1. In similar fashion, the

Table 5.2

Size: 10 year average of audio market size in millions of U.S. Dollars. *CD*: date of launch of the Compact Disc. *DCC*: launch date of the DCC. *MD*: launch date of the Mini-Disc. *Piracy*: piracy market size as a percentage of legitimate market.

	Size	CD	DCC	MD	Piracy
Argentina	99	1986	1993	-	27
Australia	246	1984	1993	1993	4
Austria	72	1983	1993	1993	1
Belgium	105	1983	1993	1993	1
Brazil	233	1987	1993	-	5
Canada	456	1984	1993	1993	1
Czechoslovakia	49	1987	-	-	40
Denmark	65	1984	1993	1993	0.5
Finland	74	1985	1993	1993	2
France	784	1983	1992	1992	10
Germany	1218	1983	1992	1992	1
Greece	42	1986	-	-	25
Hungary	23	1985	-	-	11
Holland	245	1983	1992	1992	7
Ireland	23	1985	1992	1992	2
Italy	218	1983	1993	1993	20
Japan	1671	1982	1992	1992	20
New Zealand	40	1984	1993	1993	1.5
Norway	77	1984	1993	1993	1
Portugal	38	1984	1993	1993	22
Singapore	14	1984	1993	1993	3
Spain	185	1986	-	-	5
Sweden	137	1983	1993	1993	2
Switzerland	116	1983	1993	1993	4
U.K.	1045	1983	1992	1992	1
U.S.A.	4173	1983	1992	1992	6

Source: I.F.P.I. (1990b, 1991b) and 'Music and Copyright' (1992c, 1992d, 1993a, 1993b)

Table 5.3

Dependent Variables: The number of years since the year preceding the date of launch of a format is each respective country: (A) The Compact Disc [26 observations], (B) Digital Compact Cassette [22 observations] and (C) pooled (A) and (B) [48 observations].

Variable:	A	B	C
Constant	2.8254 (8.92)*	1.8012 (15.17)*	2.9266 (12.99)*
Audio Market Size	-0.0005 (-1.79)**	-0.0003 (-3.25)*	-0.0004 (-2.64)*
Piracy	0.0634 (2.84)*	0.0061 (0.53)	0.0461 (3.14)*
Format			-1.3036 (-4.95)
R^2	0.36	0.37	0.53
ADJ - R^2	0.31	0.31	0.50
F - Stat	6.58*	5.60**	16.41*

* = significant at 1% level, ** = significant at 5% level, and
*** = significant at 10% level

launch of the DCC and Mini-Disc by implication must resemble the pay-offs in matrix 2 of table 5.1. Thus, the issue is why were the pay-offs different?

A key factor is likely to be competition among format innovators. As we noted in the model, the software set-up costs are increasing in the number of new formats launched. Hence, there is less of an incentive for software companies to adopt a new format. Thus, their optimal strategy becomes akin to matrix 2 of table 5.1, namely reject the new launch format. As is evident from table 5.1 this increases the likelihood of

hardware companies embracing the software set-up costs. However, a further stimulus is created as competition from the other emerging format is likely to increase the probability of the format's failure if early diffusion costs are not embraced.

We already know from chapter 1 that competition among formats is strongly associated with the incidence of hardware innovation incurring software set-up costs. Examples included the RCA-Colombia 'Battle of the Speeds', and the vertically integrated structure of the industry prior to the second World War when the level of systems innovation was relatively high. As matrix 1 would predict, format innovators who faced competition, and who did not incur software set-up costs, found that their products did not diffuse successfully.

If format competition has such a dramatic impact on hardware company behaviour, first mover advantage, generated by technological lock-in, would be expected to affect the speed of format launch. This appears to be the case in table 5.2. where we can see that the DCC and Mini-Disc were launched at a faster rate that the CD. The fact that the two newest formats have identical annual launch dates suggests strategic interaction. In table 5.3 we pooled the CD and DCC data and incorporated a dummy variable for DCC. Estimating the date of launch of the formats we found that market size and piracy were significant at the 1% level with the correct coefficient signs. Further, the DCC dummy was negative and also significant at the 1% level. The latter variable indicates that format competition significantly affects the speed at which new format technologies are launched across countries. Thus, the available evidence does seem to indicate that inertia in the audio software market has a significant bearing on

hardware innovators strategic behaviour.

The significance of competition goes some way towards explaining why Phillips and Sony did not embrace software set-up costs for the launch of CD. However matrix 1 of table 5.1 implies that the format would had to have been significantly attractive to software producers in order to incite them to bear the set-up costs unilaterally. In other words, the adoption of the CD would have been expected to increase the value of software profits to a level which would justify the incursion of set-up costs. This, of course, is what transpired as the CD generated a resurgence in the value of the audio software market. Consumers were evidently willing to pay more for the new format as the CD successfully diffused in the market despite being, on average, just over double the price of vinyl albums[3]. Thus, the remaining issue is how did the record companies know, prior to the launch of CD, that it was likely to raise consumers' reservation prices? We can identify three possible signals:

(1). Home-taping had not completely ousted pre-recorded software. On average a ninety minute blank tape cost approximately 20 per cent of the price of a vinyl album and given that it had the capacity to tape, on average, two albums, (the normal playing time for an album being between 35-45 minutes long), this defined its cost as roughly 10 per cent of an LP. Despite this cost advantage, record clubs/libraries did not become popular, as consumers were apparently not happy with the inferior sound quality of home tapes compared to the discernably higher sound quality of their pre-

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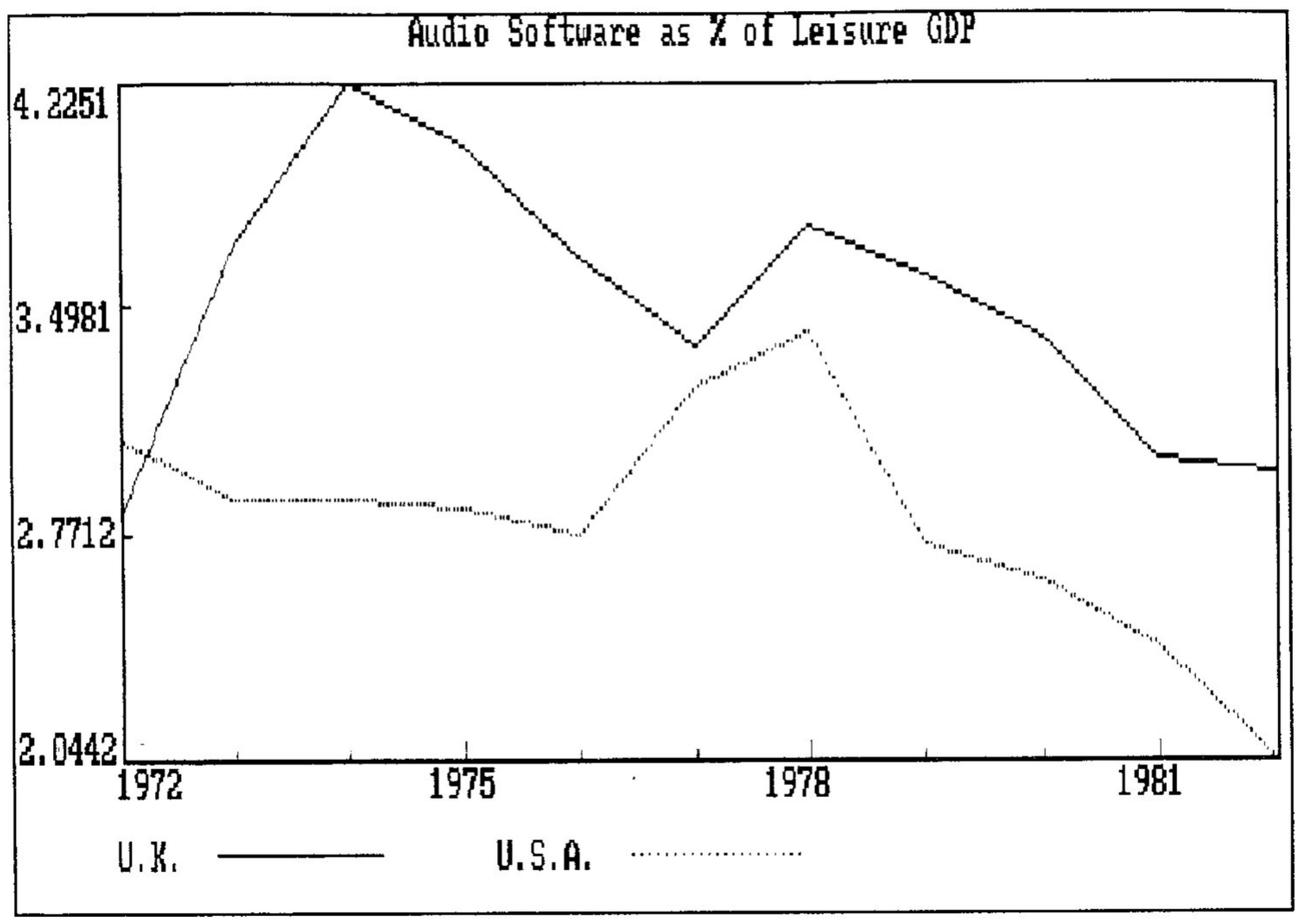
[3] In the U.K. between 1983 and 1991, the wholesale price of CD albums were, on average, 206 per cent the price of vinyl albums.

recorded counterparts. With this background, it might have seemed reasonable to expect that the same consumers would be willing to pay a higher price for a pre-recorded format that dramatically surpassed the sound quality of existing pre-recorded software.

(2). A further indication that consumers would be willing to pay more for higher sound quality could be observed from the hardware market. Hardware manufacturers had introduced many format-compatible innovations that greatly increased the quality of sound reproduction. Some of these innovations were costly and were successfully sold to willing consumers in the form of higher prices. Throughout the 1970's the variety of high priced hardware was significant.

(3). There was a growing danger that a product which had not changed much over a thirty five year period had become someway inferior as income grew over the same time-span. A test of this view is the trend in the proportion of leisure spending devoted to pre-recorded audio software. We examine this in Figure 5.1. The period of relevance is that preceding the introduction of the CD. Therefore, we look at the period 1972-1982, for the U.K. and the U.S.A. We observe a broad decline in the proportion of leisure spending devoted to audio software from 1973 onwards. In this light, the Compact Disc is likely to have appeared as an attractive option for software companies, as it entailed an upgrading of the quality of pre-recorded software which would increase its normality and reduce substitutions into other leisure activities.

Figure 5.1



Data: Retail audio software sales; IFPI. GDP data from OECD.

Conclusion

The chapter assessed the importance of switching costs as a constraint on systems innovation. It found that format innovation in the music industry was significantly affected by early set-up costs associated with deficient demand. In the cases of the Compact Disc, Digital Compact Cassette and Mini-Disc, the date of launch was found to be significantly affected by market size. It was also found to be negatively related to the level of pirate software on sale. The chapter found that in the event of competition between systems innovators, set-up costs were relatively high as hardware companies sought to attain first mover advantage. Only in the case of the Compact

Disc were set-up costs not actively incurred by hardware companies. The chapter indicated that this was due to an absence of competition from other systems innovators and the fact that the transformation of the software market to the Compact Disc format offered substantial rewards for software companies.

6: Rent-Seeking in the Music Industry

In this chapter we want to examine rent-seeking behaviour (as described by Tullock, 1967) in relation to the music industry. Tullock's definition is similar to that of the more well known definition of Krueger (1974) except that it includes theft as a rent-seeking activity. In this chapter, we look at copyright infringement which is a form of rent-seeking stimulated by music's public good characteristics. Since this entails the infringement of copyright, it involves a form of theft and hence the rent-seeking activity we describe is more akin that reported by Tullock (1967). Baumol (1990) classified rent-seeking as either unproductive or destructive entrepreneurship.

A rent-seeking, or unproductive, entrepreneur is assumed to derive pecuniary gain, not by generating new wealth, but by securing a greater personal share of existing wealth. If this activity reduces the incentives for others to generate wealth in a subsequent period, it may even be destructive. In this context economists generally regard rent-seeking as an activity that should be discouraged. In this chapter we want to examine various forms of rent-seeking in the music industry and pose the question: is rent-seeking unproductive? In other words, when industry output is characterised by public good qualities, is rent-seeking necessarily a welfare loss? In the case of public goods it may be possible to utilise the output of another firm without necessarily contracting their output on a *quid pro quo* basis. For example, making a copy of a recording does not diminish the original recording.

Thus, in the case of public goods provided through the market mechanism it may

actually be possible for rent-seeking behaviour to be productive. This occurs because rent-seeking behaviour is often only a component, rather than the entirety, of a rent-seeker's endeavours. Therefore, it is possible for a rent-seeking individual to be a net productive entrepreneur if their productive endeavours outweigh their destructive actions. The analytical implication that immediately arises is that in the case of industries whose output entails public good characteristics, a more piece-meal approach may be needed in order to divide entrepreneurs into 'heroes' and 'villains'.

