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growth?**

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# Remittances: Dutch disease or export-led growth?

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## Abstract

The literature on remittances and growth has thus far established a positive link between remittances and overall economic growth in recipient countries. We identify the main transmission channel through which remittances seem to exert their growth-enhancing effects: the ‘export-led growth’ channel, using a methodology that exploits both cross-country and within-country cross-industry variation, and correcting for the endogeneity of remittances by constructing a set of external instruments. We find that remittances are conducive to the relative growth of exporting industries within the manufacturing sector of recipient economies, contrary to what standard Dutch disease theory suggests. In doing so, we control for the potential complementarity effect between migrant networks and international trade.

**Keywords:** Remittances, manufacturing, export-led growth, Dutch disease, migrant networks.

**JEL Classification:** F2, F4, O1, Q3

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# 1 Introduction

The emergence of migrant workers' remittances as one of the largest sources of external finance to developing countries, often exceeding other prominent sources of financial flows such as foreign aid and foreign direct investments (FDI), imposes the key empirical question of whether such private flows promote economic growth in recipient countries. World Bank (2009) reports over \$443 billion of officially recorded remittance inflows transferred worldwide in 2008, of which \$325 billion were directed to developing countries. The literature thus far on the link between remittances and economic growth shows a positive correlation between remittances and growth<sup>1</sup>.

In this paper, we argue that the main transmission mechanism through which remittances can affect overall economic growth in recipient economies is 'export-led growth.' While a large number of developing countries have achieved export-driven growth<sup>2</sup>, it is not apriori clear whether remittance transfers enhance or harm export sector competitiveness in remittance recipient countries.

We argue that there are four different channels through which remittance inflows can affect export sector competitiveness in labor-exporting countries. The first two channels are negative. First, as large sums of foreign exchange to developing countries, remittances are feared to favor the growth of non-tradable sectors at the expense of the tradable sectors, hence undermining recipient countries' competitiveness through the Dutch disease effect. Second, international migration and the export sectors in labor-exporting countries are feared to compete on their tradable products: labor for the former and labor-intensive exportables for the latter. Since exporting labor is cheaper than exporting commodities, as the former occurs by default rather by design whereas the latter requires considerable efforts to build the necessary productive capacity, it is tempting for the developing labor exporters to make labor, rather than labor-intensive exportables, the country's primary export and hence benefit from the resulting remittance transfers (Kapur, 2005).

On the positive side, there exists a background effect of the large migrant networks behind remittance transfers. Such networks are showed to enhance trade links between home and host countries in the literature on the complementarity between international migration and international

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<sup>1</sup>The growth-enhancing effects of remittances were established in Giuliano and Ruiz-Arranz (2009), Ramirez and Sharma (2009), Mundaca (2009), and Catrinescu et al. (2009). On the negative side, Le (2009) and Chami et al. (2005) show that larger remittance receipts are associated with lower growth prospects. Lucas (2008) pinpoints some of the weaknesses of the Chami et al. study.

<sup>2</sup>See Giles and Williams (2000) for a review of the empirical literature on export-led growth.

trade<sup>3</sup>. In this literature, migrants are not treated as random additions to the stock of labor in host countries. Instead the importance of migrants' links to their home countries in the form of knowledge of domestic markets, language, preferences, business contacts and contract enforcement is emphasized. Such links exert their influence on bilateral trade in two basic ways. First, migrants create a preference for home-country products resulting in a direct increase of host country's imports of these goods. More importantly, migrants' foreign market knowledge as well as their contacts significantly lowers the transaction costs of trade and predicts a direct increase in both exports and imports between home and host countries (Gould, 1994).

This brings us to the fourth channel, a capital investment channel whereby remittances can, directly as capital investment transfers in export industries (for instance through network effects) and also indirectly through their economy-wide investment-enhancing effects (such as their effect on overall macroeconomic stability and country creditworthiness), boost export sector growth in recipient economies.

To identify the transmission mechanism at work, we follow and extend a similar strategy to the difference-in-difference methodology used in Rajan and Subramanian (2011) (hereafter known as RS) on foreign aid and manufacturing sector growth. Focusing on manufacturing industries, this methodology uses averaged data across the 1980s and 1990s decades and allows us to make predictions about within-country differences between industries. More specifically, we first classify such industries based on their 'exportability.' Our measure of exportability is industry-specific and is defined as the ratio of exports to value added. In that respect, we follow RS in adopting an exportability rather than a more general tradability measure and argue that for our (middle and low-income) countries, competitiveness is likely to be reflected to a greater extent in exports than in import-competing industries. Then interacting country-specific remittances with industry-specific exportability, we answer for the 1980s and 1990s separately our question of interest: Do exportable industries grow faster or slower on average than non-exportable ones in countries that receive more

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<sup>3</sup>Gould (1994) finds a strong positive effect of immigrant networks on U.S. exports to as well as imports from immigrants home countries. Similarly, Head and Ries (1998) find, among other things, that a 10 percent increase in immigrants is associated with a 3 per cent increase in Canadian imports from immigrants' home countries, and that these effects are larger for more 'independent' (skilled) migrants. Rauch and Trinidad (2002) show the large effect of ethnic Chinese business networks on global bilateral trade patterns, and that this effect is greater for the trade of differentiated than of homogenous commodities. The importance of business and social networks in breaking informational barriers to international trade has also been emphasized theoretically in the work of Greif (1993) and Rauch and Casella (2003).

remittances<sup>4</sup>?

In doing so, we control for net emigration rates in our sample of remittance recipients to rule out the migrant networks channel. Also, we account for the endogeneity of remittance transfers arising from measurement error in remittance data and reverse causality between remittances and relative manufacturing growth. Since we use economic conditions in host countries as instruments, we run our model including a number of host countries' outflows (such as foreign aid, FDI, and imports) which could potentially directly affect home countries' manufacturing sector growth. We also show the robustness of our results to using an alternative dependent variable for the 90s.

We find that remittances are conducive to tradable relative to non-tradable manufacturing sector growth. Our findings thus come in sharp contrast with RS findings on the negative effect of foreign aid inflows on the relative growth of manufacturing exporting industries, thus illustrating the inherent differences between these two major sources of foreign exchange flows to developing countries.

In addition to the remittances and growth literature, our work is related to the 'brain gain' literature arguing against the 'brain drain' result that skilled emigration can only be harmful to labor-exporting countries. In that respect it differs from existing empirical studies by linking migrants' remittance transfers, not the size of the diaspora or the density of its networks, to trade-enhancing activities in home countries. It also contributes to the remittances and Dutch disease literature as it is a direct investigation of the effect of remittances on the relative growth of tradable vs. non-tradable sectors, rather than on their relative price or the real exchange rate.

This paper is structured as follows. Section 2 discusses the econometric methodology we use. Section 3 describes the manufacturing sector trade and production data. Section 4 provides a detailed description of our instruments in terms of construction and data used. Section 5 discusses our results and diagnostic tests. In section 6, we rule out any excess appreciation channel. We control for host countries' international flows in section 7. An alternative dependent variable is used in section 8. We interpret our results in section 9. An appendix at the end of the paper describes the data in more details.

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<sup>4</sup>The reason why we classify different manufacturing industries as tradable vs. non-tradable, rather than taking the whole manufacturing sector as tradable and comparing it the non-tradable services sector, is that data on the services sector is only available at aggregate levels, contrary to the sector-specific manufacturing data.

