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The Role of Manufacturing**

by

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Quality of Growth and Poverty Incidence in Low Income Countries: The Role of Manufacturing

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Abstract

There has been a growing conversation about the revival of Manufacturing to push back growing inequality and reduce poverty. We discuss the pathways by which a higher share of the Manufacturing sector in GDP may bring about lower poverty incidence while a higher share of Services may have the opposite effect. We first compare the poverty reduction experiences of the Philippines whose growth has been largely Services-led in the last two decades with that of China and Vietnam, whose growth have, for the most part, been Manufacturing-led. We then present evidence based on cross-country panel data for low income countries that the Manufacturing share in GDP exhibits a significant negative association with poverty incidence while the higher Services share exhibits a significant positive association with poverty incidence. Low income countries seeking more inclusive growth may do better if they privilege their Manufacturing sector over the Services sector.

JEL Classification: O14, I3, O5

Key words: quality of growth, low income countries, poverty incidence, industrial structure, manufacturing, services

I. Introduction

Inclusive growth has become a rallying cry among development institutions and practitioners and a pet fixture in economic programs (Rahul et al., 2013; Ranieri and Ramos, 2013; Ianchvichina and Lundstrom, 2009). That economic growth is important for poverty reduction has become canonical since Dollar and Kraay (2004) and Lopez and Serven (2004). But beyond the quantity of growth, the quality of growth may contribute substantially to inclusiveness. By quality of growth we mean which sectors are driving overall growth. Sustainability of growth is, for example, a feature that contributes to inclusion since there is usually a considerable lag between growth and inclusion. The lifting of the prospects of the poor and marginalized is premised on high investment rate being sustained for a considerable time. But at the same time, growth may be sustainable only if it is inclusive. Berg and Ostry (2011) show that growth in economies with greater equality also tends to have more staying power. This nexus takes a long-term perspective. Rahul et al. (2013) develop a macro-social mobility measure of inclusion and show in particular that for emerging and low income countries (143 countries), macroeconomic variables (inflation, output volatility, investment and government consumption), human capital (education) and structural variables (trade openness, FDI) are important determinants of inclusive growth. Ianchivina and Lundstrom (2009), on the other hand, identify the hurdles to inclusive growth, many of which are failures in the inputs markets such as energy, telecoms, transport, and insurance. Many times, behind these failures is governance or institutional failures.

The results, however, do not seem to elucidate the role of industrial structure on inclusiveness. Policy makers in low income countries concerned with stable jobs creation and inclusive growth may want to know which industry sectors to concentrate their limited resources and policy thrust on. There seems to be a renewed excitement in favor of Manufacturing. South Africa has made noises about revitalizing manufacturing (Cape Business News, 09 June 2016). ADB has counseled the Philippines to foster manufacturing for inclusive growth (Usui, 2012) and the Philippines has responded with a Manufacturing roadmap (Aldaba, 2013). India's pitch to the world 'Make in India' is intended to make India a manufacturing destination for foreign investors to rival China. Manufacturing and inclusive growth are becoming increasingly identified as fellow travelers in the global development conversation. We will attempt to give this belief on a sound empirical ground.

Daway and Fabella (2015) has explored the phenomenon earlier identified (Fabella, 2013) as *development progeria* among low income countries: the Service sector share in GDP grows faster than the Manufacturing share in GDP and the economy early on becomes dominated by the Service sector. This phenomenon is normal among mature high-income (OECD) countries facing factor price imperatives. Mature high income economies are associated with lower growth than countries on the convergent path. Low income economies displaying development progeria also seem to grow slowly, if at all, thus precluding a convergence with mature economies. Low income economies not similarly afflicted tend to grow faster, thus have better prospect for convergence. Daway and Fabella (2015) discuss a model showing how the growth of the Non-traded sector is affected by the exchange rate and market and institutional distortions. Using Manufacturing as proxy for the Traded good sector and the Service sector as proxy for the Non-traded goods sector, they found that the share of Manufacturing in low income countries associates significantly with the pro-export bias of the exchange rate (positive),

