FOREIGN TRANSFERS, MANUFACTURING GROWTH AND THE DUTCH DISEASE REVISITED

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Foreign Transfers, Manufacturing Growth and the Dutch Disease Revisited

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Abstract

In a well-known study Rajan and Subramanian (2011) argue that aid causes a "Dutch Disease" effect in aid-recipient countries. This study successfully replicates the first part of their findings and then uses a new, extended data set, different estimation methods, and another measure of aid to analyze the robustness of their results. In addition the study explores the effect of remittance flows on the relative growth of manufacturing sectors. In general, findings from the new, extended data set do not provide sufficient evidence to support the "Dutch Disease" argument. In the case of international remittance flows, the findings indicate a positive remittance-manufacturing-growth relation, particularly in fixed effects models.

Keywords: Foreign aid, Remittances, Dutch Disease, Manufacturing. JEL classifications: F24, F35, L60

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1 Introduction

What is the effect of foreign aid and international remittance flows on the relative growth of traded manufacturing sectors in low-income countries? The so-called "Dutch Disease" phenomenon has been a part of the aid-effectiveness debate for a long time. Some researchers argue that whilst international remittance flows might have no Dutch Disease effect in recipient countries, foreign aid in most cases, can have negative effects on the relative size of traded sectors in aid-dependent countries.

This paper shows that there are variations in the relationship between aid and the relative growth of value added of traded manufacturing sectors in low income countries. Particularly, in a three-dimensional panel data analysis of the effect of aid on the relative growth of value added of sector (i) in country (j) at time (t), we must recognize that the relationship between aid or remittance flows and the relative growth of traded manufacturing sectors can be simultaneously affected by common country and sector shocks and aggregate factors, as well as shocks operating at the country-time and sector-time levels, which can potentially cause changes in the relative growth of industrial value added even in the absence of aid and remittance flows.

By estimating fixed effects models which account for common shocks at different levels, the analysis indicate that potential biases due to omitted variables cannot be fully addressed with only time or unit dummies. So, combinations of country-time and sector-time effects are included in some fixed effects models in addition to unit-specific time-invariant unobserved effects. This procedure ensures that shocks common to both sectors and countries are properly addressed.

The study begins by using a reconstructed data set to perform a replication exercise of the first part of Rajan and Subramanian (2011) (RS hereafter).[1] They argue for a negative effect of Net Overseas Development Assistance (ODA) on the relative growth of exportable manufacturing sectors in some 30 aid-dependent countries from 1980 to 1990 and 15 aid-dependent countries from 1990 to 2000. In addition the study uses a new, extended data set with 45 countries from 1970 to 1999 and 30 countries from 1970-1999 to re-examine the Dutch Disease effect of aid and remittance flows respectively.

[1] Rajan and Subramanian (2011) has 251 citations on Google Scholar as at August 2015.

Findings from the replication exercise show estimates with similar magnitudes and signs to the RS results. The first robustness check uses the same estimation method as RS to compute estimates from an extended data set. The second robustness check uses the Within Group and the Generalized Methods of Moments (GMM) estimators to further investigate the Dutch Disease effect of aid. Will these estimators tell the same story about the effect of aid and remittances on the relative growth of manufacturing sectors? Compared to the RS findings, results from the former do not provide sufficient evidence to support a Dutch Disease effect of aid. Where coefficient estimates show a negative relation, these estimates are not statistically significant at conventional levels. Likewise, results from the latter provide no strong evidence to support the Dutch Disease findings. In fact, some estimates computed from fixed effects models which account for common shocks operating at the country-time and sector-time levels suggest possible positive aid-manufacturing-growth relations. In the case of remittance flows, the coefficient estimates provide strong evidence of a positive relationship between remittance flows and the relative growth of exportable manufacturing sectors, particularly for sectors such as textiles, wearing apparel, leather products and footwear.

The term Dutch Disease was coined in 1977 by The Economist to describe the adverse effect of increased revenue from natural resources on manufacturing sectors in the Netherlands.[2] Since then, many analysts have applied the logic of the Dutch Disease to various booms in an economy. In the context of foreign aid and remittance flows, lump sum transfers to a small open economy, in the form of foreign aid or remittances, are partly spent on non-traded goods such as construction, education, health and other services. As demand for domestic currency increases, the value of the domestic currency rises (in a floating exchange rate regime). Now the stronger domestic currency implies that domestic goods produced for export are more expensive in the international market because a unit of foreign currency will now buy fewer goods and services in the domestic economy. Similarly, in a fixed exchange rate regime, aid money which expands domestic demand pushes up domestic prices. Since prices in the traded good sector are exogenously determined, the result is an increase in the real exchange rate. Therefore, in either a fixed or free floating exchange rate regime, a sudden increase

[2] "The Dutch Disease" (November 26, 1977). The Economist, pp. 82-83.

in foreign transfers to a given country reduces the country's level of competitiveness in the world market, so that domestic exports may decline.

A well-developed manufacturing sector, especially in low income economies, can have potential significant advantages for a country. Remarkable growth records observed in countries such as China, South Korea and Taiwan have partly been the result of large increases in manufacturing sector productivity. These "growth miracles" are indicative of the potential importance of a countries' traded sector. While these countries have escaped the perils of underdevelopment with little reliance on foreign aid, Sub-Saharan African countries receive, on average, about 10% of their national income in aid; yet, these countries record some of the lowest manufacturing sector growth rates (Birdsall et al., 2005).

In addition to foreign aid, remittance flows to developing countries have been increasing significantly since the mid 1970's. According to a World Bank press release, in 2013, $404 billion out of total global remittance flows of about $542 billion (approximately 75%) went to developing countries. These figures exclude the large amount of unreported remittances in the form of gifts and cash transfers via unofficial channels.[3]

Considering the amount of funds going to developing countries, one might expect high rates of economic growth and development, especially in sectors such as manufacturing, but this is not the case. For this reason, the debate on aid effectiveness has received a lot of attention over the past three decades. Among the more recent studies on the subject are Burnside and Dollar (2000); Collier and Dehn (2001); Dalgaard and Hansen (2001); Easterly (2003); Dalgaard et al. (2004); Easterly (2007); Roodman (2007); Temple (2010); Clemens et al. (2012) and Addison and Tarp (2014).

The rest of the paper is structured as follows: the next section provides an overview of the RS methods and a brief review of the literature on remittance flows and the Dutch Disease, section 3 describes the data and presents results for the replication exercise. Section 4 explains the different estimation methods used for computing estimates from the new, extended data set and also reports the results, section 5 describes a dynamic analysis of the aid-manufacturing growth relation and section 6 concludes.

[3] "Remittances to developing countries to stay robust this year despite increased deportations of migrant workers",says WB, http://www.worldbank.org/en/news/press-release/2014/04/11/remittances-developing-countries-deportations-migrant-workers-wb. Press release no.2014/436/DEC.

2 Background

In the first part of their study, RS examine the effect of Net ODA on the relative growth of exportable manufacturing sectors with a methodology that draws on variations within countries across sectors. Unlike other studies on aid effectiveness, RS is the first study to investigate the direct effect of aid on the relative growth of individual traded manufacturing sectors in developing economies. They argue that for a poor developing country, low traded sector competitiveness is more likely to be reflected in exports than imports. Therefore, they develop a proxy for the relative sensitivity of an industry to aid, based on individual manufacturing sectors. They group goods into their degree of exportability in low-income countries. For each manufacturing sector they define an indicator variable, *"EXPORTABILITY1"* index, which takes the value 1 if the industry has a ratio of exports to value added (averaged across all countries in the sample) greater than the median across industries and zero otherwise. They define another measure as the *"EXPORTABILITY2"* index based on the four industries (textiles, clothing, leather and footwear) which they judge to have been most significant in the growth process of developing countries. *EXPORTABILITY2* is a dummy variable that takes the value one for the four industries and zero otherwise. Henceforth I use *EXPORT1* and *EXPORT2* to refer to these indexes.