## 2 Econometric methodology

We check whether the remittance export-led growth channel is at work by looking at whether the industries that might be most affected by it, i.e. the exportable ones, grow faster or slower, in countries that receive more remittances, where that channel is likely to be more operative. To do so, we estimate by OLS for both the 1980s and 1990s decades equation (1) with interaction effects between remittances and our channel of interest:

$$G_{ij} = C + \alpha_i + \beta_j + \theta_1 In_{ij} + \theta_2 (Re_j * Exp_i) + \epsilon_{ij} \quad (1)$$

where  $G_{ij}$  is annual average rate of growth of real value added of manufacturing industry  $i$  in country  $j$  over the decade;  $C$  is a constant;  $\alpha_i$  and  $\beta_j$  are respectively industry and country fixed effects;  $In_{ij}$  is the the initial period share of industry  $i$  in total value manufacturing added in country  $j$ ;  $Re_j$  is the average remittances to GDP ratio to country  $j$  over the sample period;  $Exp_i$  is our measure of the exportability of industry  $i$ ;  $\epsilon_{ij}$  is the error term;  $\theta_2$  is the coefficient of interest.

Our samples for the 1980s and 1990s include net labor-exporting countries receiving positive remittance inflows which proportions to GDP vary widely across these countries. For instance, our sample for the 80s include Jordan with an average remittances to GDP ratio of about 20 percent and Ecuador with a corresponding 0.02 percent average remittance to GDP ratio over the same period. In that respect, our analysis differs from RS who only include countries which aid inflows constitute over one percent of their GDP levels.

We argue that remittances are endogenous and that such endogeneity is caused first by the fact that officially recorded remittances are known to be measured with error, and second by reverse causality between remittances and manufacturing sector growth. More specifically on such reverse causality, if remittances were altruistically motivated or are insurance-type transfers, then a decrease in manufacturing sector (and overall economic) growth will encourage more remittance transfers. If remittances were profit-motivated instead, a procyclical pattern of repatriated income would be observed. We thus estimate the model by two-stage least squares (2SLS) using multiple external instruments for the remittance variable. The first-stage regression then runs an OLS for the following

equation:

$$Re_j * Exp_i = C + \alpha_i + \beta_j + \gamma_s In_{ij} + \gamma_{s1}(Z_{j1} * Exp_i) + \dots + \gamma_{sn}(Z_{jn} * Exp_i) + u_{ij} \quad (2)$$

where  $Z_{j1}$  through  $Z_{jn}$  are the  $n$  instruments used; and the  $\gamma$  coefficients in each equation measure the sign and magnitude of the partial effect of each instrument on our endogenous variable.

As shown in the results section, the 2SLS coefficient estimates we obtain on the interaction terms are consistently and considerably larger in magnitude than their OLS counterparts. This suggests that the endogeneity of remittances created a downward bias in their estimated effect on relative manufacturing sector growth. In addition to measurement error generally leading to underestimation of the true coefficient under OLS, there exists a downward reverse causality bias or a negative causal relationship running from relative manufacturing growth to remittances.

Before moving into data description and results, we provide preliminary evidence that remittances do not seem to dampen the relative growth of tradable manufacturing sector. Figures 1 and 2 plot remittances and foreign aid against real exchange rate overvaluation for the 80s and 90s. The overvaluation measure we use is based on Johnson, Ostry and Subramanian (2010), and is discussed in details in Table E below. Figure 1 shows a negative association between remittances and overvaluation in our 80s and 90s samples, while Figure 2 shows instead a strong positive association between overvaluation and aid flows to our remittance recipients in both decades. If overvaluation is the main channel through which relative growth in tradable manufacturing sector is negatively affected, then this provides preliminary evidence in favor of the absence of any negative effect of remittances on relative tradable growth in the manufacturing sectors of remittance recipients. Such effect was showed to exist for aid flows in RS. We provide more robust evidence below ruling out the excess appreciation channel: following RS, we run equation (1) including our measure of overvaluation interacted with exportability.

### 3 Trade and production data description

Industry value added data was collected from the Historical Industrial Statistics Database (2006) of the United Nations Industrial Development Organization (UNIDO). The data are at the 3-digit level of the International Standard Industrial Classification (ISIC, Revision 3) and are available for

the 1980s and 1990s. This includes 28 manufacturing industries. Data on industry-specific exports for a large number of developing and developed countries is available from the World Bank Trade and Production Database. Details about the database are provided in a companion paper by Nicita and Olarreaga (2007).

The final samples for each decade include the countries satisfying few data requirements. First, we only include remittance recipient countries with remittance data over the decade simultaneously available with value added UNIDO data. Second, we only include countries for which the average growth rate of real value added over the decade can be computed for at least a seven-year period. Based on all of the above, we end up with 27 countries in the 80s and 28 countries in the 90s. Table C of the Data appendix ranks those countries by their remittances to GDP ratios.

We now turn to trade data namely to our measure of industry exportability: the share of industry exports to value added. We construct this country-invariant measure by collecting industry-specific exports and value added data for a large number of developing countries for each decade. The larger the samples are, the more representative this proxy is of the general tradability of each of the manufacturing industries. We compute an exportability index for each industry, which takes the value 1 if the industry’s exportability figure, i.e. its ratio of exports to value added across years and countries, is greater than the median across industries. This measure will be referred to as ‘Exportability.’ Both the underlying variable and the corresponding discretized index are listed in Table A of the Data appendix.<sup>5</sup> The final exportability samples include 36 countries for the 80s and 37 countries for the 90s.

## 4 Instrumenting remittance inflows: Methodology and data

### 4.1 First set: Instruments based on economic determinants of remittances

Inspired by Aggarwal et al. (2010), these instruments are constructed by interacting the time-invariant determinants of remittances, namely migration rates in top immigration destinations, with time-varying economic conditions in host countries as well as relative economic conditions between

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<sup>5</sup>Note that we chose to make exports to value added industry-variant but country-invariant, i.e. we chose to take the median across countries as the representative value for each industry. Our reason for not allowing the exportability measure to be country-variant is that, for each decade, the sample of countries we used for the exportability variable includes some but not all of the countries of our main samples.

host and home countries. We collect migration data for each country in each decade using two sources. The main source is the OECD International Migration Database which provides bilateral data on the stock of foreign-born population in each OECD country for the period 1990-2008. This allows us to identify the top five OECD countries that receive the largest stock of migrants from each of the remittance recipient countries in our 1980s and 1990s samples. This is however not representative of some Asian countries, namely, Bangladesh, India, Indonesia and Pakistan for the 1980s, and India, Indonesia and Sri Lanka in the 1990s sample, which migrants are mainly located in the six Gulf Cooperation Council (GCC) oil countries<sup>67</sup>. Since the Asian countries publish their own emigration statistics, we use their national emigration data, to similarly identify the top five of the Gulf countries that receive the most migrants from these countries<sup>89</sup>. In both cases, the migration weights we use are constant and the same across the two decades.

We collect data on real incomes per capita, real interest rates and growth rates in host countries as the main (time-varying) economic determinant of migration and remittances. We also consider relative economic conditions between host and home countries, namely real interest rate differentials between destination and source countries. This is meant to capture any investment motive to remittances, i.e. migrants' decision to invest in their home or host countries. The specific choice of instruments is based on their performance in our first-stage regression results: for instance we end up using weighted (by relative migration rates) host countries incomes per capita and weighted host country interest rates for the 1980s, while weighted interest rate differentials and weighted host country GDP growth tend to perform well in the 1990s (in terms of economic and statistical significance and diagnostic tests). The weights used are migration rates in the five principal OECD/Gulf destination countries. Except for weighted host countries real interest rates, which is expected to be negatively related to remittance transfers, our instruments (weighted host real GDP per capita, host country GDP growth rates, and real interest rate differentials (home

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<sup>6</sup>These are Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates.

<sup>7</sup>Note that for the Philippines, the Overseas Employment Administration reports that only 26% of its total stock of emigrants abroad over last few decades are located in GCC countries. We thus use OECD migration data for the Philippines.

<sup>8</sup>The following official institutions were used to get emigration data: Bureau of Manpower and Training, government of Bangladesh; Bureau of Emigration and Overseas Employment, government of Pakistan; Philippines Overseas Employment Administration; Sri Lanka Bureau of Foreign Employment; Ministry of Labor, government of India; and Soeprbo (2003) for Indonesia.