A simple model represents the basic argument. We assume there are N firms and that these may be divided into two sets of firms, N_u and $N - N_u$. N_u denotes the number of firms who carry out some rent-seeking activities. Each firm is assumed to produce an output and aggregate output (Y) may be defined as

$$Y = y_1(N - N_U) + y_2(N_U) \qquad (6.1)$$

where y_1 is the output of the entrepreneurial sector, and y_2 is th output of the rent-seeking sector.

The number of firms in the rent-seeking and pure enterprise sectors is determined by the level of business opportunities present in these sectors . We denote these as π_1 and π_2 for the pure enterprise and rent-seeking sectors respectively. Thus, 6.1 can be re-written

$$Y = Y_1(N - N_U(\pi)) + Y_2(N_U(\pi)) \qquad (6.2)$$

where $\pi = \pi_2/\pi_1$; $N_U'(\pi) > 0$

Equation (6.2) illustrates the means through which an increase in rent-seeking activities may occur.

$$dY = \frac{\partial Y}{\partial y_1}\frac{\partial y_1}{\partial N_u}\frac{\partial N_u}{\partial \pi}d\pi + \frac{\partial Y}{\partial y_2}\frac{\partial y_2}{\partial N_u}\frac{\partial N_u}{\partial \pi}d\pi \qquad (6.3)$$

$$(-) \qquad (+)$$

In the pure rent-seeking case the entirety of the gain of the rent-seeking sector is made at the expense of the productive sector. If such a re-allocation of wealth does not cause either a disincentive to produce, or a fall in production capacity in the productive sector, then aggregate output will remain unchanged. Otherwise rent-seeking will cause a decline in output.

However, rent-seeking firms may also carry out productive endeavours which are embodied in their rent-seeking behaviour and in this case it is possible that (6.2) might be positive. Therefore, rent-seeking may in some cases be associated with productive enterprise. If this is the case at an empirical level, it implies that the identification of rent-seeking is not a sufficient condition to warrant countervailing policy action. Instead, a cost-benefit welfare analysis is warranted.[1]

In relation to the music industry, this implies that rent-seeking activity which entails an infringement of music property rights does not necessarily imply a definitive case

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[1] In other words, it is not sufficient to identify that the first term on the left hand side of equation (6.3) is negative, but rather to identify that equation (6.3) is itself negative.

of unproductive or destructive entrepreneurship. The scope of this chapter is, therefore, to examine two of the most prominent forms of rent-seeking behaviour in the music industry, namely piracy and home-taping. The main focus of this analysis will be to examine the extent to which rent-seeking activity affects pure entrepreneurial firms and to assess its net impact on industry output. Further, the analysis will seek to identify the source of rent-seeking business opportunities in the industry, assessing whether these result from record company behaviour, technological spill-overs from other markets, or influences from the legal sector.

The chapter is structured as follows. Section 1 conducts a brief overview of technological developments that have affected the public good characteristics of audio software. This is necessary given the key role public good characteristics play as a stimulant to rent-seeking activity in the audio software market. Section 2 focuses on the impact of pirate record production on both artists and legitimate record production. Section 3 conducts a similar exercise in relation to the production of blank tapes and its impact on consumer purchases of pre-recorded audio software.

Section 1: The History of public good characteristics of audio software.

We have already outlined the history of systems innovation in chapter one. To avoid repetition, this brief history will focus exclusively on innovations involving 'non-rival' or 'non-diminishable' problems for record companies. In general, such innovations alter the characteristics of audio software so that duplication is facilitated. This increasingly implies that one person's consumption does not reduce the amount

available to others.

In 1933, a group of international record companies met in Rome to found the International Federation of Phonogram Producers (IFPI). The aims of the organisation as stated in Article 2 of its statutes were:

"The objects of the Federation are the defence in the international domain of the interests of the members by preserving their rights, statutory or otherwise, by the promotion of new legislation to extend such rights or to create them in those countries where they do not already exist and generally by safeguarding the present and future welfare of members by means or representation as a federated body in negotiations with and representations to governments and other interested and representative bodies."[2]

The stimulus behind the foundation of the IFPI was the feeling by record companies that they needed to protect the reproduction and performance of their audio software format. At this time the industry was dominated by the gramophone in the 78 rpm format. The initial need for such copyright protection was prompted by two developments, the growth of the size of the international market for records and innovation by audio hardware companies.

The former was due to a proliferation of new music composition and their successful diffusion across national boundaries. Initially record companies had been content to

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[2] Alloway (1983) p 9.

rely on domestic copyright legislation (which was not originally drafted with music recordings in mind and only implicitly protected the owner's rights), when little international trade occurred. However, by the 1930's record companies had become concerned that the lack of parallel and uniform copyright legislation in other countries would not prevent foreign companies producing records containing their original recordings. This presented three problems: (1) It reduced the incentive for companies to export their recordings abroad, (2) it greatly reduced the advantages of a domestic firm setting up a subsidiary in a foreign market in order to sell its repertoire of tunes and (3) it resulted in a practice known as 'parallel imports' which occurred when two companies, operating in separate countries, bought the rights to a recording allowing them the right to produce pre-recorded software containing these recordings. The problem of 'parallel imports' arose if one company started to export its audio software to another company's market thereby reducing the demand for the latter firm's output. Thus a degree of co-ordination and co-operation of property right licensing at an international level was necessary in order to maintain the incentive to sign new artists.

However, a more worrying threat to the viability of commercial record companies was the infringement of music property rights by 'pirate' record companies who flaunt property rights by producing unlicensed pre-recorded software. Such companies would not only be spared the expense of musicians royalties, but by solely selling recordings of successful musicians they would also be saved the development, marketing and high risk normally associated with record production. We can get an idea of the scale of the cost advantage to a pirate producer by looking at the breakdown of costs involved in record production. These are presented in table 6.1 for the year 1988.

Using the BPI's figures on legitimate pre-recorded audio software production we estimated pirate production costs. These costs are highlighted by an asterisk (*) and are summed in the bottom row of the table. The pirate producer is free of any

Table 6.1

1988 U.K. Legitimate and Pirate (*) Record Production Costs (£).

	Singles	L.P.s	Cassettes	C.D.s
Legitimate Costs:				
Distribution*	.23	.84	.84	1.12
Version Royalty	.24	.85	.85	1.32
Composer Royalty	.11	.38	.38	0.59
Packaging*	.13	.30	.15	0.23
Manufacture*	.18	.42	.45	1.05
Repertoire (A+R)	.10	.36	.36	0.48
Advertising	.29	.42	.42	0.42
Overheads*	.27	.78	.78	1.13
Total Costs	1.55	4.35	4.23	6.34
Price Mark-up	-.20	0.29	0.41	0.95
Pirate Costs*	0.81	2.34	2.22	3.53
% of Legit. Costs	52.3	53.8	52.5	55.7

Source: B.P.I. Yearbook 1989/90.

compensation obligation to the artist and composer and hence does not have to pay either version or composer royalty. The pirates practice of only duplicating albums that are successful in the legitimate market ensures they can free-ride on the legitimate producers' advertising and Artist and Repertoire (A&R) expenses. Therefore, free

from liability for these costs, we see that the pirate record comapnies generally have a 54 per cent, 53 per cent and 56 per cent respective cost advantage over legitimate producers for vinylite, cassettes and C.D.s. However, in fact, this is an underestimate of the true cost advantage. Firstly, in table 6.1 we have assumed that the remaining costs are similar for both pirate and legitimate producers. This is likely to be an underestimate for three reasons. Firstly, administration and design (packaging) are obviously greater for a firm that must formulate the public relations presentation of an album. Secondly, since pirate producers do not contribute to the recording, producing, and arrangement costs involved in album production, their overheads are less than that of a legitimate record company. Thirdly, we notice from the first column that legitimate producers actually incur a loss in the production of singles. As we observed in chapter 4 this appears to be due to the fact that single releases are an effective marketing device for record companies. They test (at a low cost) whether records are going to sell and generate publicity for albums. Since pirates can free-ride on this act, they choose not to produce singles. In sum, a pirate facing lower costs can afford to substantially undercut the prices of legitimate producers while still making profits.

Creating an international organisation such as the IFPI was seen as a means of establishing specific audio copyright legislation where it did not exist, and at the same time, harmonising legislation so that piracy and parallel imports would be illegal. Later, the IFPI realised that enactment was not sufficient to prevent infringement and increased the jurisdiction of its activities to encompass the enforcement of property rights.

In 1961 the IFPI attempted to construct an international convention in order to directly protect the rights of artists and record producers. The result was the 1961 Rome Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organisations.[3] It contained articles directly protecting the recording of a performance, its broadcast, distribution, rental and duplication. The specificity of the Convention dampened the level of enthusiasm shown for the Convention and by 1970 only eleven countries had become signatories. Part of this reluctance was due to the fact that the Convention responded to cumulative broadcasting communications innovations over the previous three decades by attempting to establish property rights for artists and record producers in the domain of public performance. Stephen Stewart, the Director General of the I.F.P.I. from 1961 to 1979, recalls:

> "In retrospect, I think the turning point was the struggle to achieve what is known as the *Rome Convention* (1961), because it was the first time that both phonogram producers and performers were to be given rights on an international level. Record producers needed the two fundamental rights in the field of artistic works: a reproduction right and a performance right. The reproduction right was gained without too much difficulty, although that too was opposed by some national delegations at the diplomatic conference. Over the performance right there was a battle royal as it proved the most fiercely contested issue of the conference. The reason was the notion of a public performance of a work (other than a live performance) was relatively new and the importance of such performances - the audience of live performances is in

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[3] I.F.P.I. (1990a)

the hundreds, sometimes thousands, whereas broadcasts may be heard and now seen by millions - was not fully appreciated. There is and never was any sound reason why such performances should not be paid for. The relevant article (Article 12 of the Rome Convention) had to be carried three times by solemn votes in a Sub-committee, the Main committee and eventually the Plenary of the Conference by a two-third majority. It was."[4]

In terms of public goods, we would say that the broadcasting innovations were increasing the non-excludability consumption characteristics of pre-recorded audio software - if a consumer decided to broadcast the reproduction of her audio software unit then, as Stewart points out, ultimately millions of other consumers could have access to these recordings.

The poor membership response to the Rome Convention became increasingly perplexing to record producers over the 1960s. This was mainly due to audio technology innovations. In 1963 Phillips launched its two-track Cassette and RCA launched the eight-track Cartridge. Both of these innovations greatly facilitated the activities of pirate record companies and for the first time opened up scope for widespread home duplication of recordings. The former activity was facilitated on four fronts. Firstly, the technology to produce audio tapes was much more accessible than vinylite. Therefore, a pirate producer could easily purchase blank cassettes which were readily available in both the wholesale and retail market. At the same time recording equipment, (necessary to transform blank tapes to pre-recorded tapes), was

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[4] Stewart (1983).

also easily obtainable; being a standard purchase of recording studios and 'hi-fi buffs'.

The second reason tape innovation facilitated pirate production was that unlike vinylite, the production of pre-recorded tapes did not necessitate high output levels in order to achieve low per unit costs. Tape production technology was more akin to constant returns to scale. Blank tapes could be purchased in small quantities and the associated recording and paper-printing costs amounted to a small proportion of unit costs, and hence were not excessively high for small runs. Under the vinylite format, the pressing of discs from a master implied that only large output levels were economically justifiable. The net impact of this factor was to stimulate both the supply of and demand for enterprise in this activity. Demand was encouraged as the arrival of tape technology created scope for selling pirate tapes at low output levels. The supply of enterprise was encouraged as tape technology, being less capital intensive than vinylite, facilitated entry through relatively low initial capital costs.

The third boost to pirate production was the fact that the portability of tape recorders allowed 'pirates' to produce more differentiated products than legitimate record producers. The reason was that portable tape recorders could be transported to live concerts in order to tape the performance. The resulting recordings were usually of low quality but enthusiasts for a particular artist were often willing to accept low sound quality in order to obtain recordings unavailable on legitimate audio software[5]. These recordings of live performances are known in the industry as 'bootlegs' and their production is generally restricted to small scale pirate production.

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[5] Source: Interview with bootleg distributer - name withheld for legal protection.

The fourth stimulus stems from the clandestine nature of pirate record production to the extent that output has to be hidden or transported great distances (especially when the source of production and the destination of demand are two separate countries). With such product requirements, the tape cassette greatly facilitated the pirate's objectives being a much smaller and durable product than its vinylite counterpart.

Home taping was facilitated because virtually every hardware tape player possessed the ability to record; a characteristic unknown to the vinylite format.