RS run regressions for two periods, each averaged over the decade. They use a sample of 30 countries from 1980 to 1990 and 15 countries from 1990 to 2000. Using the Pooled OLS estimator they find that the relative growth of traded sector value added in countries that receive an extra percentage point in the ratio of aid to GDP declines by about 0.5 percentage points. Likewise, sectors that are especially traded in low-income countries, such as textiles and footwear, grow relatively slower by about 1 percentage point per year with an extra percentage point increase in the aid to GDP ratio. These findings suggest detrimental consequences of aid on important channels of long-run growth. For their estimation strategy, RS run regressions of the form:

$$Growth_{ij} = \alpha * (Ini\_Ind\_share_{ij}) + \gamma * (X_j * EXPORT_i) + \phi_i + \pi_j + \epsilon_{ij} \quad (1)$$

where Growth_{ij} is the annual average growth of value added of industry i in country j. Growth_{ij} is calculated as the log difference of real industrial value added, averaged over a decade. Real industrial value added is calculated by dividing the nominal industrial value added by the USA producer price index (USPPI). $\text{Ini\_Ind\_share}_{ij}$ is the initial period share of industry i in total value added in country j; X_j is the ratio of Net ODA to GDP in country j averaged over the time interval; $EXPORT_i$ is an export index for industry i; ϕ_i and π_j are industry and country effects respectively.

2.1 Remittances and Dutch Disease

Remittance flows to developing countries have become a significant source of income and foreign exchange in recent times, exceeding international flows such as foreign direct investment, portfolio equity and debt and foreign aid in some countries. In 2008, there was widespread anticipation of huge declines in remittance flows due to the global financial crisis, but aside a slight drop in 2009, remittance flows, unlike foreign aid, have been relatively stable (Sirkeci et al., 2012, pp. 22-24). The comparatively high volume and stability of the flow of remittances makes this type of foreign transfer an important component in the capital accounts of remittance-dependent countries. So like aid, a growing number of studies have examined the effects of remittance flows on a range of macroeconomic and social indicators.[4]

Regarding the relationship between remittances and the relative growth of traded manufacturing sectors, some studies have shown a causal effect of remittances on the recipient country's real exchange rate (Rajan and Subramanian, 2005; Selaya and Thiele, 2010). Whether this effect is positive or negative is still a central part of the debate.

[4]For example, remittances and economic growth (Chami et al., 2008; Ruiz-Arranz and Giuliano, 2005; Gapen et al., 2009), remittances and inequality (Stark et al., 1986; González-König and Wodon, 2002), remittances and consumption (Combes and Ebeke, 2011).

There are still other studies which contend that as well as increases in the exchange rate, remittance flows also affect the performance of the relative growth of manufacturing sectors through labor market, financial and demand constraints (Dzansi, 2013). Using a sample of 109 developing and transition countries from 1990 to 2003, Lartey et al. (2008) find a positive relationship between remittance flows and the relative prices of non-tradables to tradables. Also, Dzansi (2013) uses a sample of 40 remittances-dependent countries from 1991 to 2004 and finds statistically significant positive relation between the ratio of remittance flows to GDP and the relative growth of traded manufacturing sectors. However, a working paper version of RS, Rajan and Subramanian (2005) finds statistically insignificant positive estimates for the relationship between remittance flows and the relative growth of traded sectors.

3 Data and Replication

Following RS, domestic production industrial value added data are extracted from the Industrial Statistics Database (2006) of the United Nations Industrial Development Organization UNIDO (2013). The INDSTAT2 database provides value added data at the 3 digit level of the International Standard Industrial Classification of all Economic Activity. UNIDO defines industrial value added as the portion of sales not accounted for by the use of inputs and supplies from other industries. The database covers annual industrial value added for 28 manufacturing sectors in 180 countries from 1963 to 2006, but relatively few countries have observations before 1970 or after 2002.[5]

Although INDSTAT2 is preferred because it covers a longer period of time, its main limitation is that data are recorded in nominal values. To study the Dutch Disease effects of foreign transfers, industrial value added, which is used to measure the contribution of various sectors in the economy to real national product, must be free from price changes. Unfortunately, appropriate indexes for deflating nominal value added (especially for developing countries) are erratic and incomplete. Hence data on deflators for manufacturing output at any level of industrial aggregation are not available (Yamada, 2005). As a result, RS use the USA producer price index (PPI) as a common

[5]INDSTAT2 (3 digit) is currently discontinued. Description of the ISIC codes is given in Appendix: Table 1b.See Nicita and Olarreaga (2007) for further explanation of the data sets.

deflator to eliminate price changes in nominal value added data. This study follows the same approach for deflating nominal value added. The annual USA PPI is taken from the International Monetary Fund's International Financial Statistics database (2013).

Net official development assistance (ODA) is available online on the OECD database via the World Bank (www.oecd.org/dac/stats/idsonline) and covers the period 1961-2011.[6] Although Net ODA has been widely used in the literature to study the aid-economic-growth relationship, there are a number of drawbacks in the methodology used for aggregating this measure of aid (Chang et al., 1998; Temple, 2010; Roodman, 2012). The Effective Development Assistance (EDA), which was developed by Chang et al. (1998), and used in influential studies such as Burnside and Dollar (2000), Roodman (2007) and Dalgaard et al. (2004) is argued to have an advantage over net ODA in terms of the methodology used for aggregation, however, due to its limited time span, EDA is not a suitable measure of aid for the purposes of this study. To counter potential reservations about the use of Net ODA, all estimates computed with the pooled OLS and fixed effects estimators are re-estimated with the Net Aid Transfer (NAT) measure of aid developed by Roodman (2012).

The Net Aid Transfers (NAT) developed by Roodman (2012) covers the period 1960-2013. Whereas Net ODA is net of only principal payments received on ODA loan, not of interest received on such loans, NAT is net of both principal and interest payments. Also NAT does not include canceled old non-ODA loans. Thus, this measure of aid gives a good approximation of the value of the actual aid a country receives in a particular year.

All samples exclude countries classified as high income by the World Bank (since rich countries do not receive foreign aid) and countries whose average ratio of aid and remittance flows to GDP are less than one percent.[7] The new, extended data

[6]According to the World Bank, Net official development assistance (ODA) is made up of disbursements of concessional loans (net of repayments of principal) and grants by official agencies of the members of the Development Assistance Committee (DAC), by multilateral institutions, and by non-DAC countries to promote economic development and welfare in countries and territories in the DAC list of ODA recipients.

[7]RS provided their data and STATA do-file on request. They refer to the sample from 1980-1990 as the 1980s sample and 1990-2000 as the 1990s sample. China and India are included because of their large population sizes. Although Cyprus and Israel are high income countries, they are included because of large Net ODA receipts in the 1970s and the 1980s. China (Taiwan), Mauritius, Morocco and South Africa have no aid data for the 1980s. Mauritius and Morocco have no data on aid for the 1990s. All countries included are listed in Appendix 1c and 1d.

includes 45 developing countries in a ten-year interval sample from 1970 to 1999 and 42 developing countries from 1970 to 2004 over a five-year interval aid sample. The sample for remittance flows includes 30 low income countries from 1970 to 1999 for a ten-year interval and 38 low income countries from 1970 to 2004 for a five-year interval.

Table 1 shows descriptive statistics for the replication data set. The average rate of growth of industrial value added is reported as 1.9% and 6.1% for the 1980's and 1990's samples respectively. The mean of the ratio of Net ODA to GDP is about 7% (about the same for the ratio of NAT to GDP) on average with a range of [0.7% 27.3%]. Despite the differences in their aggregation methodology, descriptive statistics of the Net ODA and NAT show no major significant differences between the two measures of foreign aid. Since there is not usually much difference between the Net ODA and NAT, we should not expect to see significant differences in the coefficient estimates.

Tables 2 and 3 summarize the descriptive statistics of the panel characteristics of the extended data set. The standard deviation is reported for three dimensions of the panel, that is, within country-sector over time ("Within") and between country-sectors ("Between"). Table 2 shows that the dependent variable is volatile within country-sector as well as between country-sectors. The independent variables, however, show less variation in both within and between country-sectors. This variability pattern in the dependent and independent variables may suggest that fixed effects models alone cannot be reliable (Szirmai and Verspagen, 2011). The authors suggest using the Hausman-Taylor estimator (Hausman and Taylor, 1981). In this study I find no significant differences between the estimates computed from fixed effects models and the Hausman-Taylor regressions, so only estimates computed from fixed effects models are reported here.