<sup>9</sup>Stock data for Bangladesh: 1976-2009; and flow data for rest, namely: Sri Lanka: 1986-2004; India: 1988-2004; Pakistan: 1995-2004; and Philippines: 1998-2004.

real interest rates minus host real interest rates)) are expected to be positively correlated with remittances.

Instrumenting for remittances using economic conditions in migration destinations however raises potential concerns about the validity of our exclusion restrictions. More specifically, since our dependent variable is manufacturing sector growth in remittance recipients, better economic conditions in migrant host (developed) countries can directly affect our dependent variable through higher international flows, namely aid donations and more FDI investments in home countries, and through higher imports from home countries. To make sure these channels are not at work, we re-run our baseline regressions with controls for aid, FDI, and imports.

## 4.2 Second set: One instrument based on non-economic determinants of migration

Inspired by Tavares (2003) in his aid instrumentation technique, this instrument exploits major time-invariant geographic and cultural determinants of international migration and hence of remittance inflows. These determinants are: the geographical distance between sending and receiving country, and colonial history between home and host countries<sup>1011</sup>. These instruments represent relative source and host country characteristics affecting migration costs and hence migration outcomes and the resulting remittance inflows. We interact these instruments with remittance outflows from major migration destinations in order to construct a new remittance variable which will serve as our instrument.

We first collect data on remittance outflows for the ten largest OECD economies according to 1990 GDP. These countries represent top migration destinations for most of the developing countries in our sample. The aforementioned Asian countries with a majority of emigrants in the Gulf area represent an exception. For those countries, we use the top six OECD and top four Gulf destinations according to the same criterion. These are Saudi Arabia, United Arab Emirates, Kuwait and Oman. For each developing country/OECD economy pair, our time-invariant instruments are then the

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<sup>10</sup>The international migration determinants we use are based on Mayda (2010). The paper is a panel data analysis on the economic, geographical, cultural, and demographic determinants of migration.

<sup>11</sup>Another cultural determinant of migration is common language, which we believe is already included within the colony variable. This will cover countries which have inherited the language of the colonizer, as well as those who have not. Our sample includes both types, and had we used the language instrument instead, we would have excluded the latter group of countries.

inverse of geographical distance and a dummy variable for ever a colony. We then express this new remittance variable in real terms as a percentage of the receiving country's GDP.

Additional description of the variables we use are presented in Table E of the Data appendix. Summary statistics are listed in Tables B1 and B2.

## 5 Results

We present results of estimating equation (1) both by OLS and 2SLS in Tables 1 and 2 for the 1980s and the 1990s respectively. In columns 3 and 4 of both tables, we account for potential migrant network effects by controlling for net emigration rates in our remittance recipient economies, interacted with exportability. For this, we use the World Development Indicator measure of net emigration, which is the annual number of emigrants less the total number of immigrants, and is measured in 5-year intervals. We express this variable as a percentage of population.

Focusing first on the 1980s, our estimates in columns 1 and 2 of Table 1 suggest a positive effect of remittances on relative manufacturing sector growth under both OLS and 2SLS estimations, with the magnitude as well as the statistical significance of our estimates considerably higher under 2SLS. More specifically, the OLS coefficient is about 0.2 and is insignificant, whereas the corresponding 2SLS coefficient is much larger at around 3.8 and passes the significance test at 5%. This suggests that for countries that receive an extra percentage point of remittances (relative to their GDP), exportable industries grow faster relative to non-exportable industries by about 3.8 percentage points pa. When compared to the average growth rate of real value added in the 80s of 11 percent, these results suggest a sizable positive effect of remittances on relative tradable manufacturing sector growth. When we control for net emigration rates in columns 3 and 4, our OLS and 2SLS results are nearly unchanged.

For the 1990s in Table 2, whether we control or not for net emigration rates, the OLS estimate is insignificantly negative and near zero, while the 2SLS estimate is positive and significant at 10%, and larger in magnitude at about 1.3.

Table 1: Remittances and relative manufacturing growth, 1980s

| Dependent variable: annual average growth rate of real value added ( $ij$ ) |         |           |         |           |
|-----------------------------------------------------------------------------|---------|-----------|---------|-----------|
|                                                                             | 1       | 2         | 3       | 4         |
|                                                                             | OLS     | IV        | OLS     | IV        |
| Initial Industry Share ( $ij$ )                                             | -0.671* | -0.509*   | -0.671* | -0.509*   |
|                                                                             | (0.352) | (0.292)   | (0.353) | (0.292)   |
| RemGDP( $j$ ) * Exportability( $i$ )                                        | 0.223   | 3.769**   | 0.231   | 3.790**   |
|                                                                             | (0.426) | (1.939)   | (0.427) | (1.953)   |
| Net Emigration Rate( $j$ ) * Exportability( $i$ )                           |         |           | -0.836  | -1.246    |
|                                                                             |         |           | (1.527) | (1.571)   |
| Observations                                                                | 709     | 709       | 709     | 709       |
| R-squared                                                                   | 0.24    | 0.17      | 0.24    | 0.17      |
| First-stage: Dependent variable: RemGDP( $j$ ) * Exportability( $i$ )       |         |           |         |           |
| Initial Industry Share ( $ij$ )                                             |         | -0.038*   |         | -0.037*   |
|                                                                             |         | (0.021)   |         | (0.021)   |
| Weighted host countries real GDP per capita ( $j$ ) * Exportability( $i$ )  |         | 0.004***  |         | 0.004***  |
|                                                                             |         | (0.000)   |         | (0.000)   |
| Weighted host countries real interest rates ( $j$ ) * Exportability( $i$ )  |         | -0.009*** |         | -0.008*** |
|                                                                             |         | (0.001)   |         | (0.001)   |
| Weighted host countries remittance outflows ( $j$ ) * Exportability( $i$ )  |         | 0.065***  |         | 0.064***  |
|                                                                             |         | (0.010)   |         | (0.007)   |
| Net Emigration Rate( $j$ ) * Exportability( $i$ )                           |         |           |         | 0.103     |
|                                                                             |         |           |         | (0.119)   |
| Observations                                                                |         | 709       |         | 709       |
| R-squared                                                                   |         | 0.61      |         | 0.61      |
| Hansen's Test of Overid Restrictions $\sim \chi^2(2)$                       |         | 0.418     |         | 0.103     |
|                                                                             |         | [0.81]    |         | [0.95]    |
| Kleibergen-Paap Wald F stat                                                 |         | 87.182    |         | 78.854    |
| (Stock-Yogo 5% critical value)                                              |         | 13.91     |         | 13.91     |
| Kleibergen-Paap LM stat $\sim \chi^2(3)$                                    |         | 249.312   |         | 236.716   |
|                                                                             |         | [0.00]    |         | [0.00]    |

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Robust standard errors in parentheses and p-values in brackets.