As is evident from table 6.1, both pirate production and home taping offered a duplicate of a pre-recorded tape at a fraction of the price. This greatly threatened the profitability of legitimate record companies. The IFPI felt it necessary to respond to this threat, especially in the light of the poor response to the Rome Convention. Therefore, the IFPI decided to introduce a new copyright convention which was less rigorous in its demands of national legislatures than the Rome Convention. The result was the (Geneva) Phonograms Convention of October 1971. This convention was more successful in gaining membership. By 1983 thirty six countries had joined, representing 95 per cent of the world's record production.[6]

In the wake of the Phonograms Convention and with a background where the principle of audio recording property rights had been established at an international level, the IFPI moved its focus of attention to the national level. It was clear that some of the signatories, particularly in Latin America, were not enforcing copyright legislation so

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[6] Alloway (1983).

that piracy and home-taping continued. Other countries had only acquiesced to parts of the IFPI conventions. For instance, in 1990 only 10 out of the 42 countries who had signed the Phonogram Convention agreed to introduce levies on blank tapes.[7] The re-orientation of attention from the international to the national level led to a proliferation of IFPI national offices who became particularly active in the realm of piracy eradication.[8]

The challenges of new technology constantly demanded more embracing property right legislation. This was particularly the case with the evolution of technologies relevant for home-taping. Initiated in 1969, the series of Dolby Noise Reduction innovations improved the sound quality of tapes over the next two decades. So too did the introduction of magnetic and Chromium Dioxide tapes in the late 1970s. The diffusion of personal tape recorders in the early 1980s increased the consumer's ability to listen to audio tapes, including home recorded tapes. Record companies were soon complaining of huge losses from home taping. Hardware technological innovations continued and the introduction of the Phillips-Sony Compact Disc in 1983 (Europe) greatly increased the sound quality of home-taping. This was due to the fact that the C.D. was a digital clone of the original studio recording. Consequently, a copy of a C.D. onto audio tape was arguably as good in sound quality as the pre-recorded version.

This trend persisted itself as hardware companies continued to introduce new digital

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[7] I.F.P.I. (1990a)

[8] Solleveld (1983).

recording innovations. In 1986 Sony planned the release of its Digital Audio Tape (D.A.T.). However, this was blocked by legal action of record companies, who felt that, without appropriate copyright protection, D.A.T. would lead to wide scale home-taping and heavy losses to the software sector[9]. Sony were finally allowed to launch D.A.T. in 1990, but the launch was not supported by record companies. Record companies decided to retard the diffusion of D.A.T. by refraining from the production of pre-recorded D.A.T. software and thus, reduce the overall attractiveness of the D.A.T. format to the consumer. Their efforts were successful as D.A.T. failed to diffuse and is likely to be withdrawn from the market.

In 1992 Phillips launched its Digital Compact Cassette (D.C.C.) which was a digital version of the 2-track cassette. Phillips are also due to release a recordable C.D. This, like D.C.C. and D.A.T., will record digitally thus ensuring that all recordings, (at home or by record companies), will be clones of the original studio recording. Furthermore, the Mini-Disc, (a recordable digital format on a computer style disc) was successfully launched onto the Japanese market in October 1992. It was launched in the U.K. in December of the same year.

All these innovations present potentially significant loss of sales for record companies, to the extent that they provide pirates with perfect digital master copies from which to make duplicates. Simultaneously, they ensure that for the first time home recordings will unambiguously have equal sound quality to their pre-recorded counterparts.

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[9] Davies (1991) and Berman (1989).

Record companies, under the umbrella of the IFPI and national organisations such as the BPI in the U.K. and the RIAA in the U.S.A., have responded vigorously to the digital threat by demanding levies on the sale of blank software. The revenue would be divided between artists and record companies. They have also lobbied for a mechanism, known as Serial Copy Management System (S.C.M.S.), to be a mandatory component in all audio hardware.[10] This system scrambles digital readings, generating nonsensical digital recordings. It therefore restricts home-taping to a traditional analogue method.

A major breakthrough in achieving this objective occurred in June 1989 with a 'Memorandum of Agreement' between hardware and software producers which became known as the Athens Agreement.[11] The agreement states:

"The European companies acknowledge that they accept the principle of royalties and will not oppose efforts by the Recording Industry to secure legislation to implement such royalties. The Japanese companies acknowledge that the Recording Industry (and particularly the Japan Phonograph Record Association) places extreme importance on the issue of royalties as remuneration for copying that is permitted to continue following the adoption of any technical standards. The Parties agree that the adoption of technical standards shall not be relied upon by the Parties as a basis for supporting or

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[10] I.F.P.I. (1991a).

[11] I.F.P.I. (1991b).

opposing royalties."[12]

This development evolved further on the 11th of July 1991 in the U.S.A. when the RIAA, the Electronic Industries Association (EIA) and the National Music Publishers Association (NMPA) agreed to lobby the U.S. Congress for a levy on blank software and the mandatory installation of SCMS in all audio hardware equipment.[13] The European Commission have also stipulated that E.U. member states must harmonise national legislation to include a blank tape levy and SCMS installation.[14] The nature of the S.C.M.S. mechanism actually envisaged, would allow one copy of a pre-recorded software unit to be made. Further copies of the same pre-recorded software would be impossible. It is a general opinion in the music industry that this agreement was made possible by the scale of the threat digital presents to the industry.[15] Without copyright protection, tune innovation would be stymied and both hardware and software producers would suffer as a result.

Section 2: Pre-Recorded Audio Software Piracy.

In the previous section we noted that pirate record production was stimulated by cost savings resulting from infringements of property rights and free-riding on legitimate

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[12] I.F.P.I. (1991b)

[13] I.F.P.I (1991d)

[14] I.F.P.I. (1991e): 'Press Information', July 1991.

[15] Davies (1991).

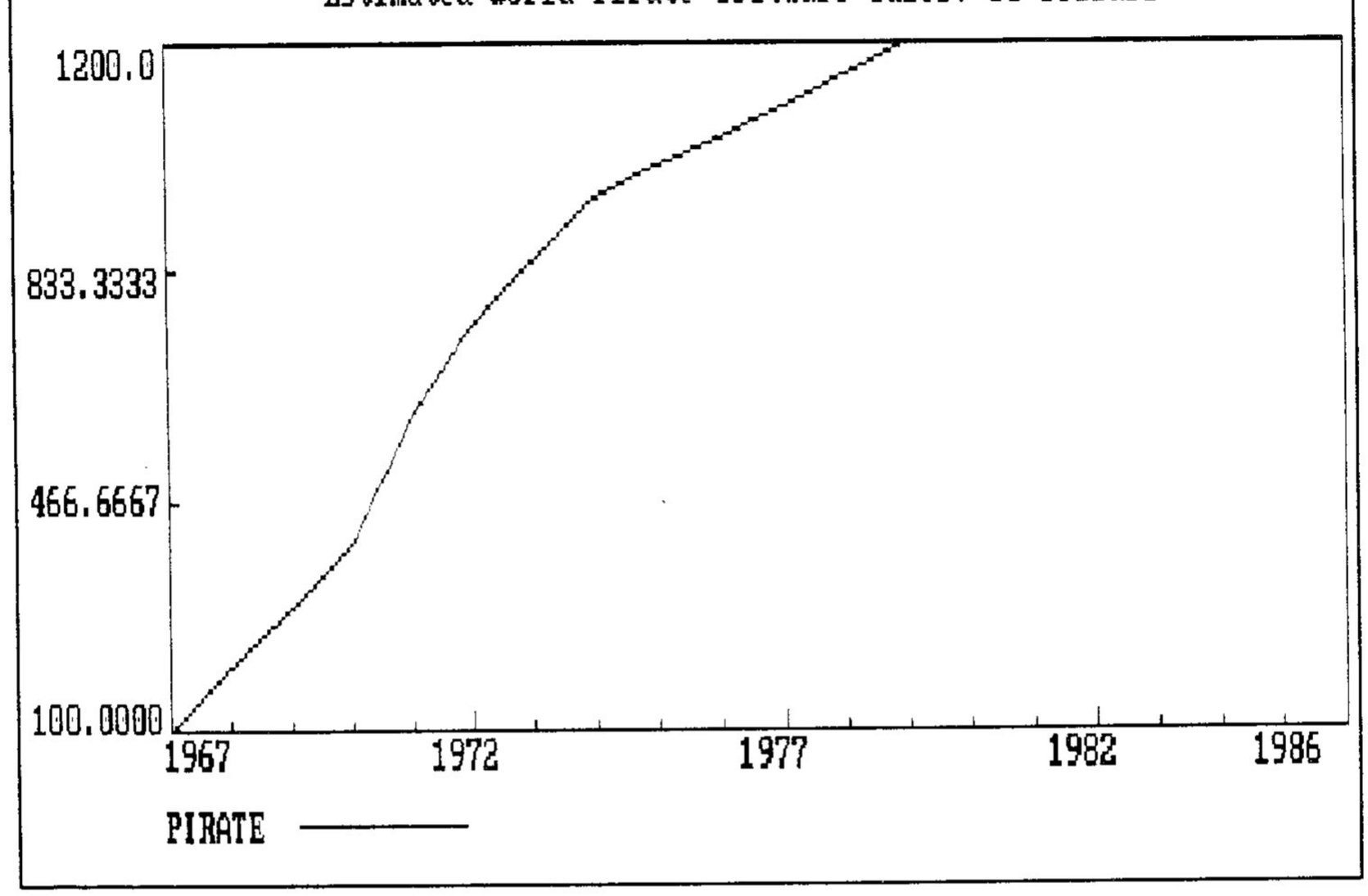
record companies' marketing. Piracy involves rent-seeking if the sales of pirated software occur at the expense of losses in sales of legitimate software. Since pirate software sells at a lower price and inferior quality to legitimate software, it is possible that rent-seeking may not occur. In other words, if the quality is sufficiently inferior, the affect of piracy may be akin to second degree price discrimination: consumers unwilling to pay the legitimate price are drawn into the market by the lower price of pirate software. In this case the pirate producer serves the lower end of the market not catered by legitimate record companies. Only in the event that pirate software reduces purchases of legitimate software does rent-seeking exist. Therefore, in this section we want to assess the affect of piracy on legitimate record sales and also examine the effectiveness of legislation designed to curb piracy.

Figure 6.1 portrays the IFPI's estimate of world sales of pirate pre-recorded audio software (millions of U.S. Dollars). After a period of rapid growth over the 1960s and 1970s due to the technological changes facilitating pirate production and distribution, pirate sales have now plateaued out. This, the IFPI claim, is primarily due to the effectiveness of their anti-piracy campaign.[16] The global distribution of piracy activity exhibits a non-uniform level of counterfeiting activity across nations. The actual pre-recorded audio software market attributable to counterfeits is presented in tables 6.2, 6.3 and 6.4. We have constructed the tables along the following criteria: table 6.2 lists the countries where piracy accounts for 10 per cent or less of the domestic audio software market. Table 6.3 contains countries where piracy accounts for between 10 and 30 per cent of the market. Finally, table 6.4 represents nations

[16] I.F.P.I. (1987b).

where piracy makes up 30 per cent or more of the domestic audio software market.

Figure 6.1: Worldwide Sales of Pre-Recorded Pirate Software.



Source: I.F.P.I. (1987): 20 Years of Record Piracy.

Inspecting table 6.2 and comparing it to the other tables, it is apparent that economies where piracy is minimal are also nations with a long tradition of Western style legal code and enforcement i.e. developed economies. The bulk of countries with less than 10 per cent of the market in the hands of pirates are in either North and Western Europe, Australia (data for New Zealand are not available) or North America. Outside of these areas only two countries, Costa Rica and Singapore, have minuscule counterfeit activity. The only European nations with more than 10 per cent piracy are the Southern European countries of Portugal, Italy, Greece and Turkey and the former Eastern Bloc nations of Poland and Czechoslovakia. Thus the tables illustrate that

geographically, the penetration of legitimate pre-recorded audio software sales of the world market has essentially been confined to Western Europe and North America. Therefore, it is clear that the loss to legitimate producers from pirate endeavours has been considerable.

A notable characteristic of areas where piracy is low is evident from table 6.5. Here we look at the percentage of the U.K. album market attributable to foreign artists. We are interested to enquire whether the nationality of these artists are from countries with high or low levels of domestic piracy. Therefore, we have broken down the foreign artist share into foreign artists originating from countries with 10 per cent or less domestic piracy and those with greater than 10 per cent domestic piracy. The table shows that the share of the U.K. market attributable to foreign artists over the years 1986-1990 averaged around 45 per cent with little variance. Of this share, an average of 98 per cent was made up of artists originating from countries where less than or equal to 10 per cent of their domestic audio software market was occupied by counterfeits (i.e. countries in table 6.2). On average only 2 per cent of foreign artists selling tunes in the U.K. market were from economies whose software markets had more than 10 per cent software (i.e. countries in tables 6.3 and 6.4). These percentages are significant because the U.K. market is usually regarded as a world leader in terms of tune innovation. Recorded music that sells well in Britain usually performs well in other markets.

Table 6.2

Countries where in 1989 at most 10% of the audio software market was occupied by pirate software. Date of membership of copyright conventions as of 1990, and 1989 percentage of audio software market attributable to piracy.