Table 1: Descriptive Statistics - Replication

Variables	Obs.	Mean	Median	St. Dev.	Min.	Max.	period
Average Real Growth Rate$_{ijt}$	765	0.019	0.019	0.167	-1.417	1.370	1980s
	388	0.061	0.040	0.238	-0.911	2.828	1990s
Initial share$_{ijt}$	765	0.043	0.021	0.065	0.000	0.583	1980s
	388	0.039	0.019	0.062	0.000	0.524	1990s
EXPORT1 Index$_i$	28	0.488	0.000	0.500	0.000	1.000	1980s
	28	0.470	0.000	0.500	0.000	1.000	1990s
EXPORT2 Index$_i$	28	0.157	0.000	0.364	0.000	1.000	1980s
	28	0.138	0.000	0.345	0.000	1.000	1990s
ODA/GDP$_{jt}$	666	0.070	0.059	0.054	0.007	0.273	1980s
	337	0.068	0.068	0.049	0.005	0.181	1990s
NAT/GDP$_{jt}$	738	0.071	0.056	0.057	0	0.212	1980
	388	0.062	0.043	0.045	0.004	0.158	1990

Table 2: Descriptive Statistics of the panel data set

			Standard Deviation			Observations			
Variables		Mean	Overall	Between	Within	# Obs.	# C'tries	# Sect.	T-bar
Growth Rate$_{ijt}$	1970-1999	0.044	0.192	0.142	0.144	2522	45	28	2.291
Initial share$_{ijt}$	1970-1999	0.043	0.067	0.063	0.022	2522	45	28	2.291
ODA/GDP$_{jt}$	1970-1999	0.055	0.049	0.045	0.022	2522	45		2.291
NAT/GDP$_{jt}$	1970-1999	0.051	0.048	0.043	0.023	2522	45		2.291
EXPORT1 Index$_i$	1970-1999	0.488	0.500	0.500	0	2522		28	2.291
EXPORT2 Index$_i$	1970-1999	0.158	0.359	0.358	0	2522		28	2.291
Remit/GDP$_{jt}$	1970-1999	0.042	0.042	0.036	0.011	1493	30		2.040

T-bar is the average number of period under observation (3 ten-year average)

Table 3: Descriptive Statistics - Dynamic analysis

			Standard Deviation			Observations			
Variables		Mean	Overall	Between	Within	# Obs.	# C'tries	# Sect.	T-bar
Sectoral share in total value added$_{ijt}$	1970-2004	0.040	0.063	0.057	0.023	5672	46	28	4.593
ODA/GDP$_{jt}$	1970-2004	0.058	0.054	0.044	0.031	5700	46	28	4.593
EXPORT1 Index$_i$	1970-2004	0.499	0.500	0.500	0	5700	46	28	4.593
EXPORT2 Index$_i$	1970-2004	0.144	0.351	0.351	0	5700	46	28	4.593

T-bar is the average number of years under observation (7 five-year average)

3.1 Replication Results

Table 4 reports results from the replication exercise (Rajan and Subramanian, 2011, p.109, Table 2). With the exception of Yugoslavia and Thailand which are excluded due to data unavailability in the INDSTAT2 data set, all other countries are the same as the RS sample. Therefore the unbalanced panel data set includes 29 countries for the 1980s (30 countries in RS) and 13 countries for the 1990s (15 countries in RS). The number of observations for the 1980s sample is 666 (684 in RS), and 328 (357 in RS) for the 1990s sample.

In general, all coefficient estimates have the predicted sign and similar magnitudes to the RS results. All coefficients are individually significant at the 10% level except in column 4. It must be noted that the 1990s results are fragile and less robust to changes in sample size particularly due to the small sample size within that time period. The results suggest that an extra one percentage point increase in the ratio of Net ODA to GDP in a typical country in the 1980s sample leads to a 0.4 and 0.8 percentage points decrease in the relative growth of traded sectors as defined by *EXPORT1* and *EXPORT2* respectively. For the 1990s sample, the relative growth of value added in industries classified as *EXPORT1* and *EXPORT2* decreases by about 0.52 and 0.41 percentage points respectively.

The NAT sample includes observations on Mauritius, Morocco and South Africa whereas the Net ODA sample has no observations for these three countries. When the model is estimated with Mauritius, Morocco and South Africa in the sample, the results show a positive NAT-manufacturing growth relation. However, there are no significant changes in the results estimated with either Net ODA or NAT when these three countries are taken out of the sample. In fact the results are almost the same with both models having 666 and 328 observations in the 1980s and 1990s respectively.The results for NAT are reported in Table 10 in the appendix.

Table 4: Impact of Net ODA on Industrial Sectoral Growth - Replication

Dependent Variable: Average Growth real value added$_{ijt}$				
Periods	1980s	1980s	1990s	1990s
	(1)	(2)	(3)	(4)
Initial Ind.	-0.359***	-0.359***	-0.271***	-0.280***
share$_{ijt}$	(0.084)	(0.083)	(0.096)	(0.095)
ODA/GDP$_{jt}$*	-0.365*		-0.524*	
EXP1 Index$_i$	(0.202)		(0.271)	
ODA/GDP$_{jt}$*		-0.792***		-0.411
EXP2 Index$_i$		(0.275)		(0.346)
Observation	666	666	328	328
Countries	29	29	13	13
R^2	0.310	0.316	0.487	0.480

All equations are estimated with the pooled OLS estimator. Robust standard errors are reported in parenthesis. ***, ** and * represent significance at 1%, 5% and 10% respectively. All equations include country and sector dummies. Growth$_{ijt}$ is the dependent variable and it denotes the real growth rate value added for industry i in country j averaged over the period. Initial Industry share$_{ijt}$ refers to the share of industry i in country j as a share of total manufacturing sector valued added in country j at the beginning of the period. ODA/GDP$_{jt}$ is the ratio of Net Overseas Development Assistance to GDP in country j averaged over the period. *EXPORT1* index is a dummy that takes on a value 1 if an industry's ratio of exports to value added is greater than the median value, and 0 otherwise. *EXPORT2* index is a dummy that takes on a value of 1 for ISIC sectors 321-324, and 0 otherwise.

4 The Extended Data Set: Methods and Results

This section examines the effect of Net ODA and remittance flows on the relative growth in value added of industry i in country j at time t. Unlike RS, the extended data set includes 45 countries, 28 sectors and 3 ten-year averages from 1970 to 1999. Also, the sample for remittance flows includes 30 countries, 28 sectors and 3 ten-year averages. The main results are computed with 10-year averages to make them comparable with results from RS. Results from 5-year intervals are included for comparison. The estimation strategy used here is to estimate panel regressions of the form:

$$\begin{aligned} Growth_{ijt} = \alpha_0 * (Ini\_Ind\_share_{ijt}) \\ + \gamma * (X_{jt} * EXPORT_i) \\ + \phi_i + \pi_j + \nu_t + \epsilon_{ijt} \end{aligned} \quad (2)$$

for i=1,...,28 and j=1,...,N and t=1,2,3 (for ten-year averaged sample) where Growth_{ijt} is the annual average growth rate value added of industry i in country j over a period of time (where a period is either ten or five years, depending on the regression). Growth_{ijt} is calculated as the log difference of real industrial value added averaged over the period. Following RS the annual average growth rate of industrial value added is calculated for countries with at least six consecutive years of sectoral value added in the ten-year averaging sample and at least three consecutive years in the five-year averaged sample; $\text{Ini\_Ind\_share}_{ijt}$ is initial industrial share in total value added for industry i in country j at the beginning of the period. It is included to control for convergence effects in the model; X_{jt} are the ratios of net official development assistance or remittance flows to GDP in country j at time t.

Using the same definition as RS, *EXPORT1* index is a dummy variable that takes on a value of 1 if the ratio of exports to value added in an industry is greater than the median value and 0 otherwise and *EXPORT2* index is a dummy that takes on a value 1 for ISIC sectors 321-324 (textiles, wearing apparel except footwear, leather products and footwear, except rubber or plastic). EXPORT1 and EXPORT2 indexes do not vary with time since there is no variation within these categories over time. γ is the parameter of interest, the coefficient of the interaction term between Net ODA or remittance flows and an *EXPORT* index. It measures the relative sensitivity of manufacturing sector growth to Net ODA or remittance flows. So, if indeed there is a Dutch Disease effect of Net ODA and remittance flows in recipient countries, then we expect γ to be negative and statistically significant. ϕ_i, π_j and ν_t are industry, country and time fixed effects. ϵ_{ijt} is the error term accounting for all other unobserved factors affecting the dependent variable.