Table 2: Remittances and relative manufacturing growth, 1990s

| Dependent variable: annual average growth rate of real value added ( $ij$ ) |                   |                      |                   |                      |
|-----------------------------------------------------------------------------|-------------------|----------------------|-------------------|----------------------|
|                                                                             | 1                 | 2                    | 3                 | 4                    |
|                                                                             | OLS               | IV                   | OLS               | IV                   |
| Initial Industry Share ( $ij$ )                                             | -0.329<br>(0.464) | -0.093<br>(0.412)    | -0.329<br>(0.464) | -0.098<br>(0.413)    |
| RemGDP( $j$ ) * Exportability( $i$ )                                        | -0.235<br>(0.305) | 1.263*<br>(0.748)    | -0.235<br>(0.340) | 1.260*<br>(0.678)    |
| Net Emigration Rate( $j$ ) * Exportability( $i$ )                           |                   |                      | -0.000<br>(0.559) | 0.661<br>(0.652)     |
| Observations                                                                | 684               | 656                  | 684               | 656                  |
| R-squared                                                                   | 0.18              | 0.16                 | 0.18              | 0.16                 |
| First-stage: Dependent variable: RemGDP( $j$ ) * Exportability( $i$ )       |                   |                      |                   |                      |
| Initial Industry Share ( $ij$ )                                             |                   | -0.006<br>(0.015)    |                   | 0.001<br>(0.014)     |
| Weighted host countries growth rates ( $j$ ) * Exportability( $i$ )         |                   | 0.018***<br>(0.003)  |                   | 0.019***<br>(0.003)  |
| Weighted real interest rate differentials ( $j$ ) * Exportability( $i$ )    |                   | -0.001***<br>(0.000) |                   | -0.001***<br>(0.000) |
| Weighted host countries remittance outflows ( $j$ ) * Exportability( $i$ )  |                   | 0.106***<br>(0.012)  |                   | 0.114***<br>(0.011)  |
| Net Emigration Rate( $j$ ) * Exportability( $i$ )                           |                   |                      |                   | -0.701***<br>(0.130) |
| Observations                                                                |                   | 656                  |                   | 656                  |
| R-squared                                                                   |                   | 0.68                 |                   | 0.73                 |
| Hansen's Test of Overid Restrictions $\sim \chi^2(2)$                       |                   | 1.122<br>[0.57]      |                   | 0.991<br>[0.61]      |
| Kleibergen-Paap Wald F stat<br>(Stock-Yogo 5% critical value)               |                   | 60.144<br>13.91      |                   | 52.566<br>13.91      |
| Kleibergen-Paap LM stat $\sim \chi^2(3)$                                    |                   | 111.600<br>[0.00]    |                   | 98.471<br>[0.00]     |

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Robust standard errors in parentheses and p-values in brackets.

Also reported are first-stage regression results showing the economic and statistical significance of each of our instruments and their power in explaining the endogenous variable. The instruments pass the necessary diagnostic tests (namely Hansen test for overidentifying restrictions since we use multiple instruments, and tests of weakness of our instruments).

We control for net emigration rates in remittance recipients in all the regressions we report below, and use the same set of instruments reported for the core specification for the 80s in Table 1, and for the 90s in Table 2.

## 6 Ruling out the excess appreciation channel

In this section, we rule out the effect of real exchange rate appreciation, potentially caused by remittance inflows, on manufacturing sector growth. We do so by running equation (1) with our measure of overvaluation interacted with exportability. If remittances do harm export sector growth through excess appreciation, then the coefficient on the interaction term between excess appreciation and our exportability measure should be negative and significant. In other words, this would suggest that in countries with more appreciated exchange rates, exportable sectors should grow relatively slower than other sectors. We find no such evidence for both decades as showed in Table 3.

Table 3: Remittances, excess appreciation and relative manufacturing growth, 1980s and 1990s

| Dependent variable: annual average growth rate of real value added ( $ij$ ) |                     |                    |                   |                   |
|-----------------------------------------------------------------------------|---------------------|--------------------|-------------------|-------------------|
|                                                                             | 1980s               |                    | 1990s             |                   |
|                                                                             | 1                   | 2                  | 3                 | 4                 |
|                                                                             | OLS                 | IV                 | OLS               | IV                |
| Initial Industry Share ( $ij$ )                                             | -0.668**<br>(0.344) | -0.510*<br>(0.291) | -0.326<br>(0.464) | -0.095<br>(0.416) |
| RemGDP( $j$ ) * Exportability( $i$ )                                        | 0.220<br>(0.432)    | 3.836**<br>(1.889) | 0.073<br>(0.302)  | 1.329*<br>(0.724) |
| Net Emigration Rate( $j$ ) * Exportability( $i$ )                           | -0.708<br>(1.537)   | -1.337<br>(1.566)  | 0.840<br>(0.813)  | 1.400<br>(0.971)  |
| Overval ( $j$ ) * Exportability( $i$ )                                      | -0.023<br>(0.099)   | 0.015<br>(0.089)   | 0.148<br>(0.098)  | 0.145<br>(0.100)  |
| Observations                                                                | 709                 | 709                | 684               | 656               |
| R-squared                                                                   | 0.24                | 0.17               | 0.19              | 0.16              |

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Robust standard errors in parentheses and p-values in brackets.

## 7 Controlling for international flows

In this section, we provide more evidence on the validity of our exclusion restriction. More specifically, we account for the channels through which economic conditions in host countries (which we used as instruments) can affect manufacturing sector growth over and above their effect on remittances. We do so by controlling for three types of host countries' outflows:

- Foreign aid inflows to home countries as a percent of GDP<sup>12</sup>.
- Two measures of FDI: 1) FDI outflows from destinations or host countries (also interacted like our instruments by relative migration weights), which we refer to as  $FDI_sGDP(j)$ , and 2) for net FDI inflows to recipient or home economies or  $FDI_hGDP(j)$ .
- Host country total imports, weighted by relative migration rates between home and host countries.

We only display 2SLS results in Table 4. Our results for both decades are robust to the inclusion of these flows (except for column 8 for the 1990s with p-value=0.13). It should be noted that results for the 90s are generally weaker than the ones for the 80s, and that they significantly improve if we re-estimate after dropping the two petroleum-related industries: Petroleum refineries and Misc. petroleum & coal products. In general, we expect no direct or indirect link between those industries and remittance transfers. These results are shown in columns 9 and 10. In this section, we reproduce the RS result of a consistently negative effect of aid on relative tradable manufacturing growth, though insignificantly so. These results show the inherent differences between remittances and aid inflows as main sources of foreign exchange to developing countries.

We also conducted two additional robustness checks (which results are available upon request). First, we decomposed the two instruments based on host countries' GDP growth and GDP per capita levels into their tradable and non-tradable components using the UN Statistics Division National Accounts Database (which provides data on sectoral GDP shares). We then only used as instruments the non-tradable component of GDP growth and GDP per capita, while controlling for host country imports. If emigrants are employed in non-tradable sectors, better conditions in such

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<sup>12</sup>As shown in Table D of the Data appendix, our samples for the 80s and 90s comprise large recipients of foreign aid.

Table 4: Remittances, aid, FDI, imports and relative manufacturing growth, 1980s and 1990s

| Dependent variable: annual average growth rate of real value added ( $ij$ ) | 1980s   |         |         |         | 1990s   |         |         |         |           |           |
|-----------------------------------------------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|-----------|-----------|
|                                                                             | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9         | 10        |
| Initial Industry Share ( $ij$ )                                             | -0.563* | -0.574* | -0.522* | -0.572* | -0.114  | -0.121  | -0.132  | -0.119  | -0.639*** | -0.623*** |
|                                                                             | (0.314) | (0.313) | (0.327) | (0.309) | (0.412) | (0.415) | (0.419) | (0.415) | (0.147)   | (0.143)   |
| RemGDP( $j$ ) * Exportability( $i$ )                                        | 3.318** | 2.536** | 4.122** | 2.511** | 1.576*  | 1.393*  | 1.521*  | 1.198   | 1.853**   | 1.489*    |
|                                                                             | (1.801) | (1.147) | (1.208) | (1.148) | (0.847) | (0.805) | (0.832) | (0.799) | (0.837)   | (0.801)   |
| Net Emigration Rate ( $j$ ) * Exportability( $i$ )                          | -0.882  | -0.811  | -0.731  | -0.772  | 0.693   | 0.537   | 0.612   | 0.485   | 0.710     | 0.559     |
|                                                                             | (1.452) | (1.465) | (1.558) | (1.553) | (0.663) | (0.632) | (0.661) | (0.619) | (0.682)   | (0.635)   |
| AidGDP( $j$ ) * Exportability( $i$ )                                        | -1.343  | -0.805  | -1.834  | -0.786  | -0.615  | -0.505  | -0.552  | -0.472  | -0.556    | -0.456    |
|                                                                             | (1.003) | (0.734) | (1.417) | (0.729) | (0.535) | (0.536) | (0.524) | (0.535) | (0.526)   | (0.533)   |
| Imports <sub>s</sub> GDP( $j$ ) * Exportability( $i$ )                      |         | 0.173   | 0.119   | 0.165   |         | 0.156   | 0.132   | 0.113   | 0.188*    | 0.174     |
|                                                                             |         | (0.283) | (0.359) | (0.267) |         | (0.127) | (0.123) | (0.134) | (0.111)   | (0.122)   |
| FDI <sub>s</sub> GDP( $j$ ) * Exportability( $i$ )                          |         |         | 0.072   |         |         |         | 2.173   |         | 2.704     |           |
|                                                                             |         |         | (5.184) |         |         |         | (1.870) |         | (1.881)   |           |
| FDI <sub>h</sub> GDP( $j$ ) * Exportability( $i$ )                          |         |         |         | -0.263  |         |         |         | -0.649  |           | -0.593    |
|                                                                             |         |         |         | (1.664) |         |         |         | (0.785) |           | (0.931)   |
| Observations                                                                | 681     | 681     | 681     | 681     | 656     | 656     | 656     | 656     | 625       | 625       |
| R-squared                                                                   | 0.19    | 0.21    | 0.17    | 0.22    | 0.15    | 0.16    | 0.16    | 0.16    | 0.19      | 0.19      |

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Robust standard errors in parentheses and p-values in brackets.