Convention:	Berne	Rome	Phonogram	% of market
Country:				
Australia:	1928	----	1974	4
Europe:				
Austria	1920	1973	1982	1
Finland	1928	1983	1973	2
Norway	1896	1978	1978	1
Sweden	1904	1962	1973	2
Switzerland	1887	----	----	4
Belgium	1887	----	----	1
France	1887	1987	1972	10
Germany	1887	1966	1974	1
Ireland	1927	1979	----	2
Holland	1912	----	----	7
Spain	1887	----	1974	5
U.K.	1887	1963	1973	1
L. America:				
Costa Rica	1978	1971	1982	10
N. America:				
Canada	1928	----	----	1
U.S.A.	1989	----	1974	6
S.E. Asia:				
Singapore	----	----	----	3
Totals:				
% membership	94.1%	53%	64.7%	
excl. post 84	93.8%	50%	64.7%	

Sources: I.F.P.I. (1990a): 'International Conventions' and I.F.P.I. (1991b): 'I.F.P.I. 1991 Review'.

Table 6.3

Countries where in 1989 between 10 and 30 % of the audio software market was occupied by pirate software. Date of membership of copyright conventions as of 1990, and 1989 percentage of audio market attributable to pirate software.

Convention:	Berne	Rome	Phonogram	% ofmarket
Country:				
Europe:				
Hungary	1922	----	1975	11
Greece	1920	----	----	25
Italy	1887	1975	1977	20
Portugal	1911	----	----	22
L. America:				
Argentina	1967	----	1973	27
Guatemala	----	1977	1977	15
Chile	1970	1974	1977	13
Colombia	1988	1976	----	16
Uruguay	1967	1977	1983	23
Venezuela	1982	----	1982	16
Middle East:				
Turkey	1952	----	----	15
S.E. Asia:				
China	----	----	----	17
Indonesia	----	----	----	25
Malaysia	----	----	----	16
Philippines	1951	1984	----	17
Taiwan	----	----	----	18
Totals:				
% membership	68.8%	37.5%	43.8%	
excl. post 84	66.7%	37.5%	43.8%	

Source: I.F.P.I. (1990a): 'International Conventions' and I.F.P.I. (1991b): 'I.F.P.I. 1991 Review'.

Table 6.4

Countries where in 1989 30% or more of the audio software market was occupied by pirate software. Date of membership of copyright conventions as of 1990.

Convention:	Berne	Rome	Phonogram	% of market
Country:				
Europe:				
Czech.	1921	1964	1985	40
Poland	1920	----	----	90
Africa:				
Ghana	----	----	----	75
Egypt	1977	----	1978	43
Ivory C.	1962	----	----	45
Kenya	----	----	1976	68
Nigeria	----	----	----	80
L. America:				
Bolivia	----	----	----	58
El Salvador	----	1979	1979	85
Honduras	1990	1989	1990	60
Panama	----	1983	1974	60
Ecuador	----	1963	1974	69
Mexico	1967	1964	1973	50
Peru	1988	1985	1985	62
Middle East:				
Cyprus	1964	----	----	90
Saudi Arabia	----	----	----	46
S.E. Asia:				
India	1928	----	1975	52
Korea	----	----	1987	40
Thailand	----	----	----	40
Totals:				
% membership	47.4%	37.0%	57.9%	
excl. post 84	41.2%	29.4%	46.7%	

Source: I.F.P.I. (1990a): 'International Conventions' and I.F.P.I. (1991b): 'I.F.P.I. 1991 Review'.

Table 6.5

U.K. audio software market: nationality of foreign artists. Total foreign artist share, foreign artist share from countries with 10% and less of their domestic market dominated by pirate software (low piracy) and foreign artist share from countries where this percentage is greater than 10% (high piracy). All figures in % shares.

Year:	1986	1987	1988	1989	1990	Average
Total Foreign Artist Share:	41.5	42.9	46.4	50.3	47.8	45.8
Artists from Low Piracy Nations	98.6 (41)	98.6 (42)	98.9 (46)	98.6 (50)	95.2 (46)	98.0
Artists from High Piracy Nations	1.4 (.6)	1.4 (.6)	1.1 (.5)	1.4 (.7)	4.8 (2.3)	2.0

Source: B.P.I. Yearbooks 1986, 1987, 1988, 1989 and 1990.

The fact is striking that the share of the U.K. market accounted for by foreign artists is almost entirely devoted to artists who originate from countries with low levels of piracy. It seems likely that at least one of two forces are generating this outcome. Firstly, record companies concentrate resources in countries where counterfeiting is minimal. Part of these resources are devoted to searching out and signing new talent; known in the industry as 'artist and repertoire' (A&R). As a result, artists resident in economies which are dominated by counterfeit software will find that there is little domestic demand for their artistic activities. In other words, tune innovation is retarded because there is not a high level of demand in this intermediate market. Secondly, the supply of new music may not be forthcoming because of a lack of

artistic and technical infrastructure in a commercially viable intermediate market for new music. These points were found to be important in the survey carried out in chapter 3.

In the brief history of copyright legislation, we observed that organisations such as the BPI in Britain and the RIAA in the U.S.A., in co-operation with the IFPI, have attempted to investigate scope for legislation to combat counterfeiting of pre-recorded software. It was argued that specific legislation was needed to account for the evolutionary nature of audio hardware and software products. We noted that in rigour and scope the 1961 Rome Convention was the most comprehensive. The 1971 Phonograms Convention was a milder version of the Rome Convention. However, prior to these conventions music copyright was implicitly acknowledged by the 1887 Berne International Union for the protection of literary and artistic works. Unlike the IFPI conventions, the Berne Convention did not single out musical works for specific attention. Thus in terms of direct powers to outlaw piracy, we would expect to rank the Rome Convention as the most effective, followed closely by the Phonograms Convention, with the Berne Convention in third place. Thus one would expect the distribution of world piracy to be negatively correlated with membership of these conventions, with the strongest negative correlation being expected from the Rome Convention, followed by the Phonograms and Berne conventions respectively.

In a bid to test this proposition, we included the dates of membership of these conventions for the countries listed in tables 6.2, 6.3 and 6.4. We were interested to see the share of countries in each table group who were members of each convention.

An effective convention would be characterised by a high membership share among countries with low levels of piracy (table 6.2) and a low percentage of membership in countries where piracy is prevalent (tables 6.3 and 6.4).

In order to fairly test conventions, we allowed a duration of time for the convention to take effect. Since the piracy data is collected for the year 1989, we felt a better indicator of convention effectiveness would be to exclude from consideration countries who joined the relevant convention within five years of 1989.[17] For this reason we listed two rows under 'totals' in tables 6.2, 6.3 and 6.4. The second row, ('excl post 85'), is the percentage of countries in the table who joined the respective convention before 1985. To facilitate interpretation, these shares are graphed in figures 6.2 (all membership considered) and 6.3 (only pre 1985 membership considered).

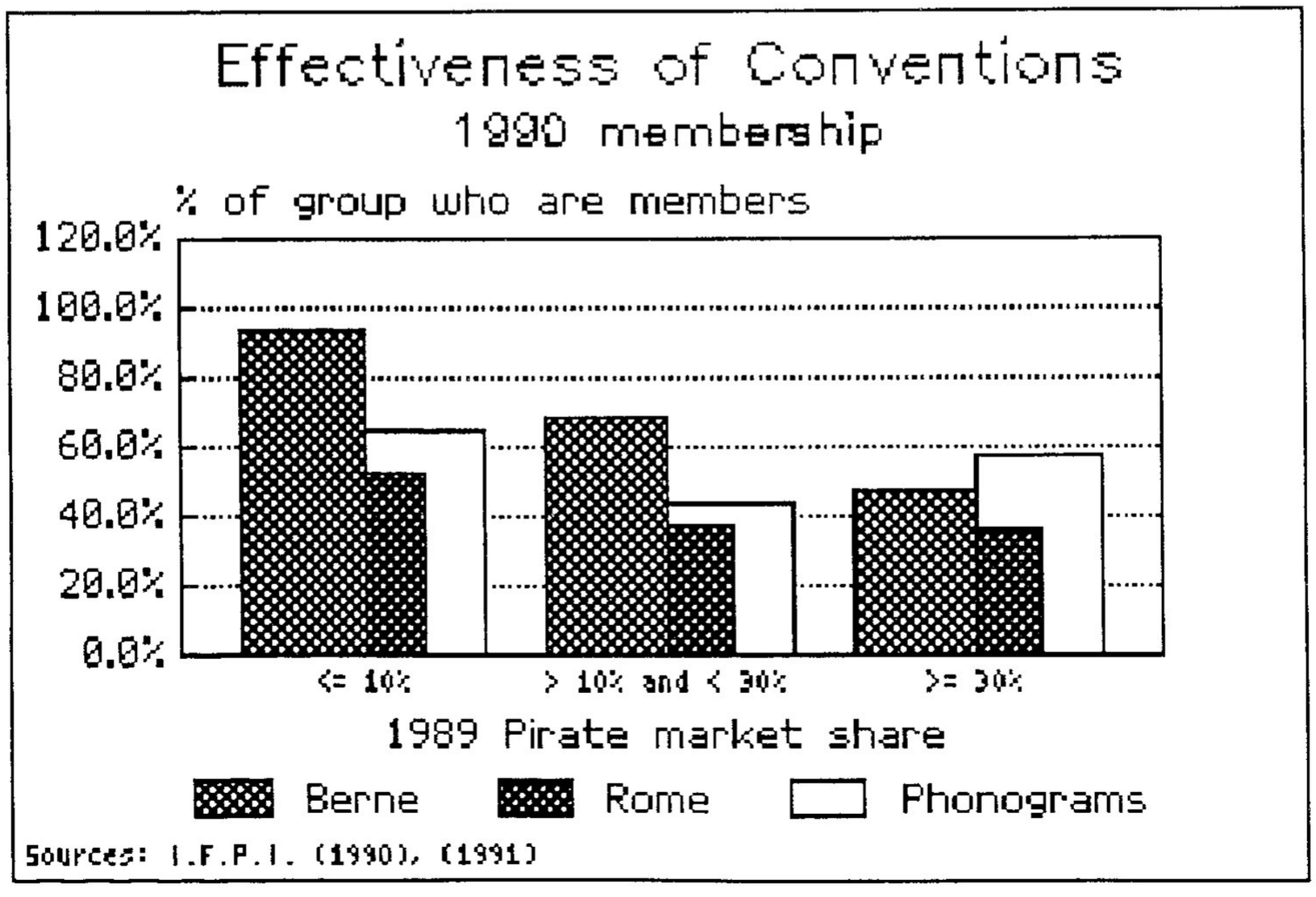
Contrary to the claims of the IFPI, the incidence of low piracy does not appear to stem from specific audio conventions. The best performer seems to be the Berne Convention. The Berne Convention accounts for 94.1 per cent of the group of countries where 10 per cent or less of the domestic market is made up of pirate software. The comparable proportion is 93.8 per cent if we exclude countries who joined the Berne Convention after 1984. The respective figures for the Phonograms Convention are the same under either classification, with 64.7 per cent of countries with 10 per cent or less piracy being members. In the case of the Rome Convention these percentages are 53 per cent for all members and 50 per cent for pre-1985

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[17] Countries such as Singapore have in fact exhibited the effectiveness of copyright legislation having a dramatic effect in eradicating piracy in as little as two years.