Table 5 reports estimates from the pooled OLS estimator. In general the estimates suggest a negative Net ODA-manufacturing growth relation especially for *EXPORT1* industries. In comparison to Table 4, the magnitudes of the estimates computed from the new, extended data set are smaller with only one estimate (column 2) being statistically significant. Also, the standard errors reported in Table 5 are relatively low compared to Table 4. Furthermore, the results indicate that estimates computed from models that control for country, sector and time effects (columns 2, 4, 6 and 8) are more precise than models which only control for time effects. This is reflected in the relatively smaller standard errors reported in columns 2, 4, 6 and 8.

Table 6 presents results for the relationship between remittance flows and the relative growth of traded manufacturing sectors. Although the coefficient estimates are not statistically significant at conventional levels, in general the estimates suggest a positive effect of remittance flows on the relative growth of traded manufacturing sectors.

While these point estimates may possibly suggest that the RS findings are not robust to the extended sample, there is not enough evidence to make this claim yet. This is because the regression model errors in equation (2) may be correlated with the explanatory variables, due to the omission of relevant variables from the model. A more appropriate approach will be to estimate fixed effects models.

The fixed effects estimator controls for unobserved time-invariant variables that may affect the relative growth of traded manufacturing sectors, however, common shocks that may affect the relative growth of value added at the country-time and sector-time levels such as shocks to national business cycles or price of raw materials may not be accounted for by just estimating simple fixed effects models . Thus, the fixed effects models analyzed in the next section will include country-time and sector- time interactions to account for these unobserved common shocks.

4.1 Fixed Effects Models

The regression models estimated in this section take the form of equation (3).

$$\begin{aligned} Growth_{ijt} = \alpha * (Ini.Ind.share_{ijt}) \\ + \gamma * (X_{jt} * EXPORT_{it}) + \phi_{ij} \\ + \pi_{it} + \mu_{jt} + \beta_i + \delta_j + \nu_t + \epsilon_{ijt} \end{aligned} \quad (3)$$

for i=1,...,28 and j=1,...,N and t=1,2,3 (for ten-year averaged sample)

Variables are defined the same way as in section 4. In addition, equation (3) includes country and sector specific fixed effects (β_i and δ_j); ϕ_{ij}, captures shocks common to countries and sectors; π_{it}, is an interaction between sector and time fixed effects which controls for sector-time level shocks; μ_{jt} is the interaction between country and time effects and captures shocks at the country-time level and ν_t are time fixed effects which control for time varying unobserved variables common to the groups. Other restricted forms of equation 3, where π_{it} and μ_{jt} are set to zero are also estimated.

Table 5: Impact of Net ODA on Manufacturing Growth - Pooled OLS

Dependent Variable: Growth$_{ijt}$								
Models	1	2	3	4	5	6	7	8
Initial Ind.	-0.107**	-0.158**	-0.109**	-0.158**	-0.143***	-0.197***	-0.146***	-0.199***
share$_{ijt}$	(0.044)	(0.070)	(0.043)	(0.069)	(0.040)	(0.063)	(0.039)	(0.063)
ODA/GDP$_{jt}$	-0.312***		-0.445***		-0.166**		-0.167**	
	(0.106)		(0.094)		(0.074)		(0.065)	
ODA/GDP$_{jt}$*	-0.227	-0.439***			-0.025	-0.139		
EXP1 Index$_i$	(0.165)	(0.140)			(0.123)	(0.104)		
EXPORT1	0.011				-0.001			
Index$_i$	(0.011)				(0.009)			
ODA/GDP$_{jt}$*			0.161	-0.006			-0.055	-0.133
EXP2 Index$_i$			(0.193)	(0.168)			(0.166)	(0.141)
EXPORT2			-0.009				-0.006	
Index$_i$			(0.015)				(0.013)	
Year dummies	yes	yes	yes	yes	yes	yes	yes	yes
Country dummies	no	yes	no	yes	no	yes	no	yes
Sector dummies	no	yes	no	yes	no	yes	no	yes
Countries	45	45	45	45	42	42	42	42
Time	3	3	3	3	7	7	7	7
R^2	0.062	0.172	0.061	0.168	0.048	0.116	0.048	0.115
Observations	2520	2520	2520	2520	4424	4424	4424	4424

Equations are estimated for the ten-year averaged sample from 1970 to 1999 (models 1-4) and five-year averaged sample from 1970 to 2004 (models 5-8). Models 2, 4, 6 and 8 include country, sector and year dummies. Cluster-robust Standard errors are reported in parenthesis with *, ** and *** representing 10%, 5% and 1% significance level respectively. Initial Industry share$_{ijt}$ refers to the share of industry i in country j as a share of total manufacturing sector valued added in country j at the beginning of the period. ODA/GDP$_{jt}$ is the ratio of Net ODA to GDP in country j averaged over the period. *EXPORT1* index is a dummy that takes on a value 1 if an industry's ratio of exports to value added is greater than the median value, and 0 otherwise. *EXPORT2* index is a dummy that takes on a value of 1 for ISIC sectors 321-324, and 0 otherwise.

Table 6: The Effect of Remittances on Manufacturing Growth - Pooled OLS

Dependent Variable: $Growth_{ijt}$								
Models	1	2	3	4	5	6	7	8
Initial Industry	-0.154**	-0.261***	-0.163***	-0.262***	-0.161**	-0.301**	-0.177**	-0.301**
$share_{ijt}$	(0.065)	(0.091)	(0.063)	(0.091)	(0.079)	(0.132)	(0.076)	(0.132)
$Remittances_j$	0.437***		0.361***		0.114		0.051	
	(0.089)		(0.091)		(0.093)		(0.105)	
$Remittances_{jt}$*	-0.124	0.128			-0.144	0.046		
EXP1 $Index_i$	(0.173)	(0.183)			(0.184)	(0.221)		
EXPORT1	-0.007				-0.016			
$Index_i$	(0.011)				(0.012)			
$Remittances_{jt}$*			0.110	0.251			-0.037	0.114
EXP2 $Index_i$			(0.259)	(0.259)			(0.211)	(0.187)
EXPORT2			0.003				-0.006	
$Index_i$			(0.016)				(0.015)	
year dummies	yes	yes	yes	yes	yes	yes	yes	yes
country dummies	no	yes	no	yes	no	yes	no	yes
sector dummies	no	yes	no	yes	no	yes	no	yes
R^2	0.04	0.18	0.04	0.18	0.02	0.10	0.02	0.10
Observations	1493	1493	1493	1493	3385	3385	3385	3385
Countries	30	30	30	30	38	38	38	38
Time	3	3	3	3	7	7	7	7

Equations are estimated for the ten-year averaged sample from 1970 to 1999 (models 1-4) and five-year averaged from 1970 to 2004 (models 5-8). Models 2, 4, 6 and 8 include country, sector and year dummies. Standard errors are robust and reported in parenthesis with *, ** and *** representing 10%, 5% and 1% significance level respectively. Initial Industry $share_{ijt}$ refers to the share of industry i in country j as a share of total manufacturing sector valued added in country j at the beginning of the period. $Remittances_{jt}$ is the ratio of personal remittances transfer to GDP in country j averaged over the period. *EXPORT1* index is a dummy that takes on a value 1 if an industry's ratio of exports to value added is greater than the median value, and 0 otherwise. *EXPORT2* index is a dummy that takes on a value of 1 for ISIC sectors 321-324, and 0 otherwise.

Table 7 (panel A) reports results based on equations (3) and its restricted forms. To enable effective comparison with other results, the total number of observations and the number of countries have been kept the same. All models include year dummies. Estimates reported in columns 1 and 5 account for all group-time effects in country and sector, country and time and sector and time fixed effects (equation 3). A Wald test performed to test the significance of these interaction terms (country-sector, country-time and sector-time specific) favours the inclusion of all these unobserved effects in the model. All standard errors are cluster-robust at the country-and-sector level. Although the coefficients are not statistically significant, the interpretation of the pattern of their signs is worth noting. Whilst Net ODA has a negative effect on the relative growth of sectors classified as EXPORT1 by about 0.2 percentage points, there is no evidence of a Dutch Disease effect of aid on EXPORT2 sectors.