In column 3 for the 80s, we use host country GDP growth rates (just like for the 90s) instead of host country GDP per capita,

as it performs better in terms of diagnostic tests. Note that all our 80s results are maintained if we used this instrument all throughout.

sectors will boost remittance transfers, without necessarily having an impact on home countries manufacturing sectors except through higher host country imports which can be used as inputs in such sectors, and which we control for. Second, there might be concerns that geographical distance to host countries, which we interact with host country remittance outflows to construct one of our instruments, might also be directly linked to manufacturing exports. We thus only use colonial history as weights, and drop geographical distance. Our results for the 80s and 90s are robust to both checks.

## 8 Alternative measure of real activity in manufacturing

As mentioned above, our dependent variable so far has been the growth in real value added of an industry. This measure is meant to capture any Dutch disease (or in our case reverse Dutch disease) effect which in theory leads to an expansion of the real size of the usually labor-intensive non-tradable sector at the expense of the usually capital-intensive tradable sector, following an increase in the relative price of the former to latter sector. However, the real measure we use is obtained by deflating the nominal value added of each industry by a common deflator, that is the US Producer Price Index, as we do not have data on industry-specific price indices that would serve as the proper deflators.

To test the robustness of our results to using a common price deflator, we look at another measure of real activity in an industry, the average growth rate of employment in that industry, for which data is available for 24 of the 28 countries of the 1990s sample. Our 2SLS results in Table 5 (columns 1 and 2) show that the coefficient on remittances interacted with exportability is positive and significant for the 90s. In columns 3 and 4, we estimate after dropping the two Petroleum industries that clearly have low labor intensity, as they are based on extractable resources.

Table 5: Remittances and relative manufacturing employment growth, 1990s

| Dependent variable: annual average growth rate of employment ( $ij$ ) |         |         |         |         |
|-----------------------------------------------------------------------|---------|---------|---------|---------|
|                                                                       | 1990s   |         |         |         |
|                                                                       | 1       | 2       | 3       | 4       |
|                                                                       | IV      | IV      | IV      | IV      |
| Initial Industry Share ( $ij$ )                                       | -0.152* | -0.161* | -0.188* | -0.198* |
|                                                                       | (0.084) | (0.084) | (0.108) | (0.107) |
| RemGDP( $j$ ) * Exportability( $i$ )                                  | 1.300** | 1.579** | 1.463** | 1.718** |
|                                                                       | (0.624) | (0.733) | (0.673) | (0.788) |
| Net Emigration Rate( $j$ ) * Exportability( $i$ )                     | -1.548  | -1.364  | -1.555  | -1.394  |
|                                                                       | (1.187) | (1.139) | (1.219) | (1.166) |
| AidGDP( $j$ ) * Exportability( $i$ )                                  | -0.284  | -0.372  | -0.182  | -0.261  |
|                                                                       | (0.357) | (0.341) | (0.367) | (0.342) |
| FDI <sub>s</sub> GDP( $j$ ) * Exportability( $i$ )                    | -0.806  |         | -0.850  |         |
|                                                                       | (0.814) |         | (0.840) |         |
| FDI <sub>h</sub> GDP( $j$ ) * Exportability( $i$ )                    |         | 0.548   |         | 0.550   |
|                                                                       |         | (0.598) |         | (0.609) |
| Imports <sub>s</sub> GDP( $j$ ) * Exportability( $i$ )                | 0.064   | 0.091   | 0.079   | 0.109   |
|                                                                       | (0.087) | (0.097) | (0.088) | (0.098) |
| Observations                                                          | 585     | 585     | 559     | 559     |
| R-squared                                                             | 0.21    | 0.21    | 0.22    | 0.22    |

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Robust standard errors in parentheses and p-values in brackets.

In columns 3 and 4, we estimate after dropping the two Petroleum industries.

## 9 Interpreting these results

In this section, we discuss the mechanisms through which exportable manufacturing sectors could grow faster relative to non-exportable ones in countries receiving more remittances. We argue that our results suggest that remittance dollars are invested in exportable industries either directly by migrants and/or their families or indirectly through their economy-wide investment-enhancing effects. In the former case, migrants channel their remittance transfers to investments in exportable sectors by essentially using their informational advantage in both home and host country markets.

The latter case includes a number of diverse direct and indirect channels through which remittances affect economic growth, and in this case, we are only interested in the channels that are more conducive to the growth of the exportable sectors. More specifically, remittances increase the total amount of savings/credit available in the economy. Remittances can also indirectly enhance investments in exportable sectors through their established positive effects on macroeconomic stability and domestic investors' as well as overall country creditworthiness (Ratha, 2007; Chami et

al., 2009; Barajas et al., 2009). A growing body of country-specific evidence argues for the existence of a link between emigration, business formation and capital accumulation. This is based on the New Economics of Labor Migration theory (Stark, 1991; Taylor, 1999), where migration is driven by market failures in home countries, and where the subsequent remittances are crucial to overcome capital market imperfections by relieving migrant households' credit constraints, and to provide recipient economies with the necessary capital to engage in entrepreneurial activity building up into productive small businesses. Remittances are also linked to agricultural asset accumulation and other investment goods such as housing, health and education<sup>13</sup>. Finally, remittance receipts enable countries to afford imports, including imports of complementary inputs in the production of exportables. This is particularly relevant for manufacturing industries which are believed to be more heavily reliant on imported inputs<sup>14</sup>.

## 10 Conclusion

In this paper, we showed that growth in manufacturing industries consistently increases when we move from countries with low remittances to GDP ratio and industries with low exportability (or low reliance on external finance) to countries with high shares of remittances in their GDP and industries with high exportability (or high reliance on external finance). In doing so, we controlled for net emigration rates in remittance recipients to account for the background role of large migrant networks in establishing trade links between home and host countries.