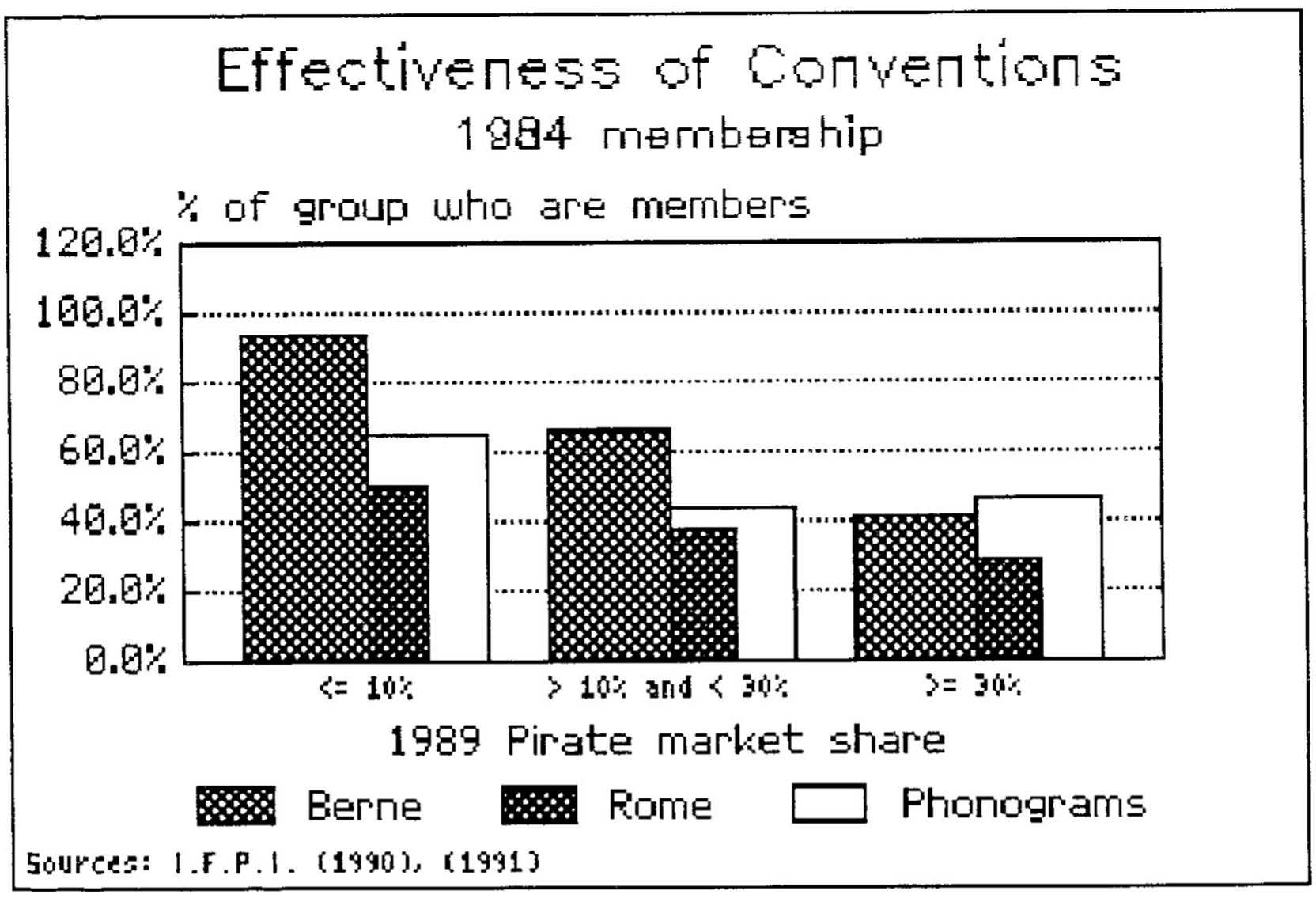
members. While appearing inferior to the Berne Convention, the Rome Convention arguably outperforms the Phonograms convention as it has a lower percentage share in both of the two higher piracy groupings i.e. countries with piracy shares greater than 10% per cent. Counter intuitively, the Phonograms Convention has a higher membership share in countries that have greater than 30 per cent in the market dominated by pirates, than in countries that have between 10 and 30 per cent piracy shares. This 'U' shaped trend line (representing membership of the Phonograms Convention) has a more gentle gradient in the upswing when we omit countries who joined the convention after 1984 (see figures 6.2 and 6.3). However, both the Berne and Rome Conventions outperform the Phonograms convention on the criterion of an expected upward trend of piracy levels across countries as convention membership declines. Both of these conventions show falling membership levels as we move from lower to higher piracy markets.

Figure 6.2.



Comparing figure 6.2 to 6.3 we note that the deletion of post-1984 members ensures the bar graphs in figure 6.3. are slightly truncated in the group of countries where 30 per cent or more of the software market is accounted for by counterfeits. On the other hand, the membership in countries with less than 30 per cent piracy are largely unaffected by the deletion of post 1984 members. Since similar deletions occurred in the group of countries with less than 10 per cent piracy, (see table 6.2) we cannot attribute the sole alteration between figures 6.2 and 6.3 to an argument that the only recent members of these conventions were nations with high levels of piracy. However, it does indicate that a short period of time may be necessary before the effects of copyright legislation have an impact in the market.

Figure 6.3



On examination of figures 6.2 and 6.3, but particularly 6.3, the Berne Convention appears to be the best performer, having both the correct upward trend in piracy levels

as membership declines, and also a high absolute proportion of members in the low piracy countries and low absolute membership levels in countries with a high incidence of piracy. To indicate this point further we employ regression analysis to test the significance of these apparent patterns in the data. The results are presented in table 6.6. The dependent variable is the percentage of the domestic market that is occupied by pirate software in 1989. The analysis is cross-section using the countries listed in tables 6.2, 6.3 and 6.4. We use three variables for each of the Berne, Rome and Phonograms conventions. The first variable is a membership dummy variable indicating whether the country is a member of each respective convention.

The remaining two variables are related to the length of time a country has been a member of the respective convention. The first variable is the number of years in which a country has been a member of a convention and the second is this variable squared. These two variables are aimed to test for the significance of length of membership and any possible non-linear effects therein. In addition to these variables we also included 1989 GDP per capita for each country to control for living standards economic development. Since judicial and policing maturity tend to be correlated with economic development, we use this as a proxy for institutional support for property right enforcement.

The general equation exhibits a highly significant negative correlation between piracy and GDP per capita data. All of the remaining variables are insignificant, except for 'length of time in the Rome Convention' variables which are significant at the 90 per cent level. The signs on these variables indicate a negative and decreasing relationship

between piracy and the number of years of membership of the Rome Convention. However, both became insignificant as we move towards the specific equation (specific 1). In fact, all of the 'Convention membership' variables are rejected in the final

Table 6.6

Dependent Variable: % of the audio software market accounted for by counterfeit software. 52 observations.

	General	Specific 1	Specific 2
Independent Variables:			
Constant	47.62	43.78	41.62
	(7.61)*	(10.79)*	(8.68)*
GDP per Capita	-0.0002	-0.002	
	(-2.83)*	(-5.43)*	
Berne Dummy	-12.21		
	(-1.05)		
Years in Berne	0.15		
	(0.34)		
(Years in Berne)^2	-0.002		-0004
	(-0.43)		(-3.80)*
Rome Dummy	37.35		
	(1.54)		
Years in Rome	-7.19		-1.84
	(-1.79)***		(-1.39)
(Years in Rome)^2	0.236		0.075
	(1.78) ***		(1.35)
Phono Dummy	-12.73		
	(-0.47)		
Years in Phono	5.38		
	(0.79)		
(Years in Phono)^2	-0.30		
	(-0.85)		
R^2	0.45	0.37	0.26
Adj - R^2	0.32	0.36	0.21
F - Stat	3.41*	29.48*	5.62*

* = sgnificant at 1% level, ** = significant at 5% level, and
*** = significant at 10% level

specific form which finds only GDP per capita to be important.

We also conducted a general to specific analysis with the GDP per capita data omitted. The specific form, denoted Specific 2 in table 6.6, finds the square on the number of years of the Berne Convention to be the sole significant variable. The last two variables to be deleted were, again, the 'number of years in the Rome Convention', also exhibiting a negative and decreasing relationship.

The regression results support the trends cited earlier to the extent that focusing on conventions exclusively pinpoints the Berne Convention as the most effective. The Rome Convention also appears superior to the Phonograms Convention. However, since the introduction of GDP per capita led to a superannuation of the importance of 'convention' variables, it appears that the institutional support for music copyright may play a more important role. Since most of the initial members of the Berne Convention were developed countries, it may be the case that the significance of the 'years of membership of the Berne Convention' variable is merely picking up this effect.

On the other hand, it is plausible that the generality of the Berne Convention may have helped develop the institutional and cultural support for music property rights. The Berne Convention, by protecting a wide range of commercial activities, provides a high level demand for the enforcement of its legal articles. The continuity and scale of this demand is often such that the legal infrastructure, (both policing and judiciary), to enforce these rights have sufficient support. This ensures that the copyright laws are

upheld. On the other hand, more specific legislation, such as that provided by the Rome and Phonograms conventions, is demanded by a much smaller group with specific interests. Thus, the legal authorities are less likely to give these demands the same priority, as they are only voiced at a micro level. The Berne Convention, by the sheer combined weight of the interests of its members, has the ability to create institutional support for the protection of intellectual property rights. For instance, since the fundamental rights of affected parties are stated within common terms in the Convention, it follows that judicial decisions in one industry have repercussions for other industries.

Since we have made the assertion that the level of institutional support for property rights is important, we will now attempt to search for microeconomic evidence to test this claim. Therefore, we will examine the audio software markets of some countries cited in tables 6.2, 6.3, and 6.4. A selective survey is only possible as information is not available on all the audio software markets listed in the tables.

Nations with 10 per cent or less domestic piracy:

U.S.A: The importance of institutional support for intellectual property rights is in evidence in the United States. The U.S.A. was already combatting piracy effectively prior to membership of any copyright convention. The existing laws protecting other intellectual property rights implied that the extension of these rights to audio recordings was reasonably straightforward. Piracy only appeared at a level to concern record companies in the late 1960s. The legislature was reasonably quick to respond. Counterfeiting was first outlawed on a federal basis in 1972 and was subsequently

enacted by 49 state legislatures.[18] These laws were later amended in 1982 to cater for new audio innovations in video recordings. The impact of the legislation was effective, and the estimated revenue of pirate operators fell from $600 million in the mid 1970s to roughly $250 million in the mid 1980s.[19]

The success of the campaign was as much due to enforcement of the legislation, as to its creation. The RIAA operated a vigilant campaign directed towards enforcing the property rights of its members through its anti-piracy unit. This organisation worked closely with the police and hired a large team of attorneys, investigators and even 'informers'. [20] These copyright enforcement activities also included blocking parallel imports at customs points. The RIAA, however, indicated that the success of its campaign was very much due to the fact that it was enthusiastically supported by the police, customs officers and judiciary. Two statements in its 1991 'RIAA News Release on Piracy' by Steven D'Onofrio, RIAA's Senior Vice President and Director of Anti-Piracy Operations makes this clear:

> "Our Industry owes a deep debt of gratitude to the continued vigilance of the U.S. Customs Service in protecting the U.S. market from the intrusion of unauthorized product in all formats, but especially C.D.'s.....Law enforcement and prosecutors at all levels of government should be recognized for their continual efforts in protecting the creative rights of the Recording Industry -

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[18] R.I.A.A. (1985).

[19] Horowitz (1987).

[20] R.I.A.A. (1985)

its artists, composers, musicians, and companies."

U.K.: In Britain the importance of institutional support for music copyright is also exhibited. The U.K. joined each copyright convention virtually as they occurred and its market has never had more than 5 per cent piracy. The zenith occurred in the early 1980s in the audio cassette sector. By 1983 10 per cent of the pre-recorded audio cassette market was dominated by counterfeits.[21] This sudden growth in piracy was due to the expanding market for cassettes and the technological developments facilitating pirate activities, notably in sound quality. The BPI's anti-piracy unit responded and with the help of the police and judicial system, they successfully brought pirates' market share down to 1 per cent by 1986. Robertshaw (1987), of the BPI, states that much of the success was due to the BPI's ability to persuade the authorities to adapt to the changing pirate climate.

"Stiffer penalties, better police co-operation and the growing involvement of the Trading Standards officers employed by local councils have contributed in the last few years to a steady reduction in pirate activity."

Such adaptive support would not have been possible if an existing cultural acceptance of intellectual property rights did not already exist.

Hong Kong: Hong Kong, (not being part of the IFPI's 1989 pirate survey and hence not included in table 6.2), had an estimated piracy share of less than 5 per cent in

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[21] B.P.I. (1991)

1983.[22] It was not a member of any copyright convention in its own capacity but its legal system and culture has been modeled on Britain. Following the cassette and cartridge innovations of the 1960s, there was a proliferation of counterfeiting activity in Hong Kong. This grew so rapidly that by the late 1960s pirate software accounted for 95 per cent of the domestic market with a large exportation component of production also.[23] An example such as this exhibits the fact that unless the rights of legitimate record producers are protected, rent-seeking activity can take over an entire market.

In 1971 the IFPI responded to Hong Kong's pirate stranglehold by setting up a regional anti-piracy office in Hong Kong. The resulting campaign was successful because support from the police and judiciary was forthcoming. Alloway (1983), of the IFPI cites:

"In Hong Kong, pirate sales - once forming 95 per cent of the local market, with huge exports - were reduced to less than 5 per cent in a period of seven years. IFPI secured the wholehearted support of the Government, the Police and the Customs and Excise departments, and new and effective laws have been put into action with regular seizures of pirate product and equipment."

Alloway also notes that the reduction of piracy not only led to a resurgence of legitimate software sales, but also to an emergence of local Hong Kong artists who by

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[22] I.F.P.I. (1983)

[23] Alloway (1983).

1983 represented roughly half of the repertoire of software sold in Hong Kong. In the heyday of piracy there was virtually no Hong Kong repertoire among all pre-recorded software sales.

Singapore: This is another country where rent-seeking pirates had completely crowded out legitimate record companies, but where effective copyright legislation transformed the market back to legitimate production. Pirate production emerged with the introduction of audio tape technology. By 1984 counterfeits accounted for 85 per cent of the domestic market. In 1987 this had been reduced to 3.[24] The transformation was largely due to the Singapore Government's desire for international acceptance in the wake of a decade of healthy economic growth. Given that Singapore was not a member of any copyright convention, such recognition was not possible unless intellectual property rights, (which largely belonged to the countries from whom it sought recognition), were upheld. This led to an immediate enforcement of existing domestic copyright legislation and the creation of new legislation. Leo (1987), of the IFPI, writes:

> "Singapore's reputation as a pirate centre was very damaging and it tarnished the good image the government was trying to project....The Singapore government's intention and its interest in rectifying the Copyright Act is clearly proof that owners of all intellectual property will stand to gain once the new bill is passed."