Panel B of Table 7 shows point estimates computed with five-year averages of the sample. The parameter estimates show that, depending on the unobserved fixed effects variable(s) controlled for in the model, the relationship between Net ODA and the relative growth of manufacturing sectors can be either positive or negative. When the Net ODA measure of aid is replaced with NAT in the fixed effects models, again, there are no significant changes between the results. These findings are reported in Table 11 in the appendix. Findings for the Dutch Disease effect of remittances are reported on Table 8. Similar to estimates reported in Table 7, these results suggest a negative effect of remittance flows on the growth of EXPORT1 manufacturing sectors and a positive effect on EXPORT2 sectors. However, the positive effect of remittances flows on the relative growth of EXPORT2 manufacturing sectors is statistically significant at the 5% level.

Overall, coefficient estimates computed from fixed effect models for the extended data set do not confirm the RS' strong findings of a Dutch Disease effect of aid. The findings suggest mixed evidence for the aid-manufacturing-growth relation depending on the *EXPORT* index. A quick robustness check show no significant differences in the results, if countries considered to be medium to high income countries such as Cyprus, Israel, Malta, Paraguay, Poland and South Korea (but still have at least 1% aid to GDP ratio) are included or taken out from the analysis.

Table 7: Effect of Net ODA on Manufacturing Growth - FE

Dependent Variable: Growth_{ijt}					Panel A			
Model	1	2	3	4	5	6	7	8
Initial Industry	-0.582***	-0.592***	-0.526**	-0.523**	-0.579***	-0.588***	-0.524**	-0.520**
share_{ijt}	(0.215)	(0.210)	(0.222)	(0.215)	(0.214)	(0.209)	(0.220)	(0.213)
ODA/GDP_{jt}			-0.628***	-0.625***			-0.810***	-0.804***
			(0.198)	(0.197)			(0.178)	(0.179)
ODA/GDP_{jt}*	-0.151	-0.122	-0.205	-0.168				
EXP1 Index_i	(0.290)	(0.294)	(0.315)	(0.319)				
ODA/GDP_{jt}*					0.500	0.588	0.485	0.569
EXP2 Index_i					(0.349)	(0.394)	(0.364)	(0.392)
Country_sector_fe	yes	yes	yes	yes	yes	yes	yes	yes
country_year_fe	yes	yes	no	no	yes	yes	no	no
Sector_year_fe	yes	no	yes	no	yes	no	yes	no
year_dummies	yes	yes	yes	yes	yes	yes	yes	yes
Observations	2520	2520	2520	2520	2520	2520	2520	2520
Countries	45	45	45	45	45	45	45	45
Time	3	3	3	3	3	3	3	3
Five-year averaged sample					Panel B			
Initial Industry	-0.737***	-0.739***	-0.782***	-0.781***	-0.737***	-0.739***	-0.783***	-0.782***
share_{ijt}	(0.148)	(0.148)	(0.155)	(0.151)	(0.148)	(0.148)	(0.156)	(0.152)
ODA/GDP_{jt}			-0.160	-0.173			-0.160	-0.179
			(0.140)	(0.133)			(0.123)	(0.119)
ODA/GDP_{jt} *	0.083	0.059	-0.021	-0.024				
EXP1 Index_i	(0.197)	(0.191)	(0.229)	(0.222)				
ODA/GDP_{jt}*					-0.0001	0.006	-0.062	-0.033
EXP2 Index_i					(0.282)	(0.290)	(0.313)	(0.303)
Country_sector_fe	yes	yes	yes	yes	yes	yes	yes	yes
country_year_fe	yes	yes	no	no	yes	yes	no	no
Sector_year_fe	yes	no	yes	no	yes	no	yes	no
Observations	4424	4423	4424	4424	4424	4424	4424	4424
Countries	42	42	42	42	42	42	42	42
Time	7	7	7	7	7	7	7	7

All equations are estimated with the fixed effects estimator for 10-year averaged sample from 1970 to 1999 shown in the first panel and estimates for five-year averaged sample in the second panel. Cluster-robust Standard errors are reported in parenthesis with *, ** and *** representing 10%, 5% and 1% significance level respectively. All Equations include country_sector pair fixed effects and year dummies. In addition, Models 1 & 5 (general model) include interaction of country_year and sector_year fixed effects. Initial Industry share_{ijt} refers to the share of industry i in country j as a share of total manufacturing sector valued added in country j at the beginning of the period. ODA/GDP_{jt} is the ratio of Net ODA to GDP in country j averaged over 10 years. *EXPORT1* index is a dummy that takes on a value 1 if an industry's ratio of exports to value added is greater than the median value, and 0 otherwise. *EXPORT2* index is a dummy that takes on a value of 1 for ISIC sectors 321-324, and 0 otherwise.

Table 8: The Effect of Remittances on Manufacturing Growth - FE

Dependent Variable: Growth$_{ijt}$					Panel A			
Models	1	2	3	4	5	6	7	8
Initial Industry	-0.866***	-0.897***	-1.009***	-1.026***	-0.865***	-0.885***	-1.008***	-1.014***
share$_{ijt}$	(0.229)	(0.240)	(0.270)	(0.277)	(0.227)	(0.239)	(0.269)	(0.277)
Remittances$_{jt}$			2.427***	2.436***			1.973***	1.946***
			(0.379)	(0.376)			(0.530)	(0.555)
Remittances$_{jt}$*	-0.160	-0.150	-0.225	-0.240				
EXP1 Index$_i$	(0.920)	(0.951)	(0.934)	(0.964)				
Remittances$_{jt}$*					2.052**	2.290**	2.111**	2.286**
EXP2 Index$_i$					(1.014)	(1.010)	(1.062)	(1.050)
Country_sector_fe	yes	yes	yes	yes	yes	yes	yes	yes
country_year_fe	yes	yes	no	no	yes	yes	no	no
Sector_year_fe	yes	no	yes	no	yes	no	yes	no
year_dummies	yes	yes	yes	yes	yes	yes	yes	yes
No. of obs	1493	1493	1493	1493	1493	1493	1493	1493
No. of c'tries	30	30	30	30	30	30	30	30
Time	3	3	3	3	3	3	3	3
Five-year averaged sample					Panel B			
Initial Industry	-0.957**	-1.089***	-1.087***	-1.198***	-0.955**	-1.090***	-1.085***	-1.199***
share$_{ijt}$	(0.414)	(0.371)	(0.382)	(0.351)	(0.414)	(0.371)	(0.382)	(0.351)
Remittances$_{jt}$*			1.073**	1.025**			0.986*	0.922*
			(0.462)	(0.436)			(0.530)	(0.553)
Remittances$_{jt}$*	-0.352	-0.231	-0.339	-0.237				
EXP1 Index$_i$	(0.945)	(0.828)	(0.922)	(0.810)				
Remittances$_{jt}$*					-0.691	-0.208	0.447	0.706
EXP2 Index$_i$					(0.954)	(0.764)	(0.957)	(0.774)
Country_sector_fe	yes	yes	yes	yes	yes	yes	yes	yes
country_year_fe	yes	yes	no	no	yes	yes	no	no
Sector_year_fe	yes	no	yes	no	yes	no	yes	no
year_dummies	yes	yes	yes	yes	yes	yes	yes	yes
Observations	3385	3385	3385	3385	3385	3385	3385	3385
Countries	38	38	38	38	38	38	38	38
Time	7	7	7	7	7	7	7	7

All equations are based on fixed effects estimations with 10 year averages from 1970-1999. Cluster-robust standard errors and reported in parenthesis with *, ** and *** representing 10%, 5% and 1% significance levels respectively. All Equations include country_sector pair fixed effects and year dummies and year and/or industry and year fixed effects. In addition, Models 1 & 5 (general model) include interaction of country_year and sector_year fixed effects. Initial Industry share$_{ijt}$ refers to the share of industry i in country j as a share of total manufacturing sector valued added in country j at the beginning of the period. Remit$_{jt}$ is the share personal remittance transfer to GDP in country j averaged over 10 years. *EXPORT1* index is a dummy that takes on a value 1 if an industry's ratio of exports to value added is greater than the median value, and 0 otherwise. *EXPORT2* index is a dummy that takes on a value of 1 for ISIC sectors 321-324, and 0 otherwise

5 Dynamic Analysis

Foreign aid may affect manufacturing sector growth with a delayed effect, to the extent that the time between when aid is given to a country and the impact of that aid on the economy will differ. For example, the benefits (positive or negative) from aid given to help eradicate malaria or improve education in a Sub-Saharan African country might not be instantaneous but reflect in future manufacturing productivity growth. Thus, an analysis of the relationship between aid and the relative growth of traded manufacturing sectors in aid-dependent countries cannot lose sight of the fact that current traded manufacturing output levels might possibly be influenced by both current and past aid.