## Acknowledgments

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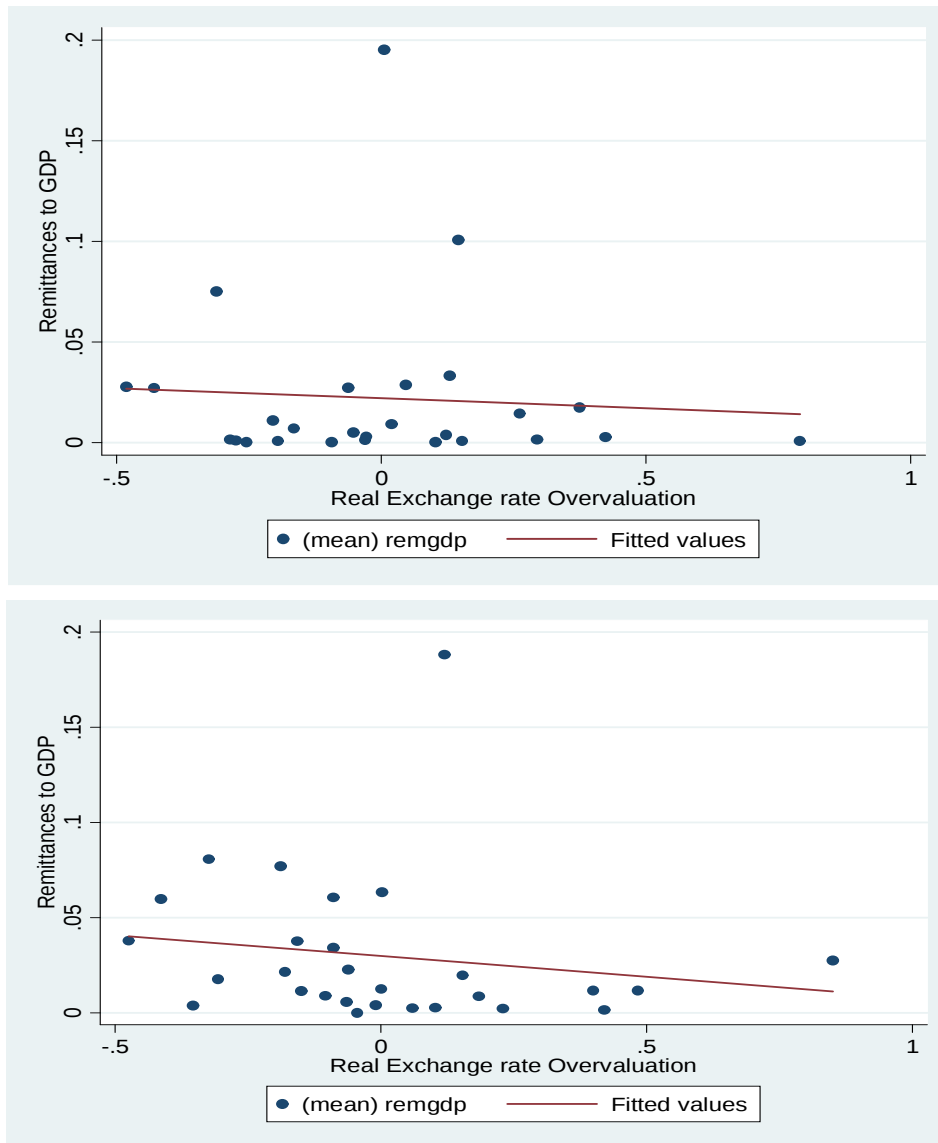
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<sup>13</sup>See Massey and Parrado (1998) and Woodruff and Zenteno (2001) on Mexico; Funkhouser (1992) on Nicaragua, Yang (2008) on the Philippines; and Cox-Edwards and Ureta (2003) on El Salvador (to list a few).

<sup>14</sup>Campa and Goldberg (1995, p.306) show this pattern for US manufacturing industries, and note that by the middle of the 1980s, "most sectors of US manufacturing industries, even those with relatively high export shares, were exposed to the international economy predominantly through their use of imported inputs into production rather than through their use of export markets for their sales."

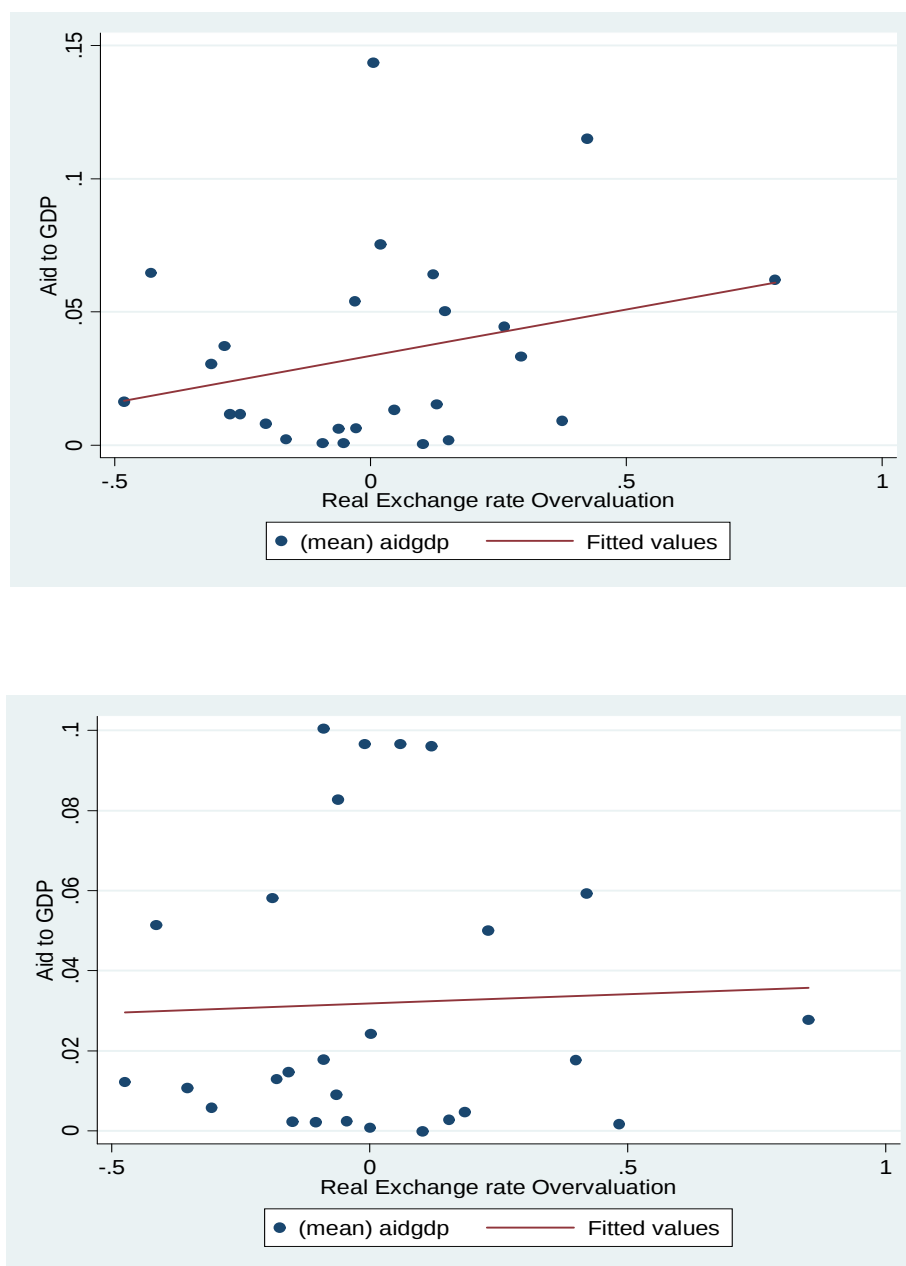
## Figures

Figure 1: Average remittance to GDP and real exchange rate overvaluation over the periods 1980-1990 and 1990-2000 respectively



Note: All countries from the 1980s and 1990s sample are included. Dots represent countries. We fit a regression line to our scatter plot.

Figure 2: Average aid to GDP and real exchange rate overvaluation over the periods 1980-1990, and 1990-2000 respectively



Note: All countries from the 1980s except for South Africa and from 1990s sample except for Jamaica are included. Dots represent countries. We fit a regression line to our scatter plot.