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[24] I.F.P.I. (1991b)

Again we see the success in combating piracy when music property rights are protected by a general culture favouring the protection of all intellectual property. The level of this co-operation is evident in Singapore where the Commercial Crime Division of the police carry out raids at the request of the I.F.P.I.[25]

Countries with Between 10 and 30 per cent Piracy:

Indonesia: Indonesia withdrew from the Berne Convention in 1958 and introduced a copyright act which only recognised the intellectual property rights of domestic innovators. Given that property rights were flouted in this general manner, it is not surprising that in 1987 Mike Hennessy of the IFPI described Indonesia as the world's leading supplier of pirate software with an export base of 50 million pirate cassettes per year[26].

Since domestic Indonesian artists were protected by copyright legislation the domestic market was not completely dominated by pirate tapes. However, in the absence of a domestic culture of respect for intellectual property rights, counterfeits of domestic recordings have also appeared. Hiett (1987), of the I.F.P.I., notes:

> 'Indonesian music is protected ....But out in the rural areas, these cassettes too are being pirated on low-cost tape and sold for less than half price. As one industry observer says: 'You need laws, enforcement, and a climate of opinion. Some laws are in place, but the rest isn't there at all.' '

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[25] Garnett (1987)

[26] Hennessy (1987).

Greece: This is another example of a quick transformation following effective legislation enforcement. In 1983 a landmark court ruling equated counterfeiting with forgery. This facilitated the fight against piracy as the police and judiciary were able to prosecute pirate producers along well established legal paths. Pirate sales fell from 80 per cent of the market in 1982 to 25 per cent in 1989. Simultaneously, the value of legitimate audio software sales climbed by 80 per cent over the period 1983 to 1985.[27]

Turkey: Pirates share of the software market has fallen from 80 per cent in 1984 to 15 per cent in 1989.[28] Despite membership of the Berne Convention since 1952, the drop in pirate activity in Turkey did not occur until the Government made a stance to protect intellectual property rights in general. John Carr (1987b), of the IFPI, states:

"Less than two years ago, the position began to change. An improving economy and a government with an open economic policy looking for links with the rest of Europe brought a favourable climate for copyright law reform. In 1985, legislation providing improved anti piracy provisions was introduced and, encouraged by this positive attitude, the legitimate industry stepped up its raids on the pirates."

Portugal: Portugal has been a member of the Berne Convention since 1911. It has also had a consistent stream of intellectual copyright legislation whose realm protected

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[27] Carr (1987b)

[28] I.F.P.I. (1991a)

audio recordings and artists. Despite this long legislative history, 80 per cent per cent of Portugal's software market was dominated by pirate products in 1987.[29] The problem stemmed from a failure to enforce copyright laws. Dr. Duarte Garin, 1987 General Secretary of U.N.E.V.A. (the Portuguese Recording Industry group), argues:

> "The legislative and judicial system have not yet devoted themselves to developing a strategy to deal with the problem. Because of this weakness, piracy grows continually at the expense both of international artists whose records are hits here and of the most popular national artists.[30]"

Portugal's entry into the E.U. has put pressure on their government to rectify this situation. The result of this pressure led to an enforcement campaign which, after only two years, brought piracy's share of the domestic market down from 80 per cent in 1987 to 22 per cent in 1989.[31]

Countries with 30 per cent and more Piracy:

Kenya: Kenya signed the Phonograms Convention in 1976, indicating a commitment to combat piracy. However, since then, government support for the protection of these property rights has waned and piracy has started to grow. Laing (1987c), of the IFPI, writes:

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[29] I.F.P.I. (1987b)

[30] I.F.P.I. (1987b)

[31] I.F.P.I. (1987b) and I.F.P.I. (1991b).

> "From sales of four-five million a few years ago, the legitimate record industry is down to under one million."

This has had an effect in reducing artists' incomes. In addition, record companies are not interested in signing artists with such a poor sales potential. Laing (1987c) cites:

> "Joseph Kumaru is one of the most respected and popular recording artists in Kenya. At one time he could expect to sell over 20,000 cassettes. Now his sales are down to a few hundred."

Thus, we observe a case where tune innovation is hindered by reductions in both the number of artists producing new tunes and the amount of recording contracts being created by legitimate recording companies.

Nigeria: The pirates share of this market has remained at roughly 80 per cent. This is not surprising given that Nigeria is not a member of any of the major copyright conventions and does not actively enforce the little domestic copyright legislation that does exist.

This is a common characteristic of other countries in this high piracy group e.g. Egypt and Liberia. Although many of these may have signed copyright conventions, intellectual property rights are not acknowledged by the authorities at any effectual level that would ensure enforcement.

Piracy Overview:

In this section we observed that rent-seeking pirate record companies could so effectively transfer profits from legitimate record companies, that the legitimate market could be effectively eliminated. This form of rent-seeking almost certainly characterises destructive enterprise to the extent that it destroys economic activity in the intermediate market for new music as well as eliminating the legitimate audio software market.

Through statistical and survey analyses we found that the enactment of copyright legislation was not correlated with a commitment to eliminate piracy. It appeared that institutional support for music property rights was a necessary condition for piracy eradication. In a bid to retrieve rents from pirates, legitimate record companies have co-operated to form industry organisations such as the IFPI, whose role is to generate such support. In some countries this investment has paid off, while in other countries such as Singapore, economic development generated exogenous institutional support for music copyright.

Section 3: Home-Taping:

The use of blank tapes to make personal copies of pre-recorded audio software is an infringement of music copy right and has been greatly encouraged by innovations in audio tape technology. Surveys conducted by the British Market Research Bureau, and

published by the BPI[32], exhibit a rise in the popularity of home taping. The surveys find that the proportion of adults who claim to have bought at least one blank tape over the last twelve months has risen progressively from 25 per cent in 1979 to 48 per cent in 1991. This is illustrated in figure 6.4. Further, the survey found that the number of households claiming to have some form of audio tape recorder has grown from 32 per cent in 1973, to 82 per cent in 1991 (see figure 6.5).

While home taping is an infringement of music copyright, there are different interpretations of the exact realm of these rights. Record company organisations, such as the BPI, RIAA and IFPI, argue that the purchase of a recording on a software format by a consumer, only confers the right for that particular consumer to listen to the recording in the exact format on which it was bought. Therefore, this view would perceive an individual who tapes her own record collection as violating music copyright. Other groups such as the Tape Manufacturers Group (T.M.G.), the umbrella organisation for the U.K.'s blank tape industry, and the U.S.A.'s Home Recording Rights Coalition (H.R.R.C.), argued that if an individual purchased a recording, she was, thereby, entitled to listen to that recording on whatever medium she pleased. Therefore, this view would claim that the taping of one's own record collection is not a breach of copyright.

[32] B.P.I. Statistical Handbook, 1991.

Figure 6.4: per cent of U.K. Adult Population who Bought at Least One Blank Tape Within the Last Twelve Months.

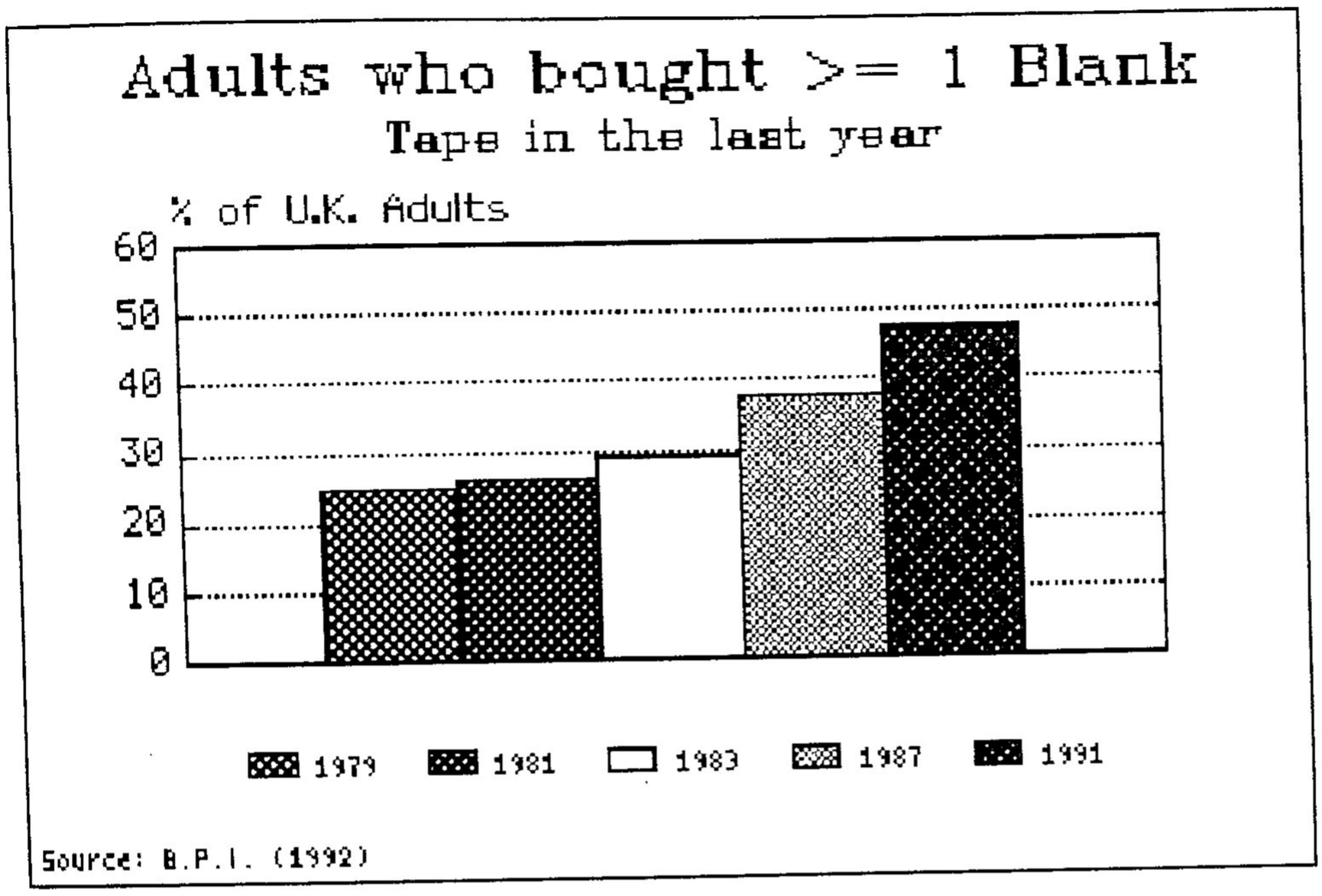
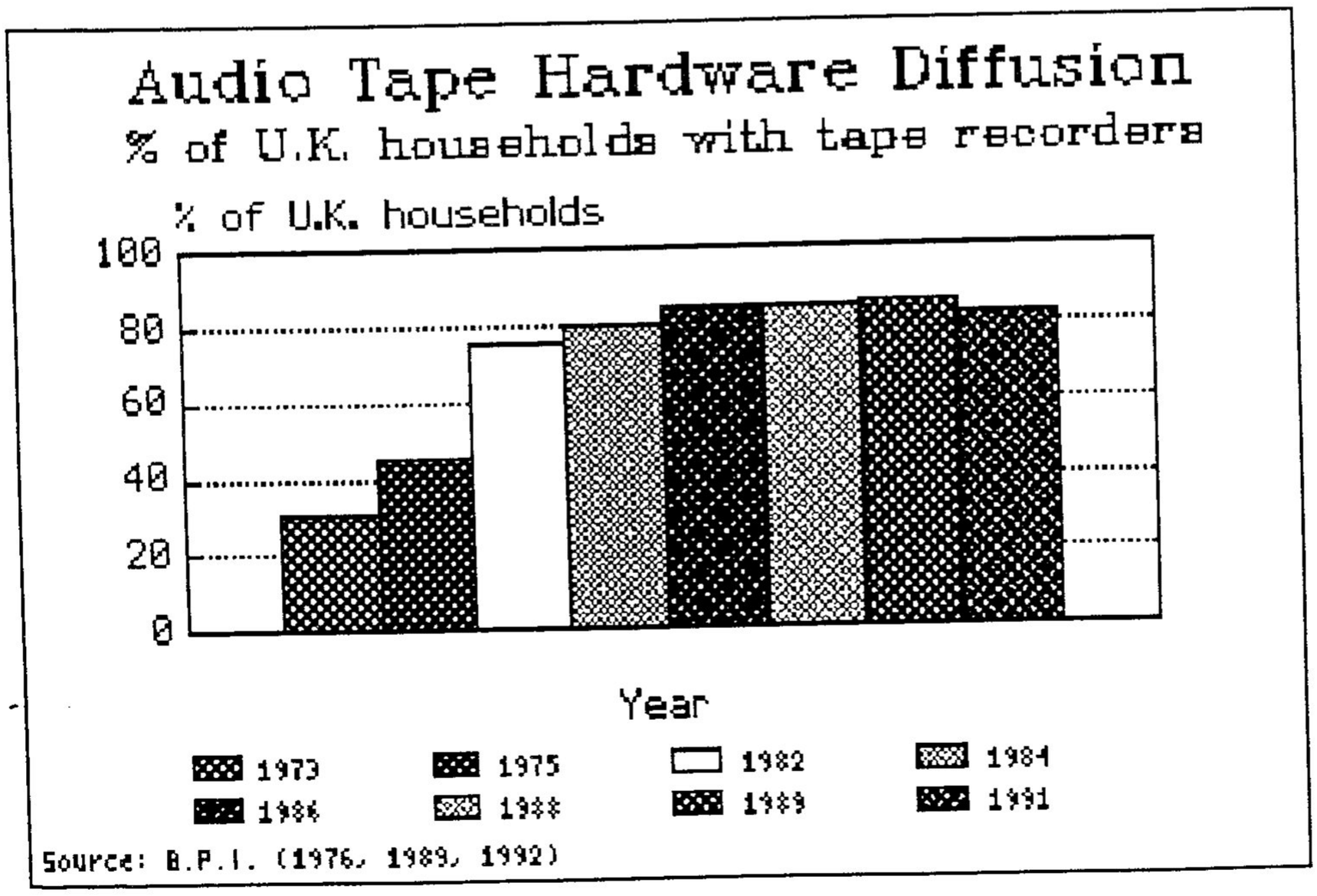


Figure 6.5: per cent of U.K. Households with Tape Recorders.