In this section, instead of examining the effect of aid on the relative growth of industrial value added, I examine the *impact of aid on the share of individual sectoral value added in total value added.* The reasoning is, if aid has a Dutch Disease effect on the relative growth of manufacturing sectors, then we expect an increase in aid to lead to a fall in the relative sectoral share in total industrial value added. To account for the dynamics in the model, the estimation strategy is to run an autoregressive model of the form:

$$\begin{aligned} SHVA_{ijt} = \beta * SHVA_{ijt-1} + \alpha * (ODA/GDP_{jt}) \\ + \alpha_0 * (ODA/GDP_{jt-1}) + \psi * EXPORT_i \\ + \gamma_0 * (ODA/GDP_{jt} * EXPORT_i) \\ + \gamma_1 * (ODA/GDP_{jt-1} * EXPORT_i) \\ + \phi_{ij} + \nu_t + \epsilon_{ijt} \end{aligned} \quad (4)$$

$|\beta| < 1$; for i=1,2,...,28; j=1,2,...,N; and t=1,2,...,7

where SHVA$_{ijt}$ is the dependent variable and measures the share of individual sectoral value added (in manufacturing sector i in country j at time t) in total industrial value added; SHVA$_{ijt-1}$ is the lag of the share of individual sectoral value added in total industrial value added; ODA/GDP_{jt} is the ratio of Net ODA to GDP in country j; ODA/GDP_{jt}*$EXPORT_i$ is the interaction between the ratio of Net ODA to GDP in country j at time t and the *EXPORT* index for industry i; ODA/GDP_{jt-1}* $EXPORT_i$ is the interaction between the ratio of Net ODA to GDP and *EXPORT* index at time $t-1$; ϕ_{ij} are country-sector-specific effects and ν_t are time dummies and ϵ_{ijt} is the error term. γ_0 and γ_1 measure the short-run effects of aid on $SHVA_{ijt}$. $\frac{\alpha+\alpha_0+\gamma_0+\gamma_1}{1-\beta}$ and $\frac{\alpha+\alpha_0}{1-\beta}$ give the total effect of Net ODA on the relative share of sectoral value added in total value added when *EXPORT* index equals one and zero respectively. For evidence of a significant long-run Dutch Disease effect of ODA, the estimated long-run effect should be more negative when EXPORT equals 1 or less positive in case both estimates are positive. The model is specified for 7 five-year averages and reduces to six after first difference.

The disturbances term (ϵ_{ijt}) in equation (6) is assumed to be serially uncorrelated. However, the lagged dependent variable ($SHVA_{ijt-1}$) is correlated with the fixed effects in the disturbance term, so applying OLS to equation (6) will give rise to an upward biased estimate of the coefficient of the lagged dependent variable, β. Although the within group estimator eliminates the individual effects by transformation, in a panel with a short time period, the transformation causes an unavoidable correlation between the transformed lagged dependent variable and the transformed disturbances term, hence, estimating equation (6) with the Within Group estimator will also produce biased estimates of β, (see Nickell (1981)). So, a consistent estimate of β can be expected to lie between the OLS and the Within Group estimates.

The Generalized Methods of Moments (GMM) due to Hansen (1982) is used to estimate equation (4). Particularly, the difference GMM estimators for dynamic panel models, originally developed by Holtz-Eakin et al. (1988) and Arellano and Bond (1991), and the system GMM estimator by Arellano and Bover (1995) and Blundell and Bond (1998), have been shown to give consistent estimates for dynamic panels with few time periods and many individuals.

5.1 Results

Tables 9 reports estimates from the pooled OLS, fixed effects models and two-step difference GMM estimators. All standard errors are heteroskedasticity-robust and consistent in the presence of any pattern of heteroskedasticity and autocorrelation within panels. As expected, the coefficient of SHVA_{ijt-1}, β, is greater than zero but less than one and statistically significant in all columns of Tables 9.

The Arellano-Bond test for serial correlation, AR(1) and AR(2), is reported for models estimated with the OLS and the GMM estimators. The Arellano-Bond test is not reported for models estimated with the fixed effects estimator because the test is not suitable for fixed effects regressions for dynamic models. For dynamic panel models, the null hypothesis for the Arellano-Bond test is no serial correlation in the first differenced residuals. So that, to check for first order serial correlation in levels we look for second order serial correlation in differences and require the test for serial correlation to reject in AR(1) but fail to reject in AR(2). AR test results reported in Columns 3, 6, 9 and 12 show this pattern. The ratio of Net ODA to GDP is treated as predetermined, that is, current Net ODA maybe correlated with all past realizations of the error term, ($\mathbb{E}(\text{ODA/GDP}_{jt}, \epsilon_{js}) \neq 0$ for s < t) (see Arellano and Bond (1991)). The Sargan test for the validity of over-identification in models does not reject the over-identifying restrictions in any of the GMM estimated models.

The parameter of interest here is γ_0, which is the coefficient of the interaction between Net ODA/GDP_{jt} and EXPORT_i. It captures the relative sensitivity of the share of individual sectoral manufacturing value added in total manufacturing value added to changes in the ratio of net ODA to GDP *ceteris paribus*. Parameter estimates computed from the two-step difference GMM estimator are all positive, but not statistically significant.[8] These estimates suggest a positive relationship between Net ODA and the relative shares of *EXPORT* traded sectors' value added in total manufacturing valued added. On the other hand the aggregate or long-run effect of the ratio of Net ODA to GDP on the relative shares of both *EXPORT1* and *EXPORT2* sectors is positive when *EXPORT1/EXPORT2* indexes take on the value one but negative otherwise. Although

[8]Two-step difference GMM estimation is computed with the *XTABOND2* command in *STATA*, see Roodman (2009).

these estimates are not statistically significant, their magnitudes and signs do not suggest any pattern of a Dutch Disease. Again, although not statistically significant, the long run estimates rather suggest a negative long run relationship between the ratio of Net ODA to GDP and the share of individual sectoral manufacturing value added in total manufacturing value added when EXPORT1/EXPORT2 indexes are zero.

This paper has shown that the qualitative implication of Net ODA inflows for relative changes in traded manufacturing sectors depends on the sample size and the identification strategy. In the case of remittance inflows, the results provide robust evidence to support the argument for a positive effect of remittance inflows on the relative growth of manufacturing sectors such as textiles, clothing, leather products and footwear, regardless of identification strategy.

Table 9: Aid and the Dutch Disease - GMM

Dependent Variable: Share of individual sectoral value added in total value added ($SHVA_{ijt}$)						
	OLS	FE	DIFF GMM (Two-step)	OLS	FE	DIFF GMM (Two-step)
$SHVA_{ijt-1}$	0.925***	0.357***	0.420***	0.925***	0.356***	0.426**
	(0.017)	(0.062)	(0.147)	(0.017)	(0.062)	(0.168)
ODA/GDP_{jt}	-0.002	-0.015	-0.137	-0.002	-0.013	-0.106
	(0.012)	(0.014)	(0.823)	(0.014)	(0.014)	(0.192)
ODA/GDP_{jt-1}	0.016	0.013	-0.062	0.006	0.004	0.0256
	(0.014)	(0.019)	(0.443)	(0.016)	(0.018)	(0.110)
ODA/GDP_{jt} *	0.002	0.018	0.258			
EXPORT1 $Index_i$	(0.023)	(0.025)	(1.513)			
ODA/GDP_{jt-1} *	-0.035	-0.036	0.157			
EXPORT1 $Index_i$	(0.027)	(0.029)	(0.879)			
EXPORT1	0.002**					
$Index_i$	(0.001)					
ODA/GDP_{jt} *				0.006	0.044	0.694
EXPORT2 $Index_i$				(0.029)	(0.040)	(0.999)
ODA/GDP_{jt-1} *				-0.050	-0.063*	-0.067
EXPORT2 $Index_i$				(0.032)	(0.038)	(0.654)
EXPORT2				0.0006		
$Index_i$				(0.002)		
AR(1) test (P.value)	0.68		0.023	0.42		0.044
AR(2) test (P.value)	0.16		0.736	-1.42		0.637
Sargan Test (P.value)			0.131			0.730
No. of Instruments			26			26
Long-run effect of Net ODA when:						
EXP1/EXP2 Indexes=1	-0.250	-0.032	0.373	-0.527	-0.043	0.951
Long-run effect SE	0.158	0.036	1.694	0.218	0.064	1.73
EXP1/EXP2 Indexes=0	0.185	-0.004	-0.343	0.054	-0.014	-0.140
Long-run effect SE	0.142	0.033	1.930	0.123	0.027	0.421
Time	7	7	7	7	7	7
Countries	42	42	39	42	42	39
No. of groups			990			990
No. of Obs.	4306	4306	3187	4306	4306	3187
Country_sector	no	yes	yes	no	yes	yes
year_dummies	yes	yes	yes	yes	yes	yes