## Data appendix

Table A: ISIC 3-digit industries and their exportability

| ISIC Code | Sectors                               | Exportability measure |      | Exportability index |     |
|-----------|---------------------------------------|-----------------------|------|---------------------|-----|
|           |                                       | 80s                   | 90s  | 80s                 | 90s |
| 311       | Food Products                         | 0.82                  | 0.74 | 1                   | 0   |
| 313       | Beverages                             | 0.11                  | 0.11 | 0                   | 0   |
| 314       | Tobacco                               | 0.13                  | 0.33 | 0                   | 0   |
| 321       | Textiles                              | 0.57                  | 0.90 | 0                   | 1   |
| 322       | Wearing apparel, except footwear      | 1.60                  | 1.86 | 1                   | 1   |
| 323       | Leather products                      | 1.76                  | 3.22 | 1                   | 1   |
| 324       | Footwear, except rubber or plastic    | 1.01                  | 0.97 | 1                   | 1   |
| 331       | Wood products, except furniture       | 0.62                  | 0.85 | 1                   | 1   |
| 332       | Furniture, except metal               | 0.34                  | 0.84 | 0                   | 0   |
| 341       | Paper and products                    | 0.24                  | 0.48 | 0                   | 0   |
| 342       | Printing and Publishing               | 0.08                  | 0.19 | 0                   | 0   |
| 351       | Industrial chemicals                  | 1.73                  | 1.25 | 1                   | 1   |
| 352       | Other chemicals                       | 0.42                  | 0.45 | 0                   | 0   |
| 353       | Petroleum refineries                  | 2.04                  | 2.90 | 1                   | 1   |
| 354       | 354 Misc. petroleum and coal products | 0.06                  | 0.41 | 0                   | 0   |
| 355       | Rubber products                       | 0.32                  | 0.70 | 0                   | 0   |
| 356       | Plastic products                      | 0.26                  | 0.50 | 0                   | 0   |
| 361       | Pottery, china, earthenware           | 0.76                  | 1.15 | 1                   | 1   |
| 362       | Glass and products                    | 0.57                  | 0.82 | 0                   | 0   |
| 369       | Other non-metallic mineral products   | 0.15                  | 0.18 | 0                   | 0   |
| 371       | Iron and steel                        | 0.37                  | 0.68 | 0                   | 0   |
| 372       | Non-ferrous metals                    | 4.07                  | 3.22 | 1                   | 1   |
| 381       | Fabricated metal products             | 0.32                  | 0.50 | 0                   | 0   |
| 382       | Machinery, except electrical          | 2.37                  | 3.27 | 1                   | 1   |
| 383       | Machinery, electric                   | 0.67                  | 1.45 | 1                   | 1   |
| 384       | Transport equipment                   | 1.93                  | 2.56 | 1                   | 1   |
| 385       | Professional & scientific equipment   | 4.59                  | 4.62 | 1                   | 1   |
| 390       | Other manufactured products           | 3.44                  | 4.52 | 1                   | 1   |

Notes: Exportability( $i$ ) is an index, taking a value of 1 if industry ( $i$ ) share of exports to value added is greater than the median across industries, and 0 otherwise.

Table B1: Summary statistics (main variables)

| Variables                        | Period     | Mean  | StDev | Min    | Max   | Obs |
|----------------------------------|------------|-------|-------|--------|-------|-----|
| Growth of value added ( $ij$ )   | 1980s      | 0.111 | 0.269 | -0.189 | 4.621 | 712 |
|                                  | 1990s      | 0.120 | 0.226 | -0.268 | 2.957 | 696 |
| Growth of employment ( $ij$ )    | 1990s      | 0.055 | 0.172 | -0.119 | 3.426 | 24  |
| Initial Industry Share ( $ij$ )  | 1980s      | 0.036 | 0.051 | 0.000  | 0.403 | 743 |
|                                  | 1990s      | 0.039 | 0.055 | 0.000  | 0.485 | 720 |
| RemGDP( $j$ )                    | 1980s      | 0.022 | 0.041 | 0.000  | 0.195 | 27  |
|                                  | 1990s      | 0.030 | 0.039 | 0.000  | 0.188 | 28  |
| Net Emigration Rate ( $j$ )      | 1980s      | 0.003 | 0.011 | -0.018 | 0.031 | 27  |
|                                  | 1990s      | 0.001 | 0.022 | -0.073 | 0.057 | 28  |
| Exportability( $i$ )             | 1980s, 90s | 0.5   | 0.509 | 0      | 1     | 28  |
| Overvaluation ( $j$ )            | 1980s      | 0.000 | 0.276 | -0.482 | 0.791 | 27  |
|                                  | 1990s      | 0.000 | 0.287 | -0.474 | 0.850 | 28  |
| AidGDP( $j$ )                    | 1980s      | 0.034 | 0.036 | 0.000  | 0.144 | 26  |
|                                  | 1990s      | 0.031 | 0.034 | 0.000  | 0.100 | 28  |
| FDI <sub>s</sub> GDP( $j$ )      | 1980s      | 0.009 | 0.006 | 0.002  | 0.022 | 27  |
|                                  | 1990s      | 0.019 | 0.010 | -0.004 | 0.039 | 28  |
| FDI <sub>h</sub> GDP ( $j$ )     | 1980s      | 0.010 | 0.011 | -0.001 | 0.040 | 27  |
|                                  | 1990s      | 0.018 | 0.015 | 0.000  | 0.058 | 28  |
| Imports <sub>s</sub> GDP ( $j$ ) | 1980s      | 0.204 | 0.084 | 0.108  | 0.368 | 27  |
|                                  | 1990s      | 0.224 | 0.082 | 0.120  | 0.433 | 28  |

Notes: Please refer to Table E of the Data appendix for definitions and sources; ( $i$ ) refers to industry and ( $j$ ) refers to country.

Table B2: Summary statistics (instruments)

| Variables                                                      | Period | Mean   | StDev | Min     | Max    | Obs |
|----------------------------------------------------------------|--------|--------|-------|---------|--------|-----|
| Weighted host countries GDP per capita in thousands( $j$ )     | 1980s  | 18.781 | 6.446 | 7.356   | 33.596 | 27  |
|                                                                | 1990s  | 21.730 | 5.651 | 5.746   | 29.654 | 28  |
| Weighted host countries GDP growth in percent ( $j$ )          | 1980s  | 2.634  | 0.711 | 0.348   | 3.234  | 27  |
|                                                                | 1990s  | 2.864  | 0.495 | 1.907   | 4.340  | 28  |
| Weighted real interest rates differentials in percent ( $j$ )  | 1980s  | -6.590 | 9.677 | -39.953 | 5.884  | 26  |
|                                                                | 1990s  | -0.599 | 3.576 | -7.450  | 5.997  | 28  |
| Weighted host countries real interest rates in percent ( $j$ ) | 1980s  | 3.377  | 1.029 | 0.819   | 5.282  | 27  |
|                                                                | 1990s  | 2.324  | 0.552 | 1.482   | 4.181  | 28  |
| Weighted host country remittance outflows ( $j$ )              | 1980s  | 0.128  | 0.200 | 0.001   | 0.935  | 27  |
|                                                                | 1990s  | 0.168  | 0.175 | 0.000   | 0.587  | 28  |

Notes: Please refer to Table E for definitions and sources; ( $i$ ) refers to industry and ( $j$ ) refers to country

Table C: Countries in core samples for 1980s and 1990s ranked by remittances/GDP

| 1980s               |        | 1990s       |        |
|---------------------|--------|-------------|--------|
| Jordan              | 19.52% | Jordan      | 18.82% |
| Egypt               | 10.08% | Jamaica     | 8.05%  |
| Pakistan            | 7.52%  | Egypt       | 7.69%  |
| Malta               | 3.31%  | Morocco     | 6.33%  |
| Cyprus              | 2.86%  | Philippines | 6.04%  |
| Philippines         | 2.78%  | Sri Lanka   | 5.97%  |
| Bangladesh          | 2.70%  | Mauritius   | 3.78%  |
| Panama              | 1.74%  | Tunisia     | 3.74%  |
| Israel              | 1.43%  | Honduras    | 3.40%  |
| India               | 1.10%  | Syria       | 2.74%  |
| Israel              | 1.43%  | Kenya       | 2.27%  |
| Kenya               | 0.91%  | Ecuador     | 2.14%  |
| Colombia            | 0.69%  | India       | 1.75%  |
| Korea               | 0.49%  | Mexico      | 1.24%  |
| Honduras            | 0.36%  | Iran        | 1.17%  |
| Malaysia            | 0.28%  | Israel      | 1.16%  |
| Papua New Guinea    | 0.24%  | Colombia    | 1.14%  |
| Costa Rica          | 0.14%  | Malaysia    | 0.87%  |
| Zimbabwe            | 0.14%  | Cyprus      | 0.86%  |
| Bolivia             | 0.11%  | Costa Rica  | 0.57%  |
| Indonesia           | 0.09%  | Bolivia     | 0.39%  |
| South Africa        | 0.07%  | Indonesia   | 0.37%  |
| Trinidad and Tobago | 0.05%  | Korea       | 0.25%  |
| Ecuador             | 0.02%  | Ethiopia    | 0.22%  |
| Chile               | 0.00%  | Cameroon    | 0.19%  |
| Venezuela           | 0.00%  | Zimbabwe    | 0.13%  |
|                     |        | Chile       | 0.00%  |