We do not intend to become embroiled in this legal debate. Our perceptive is purely economic and our main concern is whether the sale of blank tapes causes a reduction in the sales of pre-recorded audio software. If this does occur, then rent-seeking activity is taking place to the extent that rents previously secured by musicians and record companies are being transferred to blank tape manufacturers and indeed consumers.

Estimates available in the IFPI's 'Report On Private Copying' and also in the '1992 BPI Statistical Handbook' claim that on average blank tapes are used twice. Given, that most blank tapes have the capacity to copy two albums, this implies that on average, each blank tape copies the music equivalent of four albums. However, this does not imply that for every blank tape purchased, four album sales are lost, (although some industry publications implicitly attempt to suggest such). There are three reasons why such a deduction cannot be made:

Firstly, a downward sloping demand curve for audio software such as that estimated in chapter 3, implies that blank tape sales are unlikely to entail perfect rent-seeking. Given that blank tapes sell at a mean value of 20 per cent of the cost of pre-recorded albums, their availability draws in purchases to the blank tape market that would not be forthcoming in the higher price pre-recorded market. Furthermore, a large proportion of home taping is carried out by individuals who merely want to transfer a recording from one format to another e.g. vinylite to cassette. Given that they have already purchased the recording on one format, it is unlikely that they will purchase it on a second

format (diminishing marginal utility). This last point is supported by N.O.P.'s (1986) report for the T.M.G. where they found that individuals who made private copies of recordings were also heavy buyers of pre-recorded software. The B.M.R.B. came up with similar conclusions with a survey carried out for the BPI, published in the latter's 1992 Statistical Handbook. They found that 60 per cent of private copies made from both C.D.s and vinylite were owned by the same individual. The same estimate of private copies made from pre-recorded cassettes is much lower at 31 per cent.

Secondly, the sound quality of home recording is generally inferior to pre-recorded software. This may change when digital blank software become available.

Thirdly, home taping is only possible in an instance akin to Adam Smith's 'double coincidence of wants'. An individual is prevented from taping all the recordings she would desire, as home taping is only possible when she encounters another individual who possesses a recording that she likes and who is also willing to let her make a copy.

The above points demonstrate that the most effective means to assess the scale of pre-recorded audio software sales losses resulting from home taping is to include the price of blank tapes in the 'demand for albums' equations of chapter 3. However, as we

noted in that chapter, such data do not exist.

The only other alternative is to derive an estimate of the quarterly sales of blank tapes and use this as an independent variable in a demand for albums equation. The danger here of course, is that the quantity of blank tapes sold will be endogenous to the model, and hence be dependent on the other independent variables. Despite this obvious danger, this is the route we chose to follow. There are no data for the actual sales of blank tapes. However, we were able to acquire annual data on the level of blank tapes imported into the U.K., from the BPI statistical handbook. These data were remarkably consistent with the IFPI's own estimates of blank tape sales over the period 1983 - 1987. The BPI data averaged at 95 per cent of the level of the I.F.P.I. data with a standard deviation of 3 per cent. We also secured quarterly import data for the year 1990 (sourced from the T.M.G.), and we used these quarterly shares as weights to create quarterly data from the annual data.

We used the blank tape sales variable in linear and log form in all of the vinyl albums equations in chapter 3. In all cases the variable was significant but its coefficient was positive. This was most likely due to the fact that quantity of blank tapes was endogenous to the model. The endogeneity may result from multicollinearity with other independent variables (e.g. income and price), or simply be due to the finding of the B.M.R.C. survey that when people buy albums they often make copies of these albums.

In order to control for the endogeneity affect, we tried an alternative procedure where

we included both the log and linear blank tape variables in the vinyl albums equation simultaneously. In all of the equations one of the blank tape variables was negative, while the other was positive. However, only in the Substitution Price Permanent Income equation was the negative coefficient statistically significant. The results for this equation are reported in table 6.7.

We used the negative coefficient from the blank tape variable of equation 'C' in table 6.7 to estimate the negative impact of blank tape sales on pre-recorded software. The first step was to multiply the negative relationship (coefficient) between blank tape sales and pre-recorded software sales, by the quantity of blank tapes sold in order to arrive at an estimate of the number of record sales lost. This implied multiplying BLANK (our proxy for blank tape sales) by the absolute value of the coefficient (-.0329). Remembering that the dependent variable is the log of the quantity of vinylite albums sold, this implies that the resulting variable, which we denote 'LOSS', represents the percentage reduction in the size of the vinylite album market due to home taping activities.[33] We also generated a four period moving average of LOSS (MALOSS) and a moving annual total of LOSS (M.A.L.).

LOSS, MALOSS and M.A.L. are plotted in figure 6.6. We can observe a broad upward trend in vinylite album sales lost as a result of the growth of home taping throughout the 1980s. This trend is more pronounced in the annual rather than the quarterly data. On average, private copying was estimated to have caused an annual loss of vinylite album sales equivalent to 2.7 per cent of the vinylite market with a

[33] LOSS = BLANK*0.0329

standard deviation of 0.39 per cent. The same losses on a quarterly basis have a mean

Table 6.7: Blank Tape Significance Tests

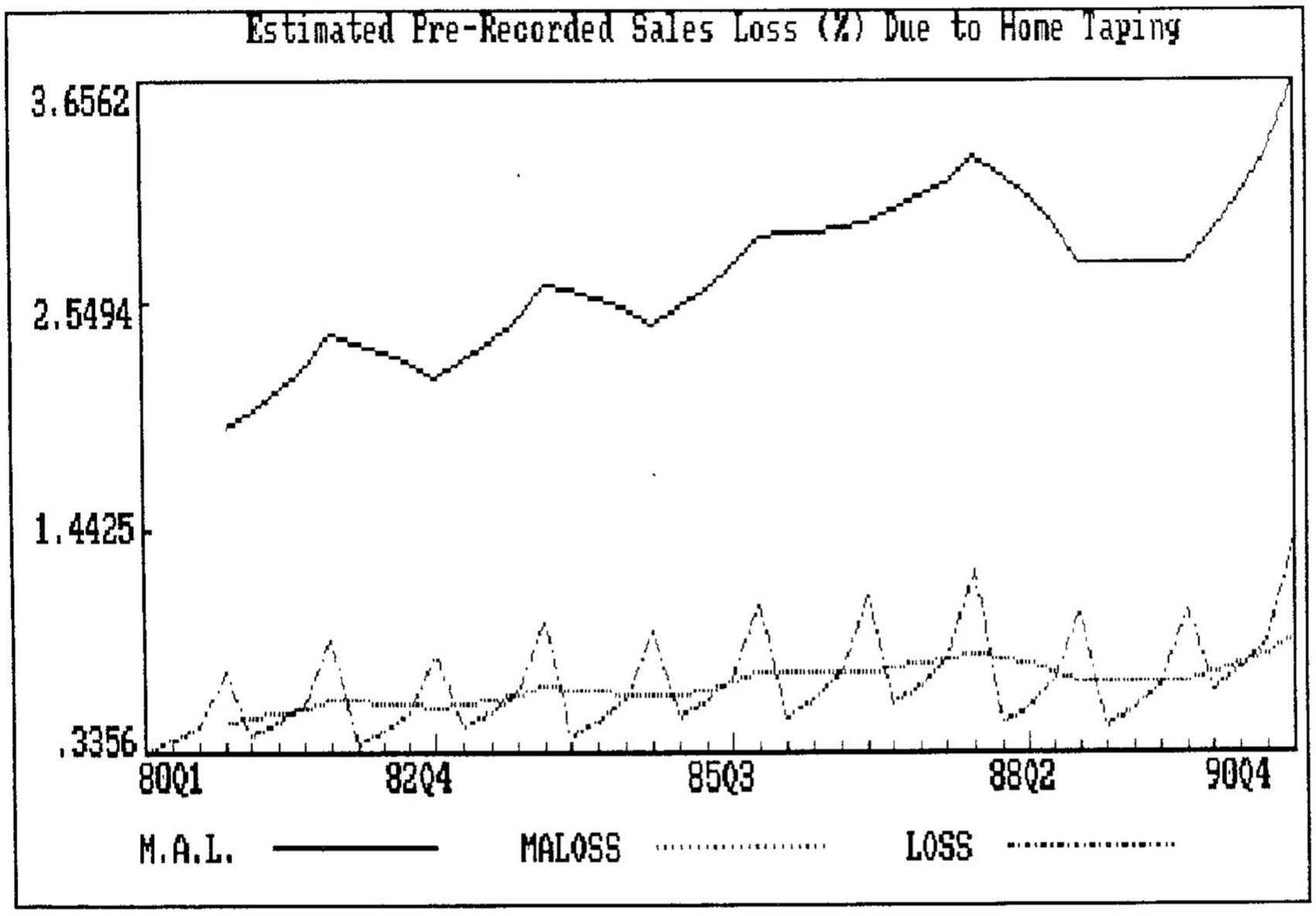
Dependent Variable: LQLP. *Regressors:* (previously unidentified): BLANK = UK blank tape imports, LBLANK = log of BLANK. *Sample:* [A], [B] and [C] 1980q1 to 1988q1 (33 observations).

Variables:	[A]	[B]	[C]
CNT	-97.08	-95.29	-121.63
	(-4.06)*	(-3.64)*	(-5.19)*
RESSINH	0.3015	0.2738	0.398
	(1.60)	(1.36)	(2.30)**
XMAS	0.6411	0.7130	0.696
	(8.00) *	(8.01) *	(9.25)*
DIFLP	5.5757	5.5002	6.623
	(4.46)*	(4.06) *	(5.56)*
LPOP29	5.47	7.2212	5.839
	(1.53)	(1.90) ***	(1.81)***
LSUBPLP	-0.9486	-0.8962	-1.192
	(-2.25)**	(-1.99)***	(3.06)*
YPER2	4.1988	2.8242	5.88
	(2.27)**	(1.81)***	(3.68)*
LBLANK	0.2283		0.854
	(2.15) **		(3.35)*
BLANK		0.0057	-0.033
		(1.04)	(-2.64)**
Statistics:			
R-Squared	0.9720	0.9682	0.978
R-bar Squared	0.9641	0.9593	0.971
F-Statistic	123.93*	108.67*	135.30*
D.W.	2.4001	2.2988	2.282

* = significant at 1% level, ** = significant at 5% level, and
*** = significant at 10% level.

value of 0.7 per cent with a standard deviation of 0.24 per cent.

Figure 6.6 : Estimates of the percentage loss of Vinylite Album Sales due to Blank Tape Sales. [*Variable definitions*: LOSS = quarterly losses, MALOSS = four period moving average of LOSS and M.A.L. = moving annual total of LOSS].