Standard errors are robust and reported in parenthesis with *, ** and *** representing 10%, 5% and 1% significance levels respectively. 'FE' is fixed effects estimation. GMM results are two-step difference estimates with consistent heteroskedastic standard errors and test statistics. AR(1) and AR(2) are test for first and second order serial correlation in the first difference residuals (null hypothesis: No serial correlation). P.values from Sargan test are reported. The Sargan test the validity of the over identification restrictions in the model (null hypothesis: instruments are valid). $SHVA_{ijt}$ is the share of value added in sector i in country j at time t in total industrial value added in country j at time t. ODA/GDP_{jt} is the ratio of Net ODA to GDP in country j averaged over five years. EXPORT1 index is a dummy that takes on a value 1 if an industry's ratio of exports to value added is greater than the median value, and 0 otherwise. *EXPORT2* index is a dummy that takes on a value of 1 for ISIC sectors 321-324, and 0 otherwise.

6 Conclusion

This paper contributes to the literature on the relationship between foreign transfers and the relative growth of traded manufacturing sectors. It re-examines the argument that the Net ODA/NAT or remittance flows have a “Dutch Disease” effect on traded manufacturing sectors in aid and remittance-dependent economies. The findings from this study do not show strong evidence for a Dutch Disease effect of aid as suggested by RS. Whereas the Rajan and Subramanian (2011) conclusion might be robust for the specific sample and estimation methods they employed, in general, there is less robust evidence to support the argument for a negative effect of Net ODA on the relative growth of manufacturing sectors with a new, extended data set.

Estimates computed from the pooled OLS estimator are not only statistically insignificant but also suggest that the Net ODA-manufacturing growth relation can be either negative or positive depending on the *EXPORT* index under consideration. Also estimates from fixed effects models and GMM estimators predominantly suggest a statistically insignificant positive relationship between Net ODA and the relative growth of manufacturing sectors. Again the computed long-run effects of Net ODA do not only show no evidence of Dutch Disease, but the estimates also show possible positive long-run effects of Net ODA on the share of individual sectoral manufacturing value added in total manufacturing value added when *EXPORT1/EXPORT2* indexes take the value one.

This study also assessed the Dutch Disease effect of remittance flows to developing countries. The findings show that remittance flows have a positive effect on the relative growth of traded manufacturing sectors. The estimates are relatively robust to different sensitivity checks. Predominantly, the estimates from the fixed effects estimator also indicate a positive and statistically significant remittance-manufacturing growth relation, particularly in manufacturing sectors where more developing countries have some comparative advantage (textiles, wearing apparel, leather products and footwear).

The mixed results from the new, extended data set for the evidence of a Dutch Disease effect of aid may be due to the lack of data sets covering long periods of time from aid-dependent developing countries. As more data on aid and other economic indicators from developing countries become available, important issues surrounding the aid-manufacturing growth relation can be revisited. But until then we should be mindful of over-generalizations from the research carried out to date.

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Appendix

Table 10: Effect of Net Aid Transfers on Industrial Sectoral Growth - Pooled OLS

Dependent Variable: $Growth_{ijt}$				
Models	1	2	3	4
Initial share Value $added_{ijt}$	-0.110**	-0.157**	-0.112***	-0.158**
	(0.044)	(0.069)	(0.043)	(0.069)
NAT/GDP_{jt}* EXPORT1 $Index_i$	-0.178	-0.362**		
	(0.172)	(0.150)		
NAT/GDP_{jt}	-0.296***		-0.388***	
	(0.108)		(0.098)	
EXPORT1 $Index_i$	0.007			
	(0.011)			
NAT/GDP_{jt}* EXPORT2 $Index_i$			0.180	-0.007
			(0.187)	(0.157)
EXPORT2 $Index_i$			0.054	-0.077
			(0.186)	(0.151)
year dummies	yes	yes	yes	yes
country dummies	no	yes	no	yes
sector dummies	no	yes	no	yes
Observations	2517	2517	2517	2517
R^2	0.064	0.188	0.064	0.183

All estimates are based on pooled OLS estimator. Robust Standard Errors are reported in parenthesis below the coefficient estimates. *, ** and *** represents 10%, 5%and 1% level of significance respectively. Initial industrial share of industry i in country j refer to the share in total manufacturing value added. NAT/GDP_{jt} is the ratio of Net Aid Transfers to GDP in country j averaged over the period. EXPORT1 index is a dummy that takes on a value of 1 if industry i's ratio of exports to value added is greater than the median value and 0 otherwise. EXPORT2 index is a dummy that takes on a value of 1 for ISIC sectors 321-324, and 0 otherwise. All equations include country and industry fixed effect.

Table 11: The Effect of Net Aid Transfers on Manufacturing growth - FE

Dependent Variable: Growth_{ijt}								
Models	1	2	3	4	5	6	7	8
Initial share	-0.580***	-0.591***	-0.527**	-0.526**	-0.581***	-0.591***	-0.528**	-0.526**
Value added$_{ijt}$	(0.215)	(0.210)	(0.222)	(0.215)	(0.214)	(0.209)	(0.221)	(0.214)
NAT/GDP$_{jt}$			-0.470***	-0.460***			-0.627***	-0.601***
			(0.176)	(0.174)			(0.172)	(0.172)
NAT/GDP$_{jt}$*	-0.153	-0.119	-0.278	-0.252				
EXPORT1 Index$_i$	(0.291)	(0.295)	(0.308)	(0.311)				
NAT/GDP$_{jt}$*					0.265	0.250	0.156	0.135
EXPORT2 Index$_i$					(0.315)	(0.346)	(0.352)	(0.375)
N	2520	2520	2520	2520	2520	2520	2520	2520
Country_sector_fe	yes	yes	yes	yes	yes	yes	yes	yes
country_year_fe	yes	yes	no	no	yes	yes	no	no
Sector_year_fe	yes	no	yes	no	yes	no	yes	no
year_dummies	yes	yes	yes	yes	yes	yes	yes	yes

All equations are based on fixed effects estimations with 10 year averages from 1970-1999. Cluster-robust standard errors and reported in parenthesis with *, ** and *** representing 10%, 5% and 1% significance levels respectively. All Equations include country_sector pair fixed effects and year dummies and year and/or industry and year fixed effects. In addition, Models 1 & 5 (general model) include interaction of country_year and sector_year fixed effects. Initial Industry share$_{ijt}$ refers to the share of industry i in country j as a share of total manufacturing sector valued added in country j at the beginning of the period.NAT/GDP$_{jt}$ is the ratio of Net Aid Transfers to GDP in country j averaged over the period. *EXPORT1* index is a dummy that takes on a value 1 if an industry's ratio of exports to value added is greater than the median value, and 0 otherwise. *EXPORT2* index is a dummy that takes on a value of 1 for ISIC sectors 321-324, and 0 otherwise

Appendix Table 1a: Description of variables and data sources

Variable Names	Definition	Source
Domestic prod. industrial value added	This measures the portion of sales that is not accounted for by the use of inputs and supplies from other industries.	INSTAT2 UNIDO(2006)
Growth_{ijt}	Industry's $i's$ annual growth rate of value added in country j, averaged over five or ten years	calculated using INSTAT2 UNIDO(2006)
Initial Indust. share_{ijt}	Industry $i's$ share in country $j's$ total value added at beginning of five or ten-year averaging sample	calculated using INSTAT2 UNIDO(2006)
EXPORT1 Index_i	A dummy that takes a value of 1 if industry i has a ratio of exports to value added that exceeds the industry median value. For each industry, the average ratio of exports to value added is calculated using a group of developing countries	Rajan and Subramanian (2011)
EXPORT2 Index_i	A dummy that takes a value of 1 for four textiles and leather industries (ISIC 321-324)	Rajan and Subramanian (2011)
Net official development assistance (ODA)	Disbursement flows made to countries and territories on DAC list (In constant 2010 US$)	OECD-DAC database via The World Bank website
Aid/GDP_{jt}	Annual ratio of aid to GDP in country j at time t	Calculated using ODA
Remittances	This comprise personal transfers and compensation of employees. Personal transfers include all current transfers between resident and nonresident individuals	WDI (2013)
USA PPI	This measures average change in prices received by domestic producers for their output	IMF's International Statistics Database (2013)