the ICRG quality of governance (positive), the investment rate (positive), the Power of the Service sector to absorb workers (negative), and the growth of the Service sector (negative). In this paper we enquire about the power of Manufacturing to deliver greater inclusion, thus, more sustained growth. Specifically, we compare the relative strength of Manufacturing and the Service sectors at fostering poverty reduction among low income countries. Ducanes, Daway, Ravago and Fabella (2016) show that for low income countries ($\leq \$10,000$ per capita), lower power cost and more outward-oriented exchange rate, good institutions but also higher CO2 emission are strong correlates of Manufacturing growth.

In Section II we first examine the contrasting cases of the Philippines, on the one hand, and China and Vietnam, on the other, on the nexus between Manufacturing and poverty reduction. In Section III, we present possible theoretic underpinnings that support the nexus. We first discuss a simple two-good (Traded and Non-traded goods) two-input (labor and capital) model where the owners of input labor are poor, while the owners of capital are affluent. We assume CRS technology and that the Traded goods are labor-intensive, while the Non-traded goods are capital-intensive. We show how the rise in the share of the Traded goods sector correlates with lower poverty incidence while the rise in the Service sector does the opposite. However, in view of the heterogeneity of the activities under the Service sector where some activities are associated with the overall competitiveness (infrastructure, power, governance), the effect on poverty reduction is more likely to be ambiguous. We then discuss the Rodrik (2008) hypothesis: institutional and market. In Section III, we test the hypotheses derived.

II. Comparison of the Philippines, China and Vietnam

We start this section with an object comparison of the experience of Vietnam and China in poverty reduction and quality of growth, reflected by the industrial structure. **Figure 1** below shows that poverty fell much more sharply for both China and Vietnam in the past two decades.

Source: The World Bank, World Development Indicators, 22 July 2016

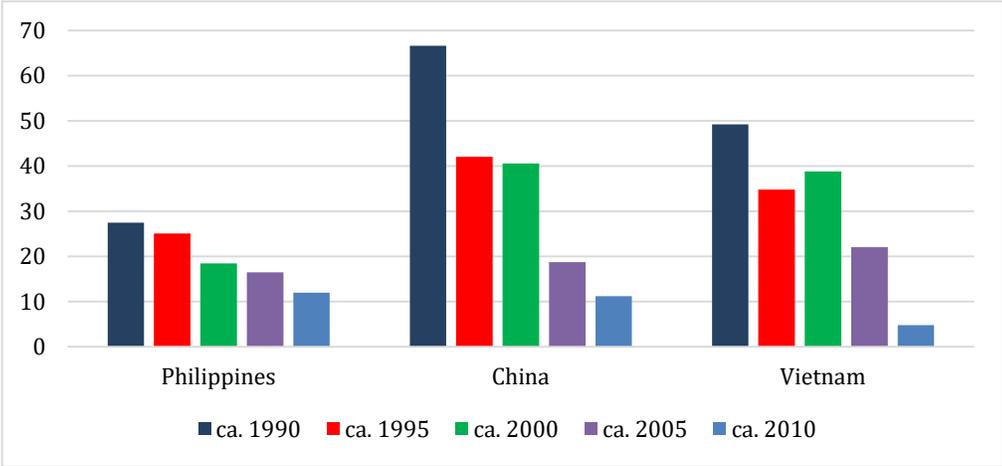


Figure 1. Poverty head count ratio 1990 to 2010 at \$1.90 a day (2011 PPP) (% of population)

Figure 2 suggests possible reasons why: first, the quantitative aspect—those two countries grew relatively faster overall; but second, the qualitative aspect—the pattern of growth may have played a part. In those other two countries, growth was mainly driven by the Manufacturing sector, as opposed to the Philippines, where Services led growth.