Table D: Countries in core samples for 1980s and 1990s ranked by aid/GDP

| 1980s               |        | 1990s       |        |
|---------------------|--------|-------------|--------|
| Jordan              | 14.36% | Honduras    | 10.04% |
| Papua New Guinea    | 11.50% | Ethiopia    | 9.66%  |
| Kenya               | 7.54%  | Bolivia     | 9.66%  |
| Bangladesh          | 6.46%  | Jordan      | 9.61%  |
| Honduras            | 6.41%  | Kenya       | 8.27%  |
| Ghana               | 6.20%  | Zimbabwe    | 5.92%  |
| Bolivia             | 5.40%  | Egypt       | 5.81%  |
| Egypt               | 5.03%  | Sri Lanka   | 5.14%  |
| Israel              | 4.44%  | Cameroon    | 5.00%  |
| Costa Rica          | 3.72%  | Syria       | 2.77%  |
| Zimbabwe            | 3.31%  | Morocco     | 2.42%  |
| Pakistan            | 3.05%  | Jamaica     | 2.10%  |
| Philippines         | 1.62%  | Philippines | 1.77%  |
| Malta               | 1.51%  | Israel      | 1.76%  |
| Cyprus              | 1.33%  | Tunisia     | 1.47%  |
| Indonesia           | 1.17%  | Ecuador     | 1.29%  |
| Ecuador             | 1.16%  | Mauritius   | 1.22%  |
| Panama              | 0.91%  | Indonesia   | 1.07%  |
| India               | 0.81%  | Costa Rica  | 0.90%  |
| Malaysia            | 0.63%  | India       | 0.58%  |
| Turkey              | 0.60%  | Cyprus      | 0.47%  |
| Colombia            | 0.21%  | Turkey      | 0.27%  |
| Trinidad and Tobago | 0.17%  | Chile       | 0.25%  |
| Korea               | 0.07%  | Colombia    | 0.23%  |
| Chile               | 0.06%  | Malaysia    | 0.21%  |
| Venezuela           | 0.04%  | Iran        | 0.17%  |
| South Africa        | na     | Mexico      | 0.07%  |
|                     |        | Korea       | -0.01% |

Table E: List of variables and data sources

| Variable                                        | Definition and Construction                                                                                                                                                                                                                                                                                                                                                                                                       | Source                                                  |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>Growth Rate of Value Added</b> ( $ij$ )      | Industry $i$ 's annual growth rate of real value added in country $j$ , averaged over each decade. Nominal value added (in current USD) was changed to a real value added using the U.S. Producer Production Index (WDI).                                                                                                                                                                                                         | UNIDO Historical Industrial Statistics database (2006). |
| <b>Initial share</b> ( $ij$ )                   | Industry $i$ 's share in country $j$ 's total manufacturing value added at the beginning of the decade.                                                                                                                                                                                                                                                                                                                           | Idem                                                    |
| <b>Exportability</b> ( $i$ )                    | Index taking the value of one if industry $i$ share of exports to value added (averaged across a sample of developing countries) is greater than the median across industries, and to zero otherwise.                                                                                                                                                                                                                             | World Bank Trade and Production Database, 1976-2004.    |
| <b>RemGDP</b> ( $j$ )                           | The ratio of remittances to GDP for country $j$ , averaged over each decade                                                                                                                                                                                                                                                                                                                                                       | World Development Indicators WDI 2011.                  |
| <b>AidGDP</b> ( $j$ )                           | The ratio of aid to GDP for country $j$ , averaged over each decade                                                                                                                                                                                                                                                                                                                                                               | Idem                                                    |
| <b>Net Rate</b> ( $j$ )                         | <b>Emigration</b><br>Net number of emigrants divided by population in country $j$ , averaged over the period.                                                                                                                                                                                                                                                                                                                     | Idem                                                    |
| <b>FDI<sub>s</sub>GDP</b> ( $j$ )               | FDI outflows to country ( $j$ ) from its top migration destinations weighted by relative migration rates, averaged over the period.                                                                                                                                                                                                                                                                                               | UNCTAD 2011.                                            |
| <b>FDI<sub>h</sub>GDP</b> ( $j$ )               | Net FDI inflows to country ( $j$ ) averaged over the period.                                                                                                                                                                                                                                                                                                                                                                      | World Development Indicators WDI 2011.                  |
| <b>Imports<sub>s</sub>GDP</b> ( $j$ )           | Imports from country ( $j$ ) to its top migration destinations weighted by relative migration rates, averaged over the period.                                                                                                                                                                                                                                                                                                    | Idem                                                    |
| <b>Real Exchange Rate Overvaluation</b> ( $j$ ) | For every year in each decade, we ran a cross-section regression of the log of a country's price level of GDP on the log of country's per capita real GDP in PPP terms. The deviation of the actual price level from the estimated price level is the measure we use of the country's overvaluation. For each country in each decade, we averaged the annual values over the decade to obtain the final measure of overvaluation. | Penn World Tables 6.3.                                  |

|                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Weighted host countries GDP per capita (<math>j</math>)</b>      | GDP per capita of the five principal OECD immigration destinations of country ( $j$ ), weighted by share of total migration to these countries. For the Asian countries (Bangladesh, India, Pakistan, Philippines and Sri Lanka), we consider the Gulf Cooperation countries instead as main migration destinations.                                                                                                                                    | For migration data: OECD International Migration Database (2010); Bureau of Manpower and Training, government of Bangladesh; Bureau of Emigration and Overseas Employment, government of Pakistan; Philippines Overseas Employment Administration; Sri Lanka Bureau of Foreign Employment; Ministry of Labor, government of India. GDP per capita series in constant 2005 dollars from WDI (2011). |
| <b>Weighted host countries GDP growth rates (<math>j</math>)</b>    | GDP growth in five principal OECD immigration destinations, weighted by share of total migration to these countries from remittance recipient $j$ .                                                                                                                                                                                                                                                                                                     | Idem                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Weighted real interest rate differentials (<math>j</math>)</b>   | Interest rate differentials between the five principal OECD/Gulf recipients of migration and each country in our sample, weighted by share of total migration to these countries.                                                                                                                                                                                                                                                                       | For migration data: Idem. For interest rate data: WDI (2010), IMF International Financial Statistics IFS (2011), and central banks' publications.                                                                                                                                                                                                                                                  |
| <b>Weighted host countries real interest rates (<math>j</math>)</b> | Real interest rates in the five principal OECD/Gulf recipients of migration and each country in our sample, weighted by share of total migration to these countries from remittance recipient $j$ .                                                                                                                                                                                                                                                     | Idem                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Weighted host countries remittance outflows (<math>j</math>)</b> | Constructed remittance variable obtained by interacting remittance outflows from the 10 largest OECD economies with country-specific non-economic determinants of migration: inverse of geographical distance, and a dummy variable taking the value one if the remittance recipient was colonized by any of the largest OECD economies. For Asian countries, we take instead the top 6 OECD and top 4 Gulf countries as main immigration destinations. | Remittance outflows data from WDI (2010). Geographical distance and colonial history data taken from the CEPII Database.                                                                                                                                                                                                                                                                           |

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