Appendix Table 1b: Description of 3-digit ISIC codes

ISIC	DESCRIPTION	Export 1 index	Export 2 index
311	Food products	1	0
313	Beverages	0	0
314	Tobacco	0	0
321	Textiles	1	1
322	Wearing apparel except footwear	1	1
323	Leather products	1	1
324	Footwear exc. rubber or plastic	1	1
331	Wood products except furniture	1	0
332	Furniture except metal	0	0
341	Paper and products	0	0
342	Printing and publishing	0	0
351	Industrial chemicals	1	0
352	Other chemicals	0	0
353	Petroleum refineries	1	0
354	Mis. petr. and coal products	1	0
355	Rubber products	0	0
356	Plastic products	0	0
361	Pottery china earthenware	0	0
362	Glass and products	0	0
369	Other non-metallic mineral products	0	0
371	Iron and steel	0	0
372	Non-ferrous metals	1	0
381	Fabricated metal products	0	0
382	Machinery except electrical	1	0
383	Machinery Electric	0	0
384	Transport equipment	1	0
385	Professional and sci. equipment	1	0
390	Other manufactured products	1	0

Source: Rajan and Subramanian (2011)

Appendix Table 1c: Country groups and % of Aid to GDP received.
(+ denotes countries included in the RS core sample and replication sample)

Countries	**ISO** Code	**WB*** **Class.**	**Period**	**Aid/GDP** (%)
Bangladesh+	BGD	LI	1970s	5.82
			1980s	6.47
			1990s	4.56
Bolivia+	BOL	MLI	1970s	3.06
			1980s	5.37
			1990s	9.66
Botswana+	BWA	MUI	1980s	8.16
Burkina Faso	BFA	LI	1970s	8.70
			1980s	11.57
Cameroon+	CMR	LI	1970s	4.30
			1980s	2.91
			1990s	5.03
Central Afr. Rep.	CAF	LI	1970s	10.44
			1980s	13.80
China	CHN	MLI	1980s	0.35
			1990s	0.47
Congo Rep. of+	COG	LI	1970s	6.39
			1980s	4.59
Costa Rica+	CRI	MLI	1970s	1.42
			1980s	3.70
			1990s	2.02
Cote D'Ivoire+	CIV	LI	1970s	2.43
			1980s	2.25
			1990s	8.58
Cyprus	Cyp	HI	1970s	7.26
			1980s	1.54
Dominican Rep.	DOM	MLI	1970s	1.64
			1980s	1.96
Ecuador	ECU	MLI	1970s	1.38
			1980s	1.64
			1990s	1.51
Egypt+	EGY	MLI	1970s	11.50
			1980s	5.07
			1990s	6.84
El Salvador	SLV	MLI	1970s	1.54
			1980s	6.41
			1990s	3.54
Ethiopia+	ETH	LI	1990	10.16
Fiji+	FJI	MLI	1970	3.18
			1980s	3.17
			1990s	3.41
Ghana+	GHA	LI	1970s	2.88
			1980s	4.66
Guatemala+	GTM	MLI	1970s	1.20
			1980s	2.75
Honduras+	HND	MLI	1970s	2.61
			1980s	6.68
			1990s	10.39
India+	IND	LI	1970s	1.15
			1980s	0.78
			1990s	0.55
Indonesia+	IDN	LI	1970s	2.79
			1980s	1.50
			1990s	1.40
Israel	ISR	HI	1970s	3.74
			1980s	4.44
			1990s	2.31
Jamaica+	JAM	MLI	1980s	5.55
			1990s	3.20
Jordan+	JOR	MLI	1970s	25.61
			1980s	16.34
			1990s	9.80
Kenya+	KEN	LI	1970s	4.06
			1980s	7.55
			1990s	8.46
Korea	KOR	LI	1970s	2.39
Madagascar+	MDG	LI	1970s	3.51
			1980s	7.80
Malawi+	MWI	LI	1970s	9.72
			1980s	14.64
			1990s	26.36
Malta	MLT	MUI	1970s	6.06
			1980s	2.29
Pakistan+	PAK	LI	1970s	4.68
			1980s	3.05
			1990s	2.54
Panama	PAN	MUI	1970s	1.71
			1980s	1.29
			1990s	2.04
Papua New Guinea+	PNG	MLI	1970s	18.09
			1980s	11.50
Paraguay	PRY	MLI	1970S	2.64
Peru	PER	MLI	1980s	1.59
Philippines+	PHL	MLI	1970s	1.46
			1980s	1.80
			1990s	2.15
Poland	POL	MUI	1990s	1.99
Senegal+	SEN	LI	1970s	6.67
			1980s	11.47
			1990s	11.78
Sri Lanka+	LKA	MLI	1970s	3.41
			1980s	8.71
			1990s	5.05
Swaziland+	SWZ	LI	1970s	6.99
			1980s	6.28
Syrian Arab Rep.	SYR	MLI	1970s	10.87
			1980s	6.14
			1990s	3.23
Tanzania+	TZA	LI	1980s	19.76
			1990s	18.35
			1980s	11.18
Togo	TGO	LI	1970	9.98
Tunisia+	TUN	MLI	1980s	2.8
			1990s	2.23
Zimbabwe	ZWE	LI	1980s	3.30
			1990s	6.52

*World Bank Classification of economies by income and region (2000)
LI-Low income
MLI-Middle lower income
MUI-Middle upper income
HI-High income

Appendix Table 1d: Country groups and % of Remittance to GDP received

Countries	**ISO Code**	**WB[*] Class.**	**Years**	**Remit** GDP (%)	**Countries**	**ISO Code**	**WB Class.**	**Years**	**Remit** GDP (%)
Algeria	DZA	MLI	1970s	2.41	Israel	ISR	HI	1970s	1.83
								1980s	1.66
			1990s	2.37				1990s	1.75
Bangladesh	BGD	LI	1980s	2.70	Jamaica	JAM	MLI	1970s	2.95
			1990s	3.05				1980s	3.60
								1990s	7.59
Barbados	BRB	MUI	1970s	2.23	Jordan	JOR	MLI	1970s	17.51
			1980s	1.44				1980s	19.51
			1990s	3.15				1990s	18.82
Botswana	BWA	MUI	1980s	3.95	Kenya	KEN	LI	1990s	2.24
Burkina Faso	BFA	LI	1970s	5.33	Korea		LI	1970s	2.39
China	CHN	MLI	1980s	0.15					
			1990s	0.20	Malta	MLT	MUI	1970s	5.14
								1980s	2.99
Cyprus	CYP	HI	1970s	6.37	Pakistan	PAK	LI	1970s	5.95
			1980s	2.86				1980s	7.52
			1990s	1.20					
Dominican Rep.	DOM	MLI	1970s	2.16	Panama	PAN	MUI	1980s	1.75
			1980s	2.72				1990s	1.66
Ecuador	ECU	MLI	1990s	2.82	Philippines	PHL	MLI	1980s	2.78
								1990s	5.46
Egypt	EGY	MLI	1980s	10.08	Senegal	SEN	LI	1970s	1.79
			1990s	8.34				1980s	2.16
								1990s	2.95
El Salvador	SLV	MLI	1980s	3.09	Sri Lanka	SLKA	MLI	1980s	5.17
			1990s	10.90				1990s	5.98
Fiji	FJI	MLI	1980	2.20	Swaziland	SWZ	LI	1970s	3.96
			1990s	1.55				1980s	10.90
								1990s	8.73
Greece	GRC	LI	1970s	2.51	Syrian Arab . Rep	SYR	LI	1980s	3.06
			1980s	2.07					
			1990s	2.26					
Honduras	HND	MLI	1990s	2.79	Tunisia	TZA	LI	1990s	3.64
India	IND	LI	1970s	0.71	Turkey	TUR	LI	1970	2.32
			1980s	1.07				1980s	2.71
			1990s	1.69				1990s	1.95

[*] World Bank Classification of economies by income and region (2000)
LI-Low income
MLI-Middle lower income
MUI-Middle upper income
HI-High income