Source: The World Bank, World Development Indicators, 22 July 2016

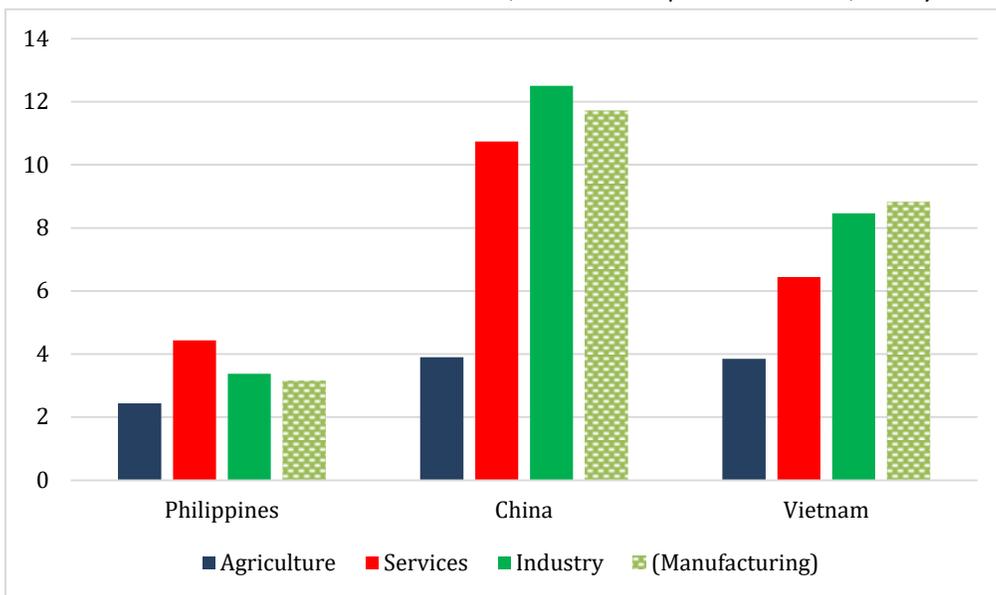


Figure 2. Average annual growth in Sectoral Value Added (1990 to 2010)

III. Quality of Employment and Inclusion by Sectors in a Low-Income Economy: The Case of the Philippines

We look at a particular low income economy, the Philippines, as a case in point. **Table 1** divides the Philippine economy into five subsectors, namely: Agriculture, Manufacturing, Other industry (mining, construction, and utilities), High-skill services (information technology, finance, research and consultancy, and teaching and health care services), and Other Services. This table compares these variables across basic measures of employment quality. These are compared by the quality of employment provided. It shows that Manufacturing beats all others in terms of median basic pay per day apart from High-skill services. Visible underemployment (less than full-time work) is relatively low in Manufacturing, and the share of workers in permanent status is lower only than in the High-skill services sector. Overall, the table suggests that Manufacturing is next only to High-skill services in terms of quality.

Table 1. Measures of quality of employment by sector

Sector	Median basic pay per day	Visible underemployment rate	Workers in permanent status (%)
Agriculture	150	21.0	66.9

Manufacturing	315	8.3	74.0
Other Industry	300	8.2	48.5
High-skill services	576	2.8	87.1
Other Services	250	8.4	76.5
Total	250	11.9	72.0

Source: 2013 Labor Force Survey

The pronounced advantage of Manufacturing over High-skill services is that it is much more accessible to lower-skilled or less-educated workers, and because education is highly correlated with income status, also with workers from poorer households. **Table 2** shows that 86% of first-time workers in Manufacturing are with high school diploma or less education. In contrast, 79% of first-time workers in the high-skill services sector are college graduates.

Table 2 shows the distribution of first-time workers by education, and shows that almost one-fifth of new workers in manufacturing come from the lowest income quintile of households (which is approximately the poor households, by official definition). Industry and Agriculture have a bigger share of first-time workers coming from the lower income quintiles, but as shown earlier, these offer lower quality jobs, on average. Services sector jobs, especially, high-skill services jobs, favor workers from the richer households. Ducanes and de Dios (2016) showed that these patterns hold when comparing export-oriented Manufacturing jobs versus Business Process Outsourcing jobs and overseas jobs—the former are more inclusive in the sense of being more accessible to lower-skilled workers from relatively poorer households.