If the audio software market is negatively affected by home taping, this is likely to cause a contraction in the intermediate market for new music. In order to gauge the scale of this possible effect, we divided the average number of albums sold per album release, into the number of album sales lost due to home taping. However, we first wanted to convert the LOSS variable from market share to actual units (millions). We did this by multiplying the quantity of albums sold (QLP), by LOSS and dividing the product by 100. This gave us a variable which we called 'QLPLOSS'. [34] We then

[34] QLPLOSS = QLP*(LOSS/100)

gathered the only available data for the number of albums released on vinylite in the U.K. These were sourced from Davies (1985) with 5,000 for 1984, I.F.P.I. (1989b) with 5,631 for 1987, BPI(1989) with 5,631 for 1988, and BPI (1992) with 5811 for 1989.[35] Using these data we had a mean value of 8873 albums sold per release. Converting this average to millions of units and dividing it into QLPLOSS, gave us 'TUNELOSS': the number of album releases prevented by the contraction of the audio software market which was caused by home taping.[36] We plotted TUNELOSS, a moving average of TUNELOSS (MATLOSS) and a moving annual total of TUNELOSS (M.A.T.L.) in figure 6.7. On average, 44 vinyl album releases per year were not possible because of home taping (to arrive at an estimate for overall album release reduction we can multiply 44 by the number of album formats available, 3, to give us a figure of 132). In figure 6.7 we can see the level of these losses growing over the 1980s up until 1988. The decline exhibited from 1988 onwards is due to a fall in the denominator of TUNELOSS (i.e. QLPLOSS). Therefore, it does not represent a falling susceptibility of record companies to home taping, but the decline of the vinylite format itself as it became superannuated by cassettes and C.D.s.

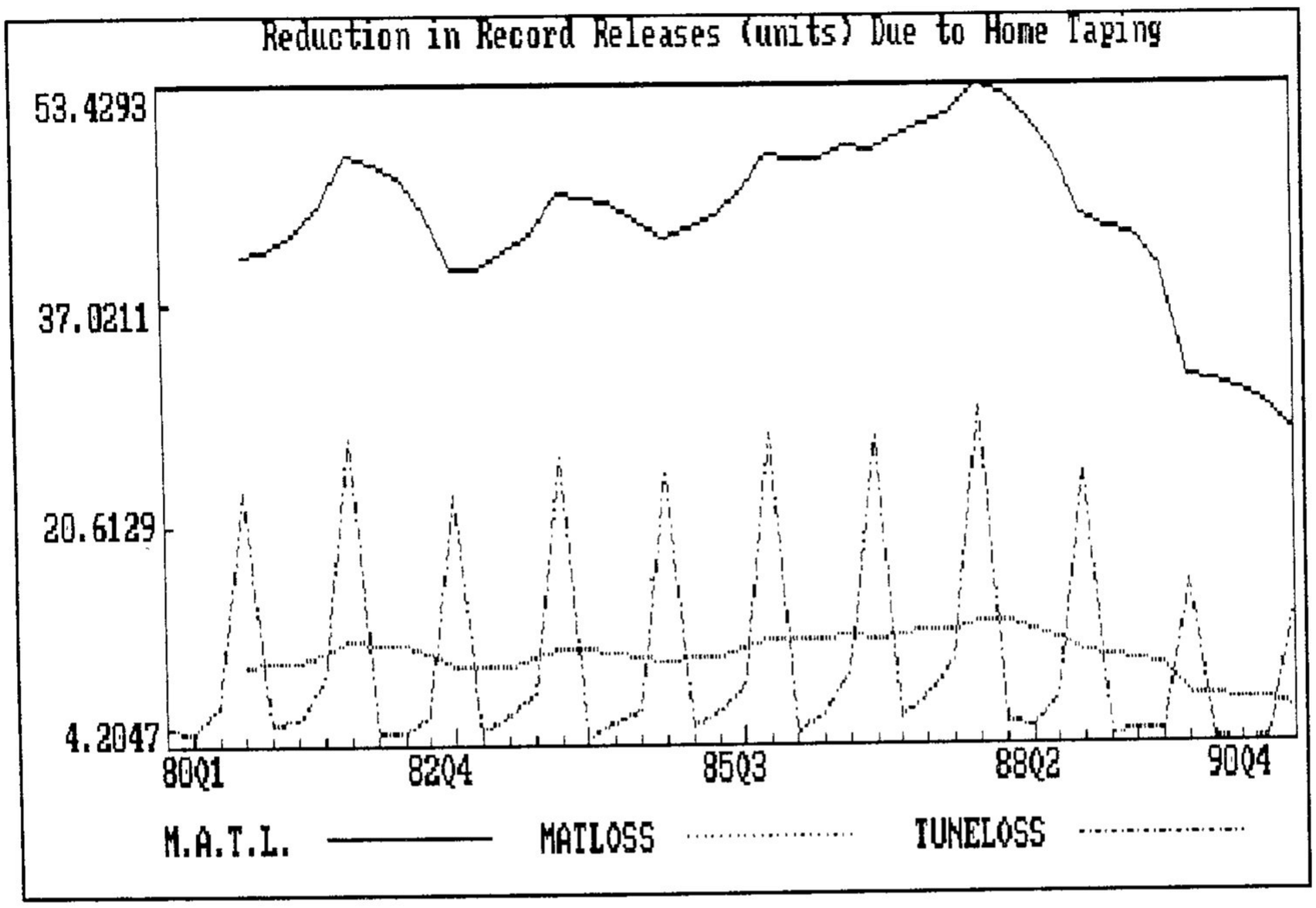
The available evidence seems to suggest that the activity of blank tape manufacturers has had a relatively small impact on both the audio software market and the intermediate market for new music. To this extent their activity seems to generate significant purchases of new audio software rather than cause the substitution of expenditure from the existing software market. Therefore, although some of the profit

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[35] The fact that 1987 and 1988 estimates are exactly the same has been checked and is purely coincidental.

[36] TUNELOSS = QLPLOSS/.008873.

Figure 6.7: Estimates of the decline in tune innovation attributable to Blank Tapes. The reduction in new recording releases caused by a contraction in album sales volumes resulting from home taping. [*Variables*: TUNELOSS = quarterly reduction in tunes released, M.A.T.L. = moving annual totals of TUNELOSS and MATLOSS = four period moving average of TUNELOSS].



opportunities available in blank software production are generated from a transfer of rent from artists and record companies, the net effect of their activities appears to be productive.

In the U.K. record companies and musicians do not receive compensation for this transfer of wealth. However, in many European countries there are tariffs levied on blank tapes. The revenue from these tariffs are returned to artists and record companies. It is interesting to observe whether the revenue from blank tape levies is such that it sufficiently compensates musicians and record companies for rent transfer to blank tape companies, or whether it actually exceeds this amount in recognition of

the use of property rights in home taping. We can glean this information from the level of taxes chosen in Germany and France - countries where data on the level of blank tape sales is available. Table 6.8 contains the blank tape levies chosen in 1985 (their first year of introduction) in both France and Germany as the equivalent of 0.24 U.S. Dollars and 0.06 U.S Dollars respectively. In the same year, the number of blank tapes sold in each country was 45.5 million and 86 million respectively. Therefore, total levy revenue was $10.92 million and $5.16 million in France and Germany respectively. As a percentage of the value of pre-recorded sales, total levy revenue amounted to 2.18 per cent in France and 0.61 per cent in Germany. Dividing the number of blank tapes sold into this percentage gives us the percentage of pre-recorded revenue that is estimated to have been lost due to the sale of a single blank tape. This has exactly the same interpretation as the coefficient on our 'BLANK' variable in the regression analysis, which related the sale of a blank tape to the percentage loss of sales of vinylite albums. The exact relationship was quantified at -.0329. The corresponding estimates for France and Germany are listed in row 6 of table 6.8 as -0.0479 and -.0071 respectively, with a mean value of -.0275. To the extent that one can make cross comparisons between national markets, it would appear that blank tape revenue in France and Germany is around the magnitude that would only compensate musicians and record companies for the losses resulting from rent transfer. Record companies and musicians do not appear to be receiving a reward for the use of their music in that home taping which does not detract from the pre-recorded market i.e. from expenditure along the lower end of the demand curve.

Table 6.8

1985 French and German blank tape levies: derivation of the governments' implicit estimation of the impact of blank tape sales on pre-recorded audio software sales. All money values in 1985 U.S. Dollars and all unit values in millions of units.

Country:	France	Germany
Per Unit Blank Tape Levy:	0.24	0.06
Blank Tape Sales (units):	45.5	86.0
Total Levy Revenue:	10.92	5.16
Pre-Recorded Software Sales (value):	500.82	845.79
Levy Revenue as % Pre-Recorded Sales:	2.18	0.61
Coefficient relating blank tape sales to the log of pre-recorded sales (i.e. Row 5 Divided by Row 2 multiplied by -1):	-.0479	-.0071
Mean Coefficient:	-.0275	-.0275

Source: Blank tape levies and sales; I.F.P.I. (1991b):`1991 Review' and value of software sales; I.F.P.I. (1990b):`World Record Sales: 1969-1990'.

Conclusion

In this chapter we examined rent-seeking behaviour in two areas of the audio software market. The first case focused on counterfeit production where illegal pirate record companies flouted copyright and produced duplicates of pre-recorded software. This pirate software, being an almost perfect substitute for legitimate software, was observed to effectively push its legitimate counterpart out of the market. Therefore, rent-seeking activity by pirate producers was found to be destructive; especially as it also destroyed the intermediate market for new music. An examination of copyright legislation designed to combat piracy was found to be extremely ineffectual as there appeared to be little correlation between copyright enactment and enforcement. In general, it appeared that the elimination of this form of destructive rent-seeking was only possible if support for similar intellectual property rights in other industries was generated.

In the case of blank tape production it appeared that although this activity involved rent-seeking, it did not result in net destructive enterprise. Blank tapes appeared to be imperfect substitutes for pre-recorded software and exhibited only a relatively small amount of rent transfer from the audio software and intermediate music markets.

The case of blank tape production appeared in contrast to pirate record production to the extent that in the former, rent-seeking was interwoven with productive enterprise. In the latter, the activity was almost exclusively stimulated by rent-seeking rewards. The comparison implies that a policy to counteract rent-seeking cannot be applied

indiscriminately as it does not always occur in the pure form described by Baumol (1990). Further, in a bid to encourage productive enterprise it may be necessary to allow rent-seeking rewards to stimulate productive enterprise. For example, in the case of blank tape production existing record companies chose not to produce blank tape software. This either occurred because they were unwilling to undertake the risks associated with this market, or they felt that the development of a 'low quality' audio software market would significantly deplete the pre-recorded market. Thus, it was left to companies such as Sony (prior to its ownership of CBS) and BASF to enter the market. The dilemma for analysts is, therefore, the issue of whether these companies would have entered the market if the rent-seeking rewards were not on offer i.e. if a blank tape levy was introduced at the outset.

Conclusion

The thesis conducted an economic analysis of enterprise in the music industry and was the first comprehensive quantitative analysis of this industry. The research focused on the sectors of the music industry relating to the sale of audio software. This initially involved an analysis of the intermediate market for music where the output of musicians was sold as an input to the production of audio software. In the absence of data in this sector of the industry, the research collected a comprehensive data set on the behaviour of composers and used this to examine record company formation, survival rates of composers, and the contracting of musicians by record companies. The analysis then moved on to look at the audio software market. It examined the similarity of music in the singles and albums markets and used these results to assess the importance of music innovation at both the firm and industry level. The research then investigated the audio hardware sector and examined the strategic interdependence between audio hardware and software companies in the event of systems innovation. The final chapter of the thesis looked at the public good characteristics of music and how this affected counterfeiting activity. The chapter assessed the extent to which this activity has affected the productivity of the industry as a whole. As a foundation to these analyses the thesis also provided a theoretical model of enterprise in the music industry and compiled a history of audio technology innovation.

The thesis also generated results of interest from a specific level to the general. Firstly, the quantitative methodology of this analysis demonstrated that such an approach is feasible in other cultural industries. The two main impediments to such an

approach to the music industry initially appeared to be a lack of data in the intermediate market for music and the immeasurability of the quality of music. The thesis overcame the first obstacle by collecting new data. The analysis of this data resulted in a significant insight into both the dynamics of this market and the relative importance of variables that are often assumed to play an major role. The quality of music was estimated using the finding that a significant proportion of successful singles and albums contained the same music. Using the residuals from a singles equation, a proxy for the quality of music was derived and this was used as an independent variable in an albums equation to assess its importance. The analysis would seem to suggest that the extent of quantitative analyses of cultural industries could be increased. Artists were found to co-operate in the collection of economic data and the methodology for estimating the quality of music could similarly be applied to the measurement of the quality of other cultural goods, such as movies and literature.

The thesis research was also of relevance to the economic literature on entrepreneurship. A primary objective of this literature is to explain the performance of enterprise and hence is to classify enterprise according to its productivity. Variations in productivity are usually associated with the distribution of rewards for enterprise across productive and unproductive activities. The thesis, however, analyses enterprise in an industry where financial reward is not the primary stimulus for a significant proportion of actors. The research found that the presence of such motivations is likely to generate a significant level of unproductive enterprise, particularly in the realm of new firm formation. However, the thesis discovered that

the music industry operated in a reasonably consistent manner with more commercially orientated industries. The successful application of the analysis of entrepreneurship to this industry seems to indicate that its generality is likely to extend to other cultural industries.

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