Table 2. Distribution of first-time workers by Sector and by Education

Sector	HS undergrad	HS grad	College undergrad	College graduate	Total	Total first-time workers
Agriculture	78.6	14.9	4.5	2.0	100.0	108,172
Manufacturing	36.3	50.1	8.1	5.5	100.0	67,193
Other Industry	49.5	28.8	13.3	8.4	100.0	38,143
High-skill services	0.7	9.7	11.1	78.5	100.0	78,394
Other Services	28.7	41.2	15.5	14.6	100.0	443,357
Total	34.8	34.2	12.6	18.4	100.0	735,259

Source: 2013 Labor Force Survey

Table 3. Distribution of first-time workers by Sector and by HH per capita income quintile

Sector	1st Quintile	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile	Total	Total first-time workers
Agriculture	58.0	22.6	13.5	5.3	0.5	100.0	108,172
Manufacturing	19.8	19.6	29.5	22.0	9.1	100.0	67,193
Other Industry	20.7	25.3	22.6	24.7	6.7	100.0	38,143
High-skill services	1.3	9.3	12.3	24.4	52.7	100.0	78,394
Other Services	18.3	17.0	22.8	20.9	20.9	100.0	443,357
Total	22.6	17.7	20.9	19.3	19.5	100.0	735,259

Source: 2013 Labor Force Survey

Thus, if inclusive growth is the paramount concern as it is of the current Philippine and other low income countries' authorities, Manufacturing sector growth—and especially when growing faster than the Services sector—can make a big difference for inclusiveness. The data for the Philippines may also reflect the reality in other low income economies.

IV. The Model

We consider three pathways to lower poverty incidence by way of industrial structure. The first is the classical Heckscher-Ohlin-Samuelson trade model: (i) Consider a standard two-sector economy consisting of the Traded sector, T , and the Non-traded sector, N . There are just two factors in this economy, utilized as inputs in both T and N : Labor L and Capital K . The economy is labor-abundant. We assume further that the owners of L are poor, while the owners of K are affluent. Poverty occurs only among owners of L . These above assumptions are more likely true for low income than for high income countries. Furthermore, T is labor-intensive and N is capital-intensive. Unit of Labor is paid wage w , and Capital is paid interest rate r . Both T and N operate under a CRS technology. This is the familiar two-good two-factor Stolper-Samuelson economy if we assume full employment always. As suggested by the label, T sells its product in the global export market which determines the price of T , p_T . The Stolper-Samuelson theorem states thus: as p_T rises *ceteris paribus*, the returns w of the factor L more intensively used in T will rise, while the returns r of the factor more-intensively used in N will fall. Along the way, the output of T rises while that of N falls. Structurally, the share of T in aggregate national output rises while that of N should fall. Thus, when p_T rises *ceteris paribus*, the wage rate of the poor members of society rises and while the returns to affluent owners of capital falls. Since poverty is found only among the owners of L , poverty incidence should fall. This is only one of the ways by which the structural change can have differential impact on poverty incidence. Note however that the terms of trade is not wholly under the control of local authorities; part of it is—the value of the domestic currency in terms of foreign exchange can be manipulated by the local monetary authorities and change the terms of trade between the Tradable and Non-tradable outputs!

The second pathway goes through the allocation of investment and employs the Rodrik differential sectoral response to market and institutional distortions (Rodrik, 2008; see also Daway and Fabella, 2015): market and institutional failures, including poor governance, will tend to weigh down the traded goods sector more than they do the non-traded goods sector, in that domestic tradable goods have to compete in the global economy with rival tradables from other jurisdictions, some with lower levels of such distortions. Under these distortions, investments will flock towards the Non-traded or Services sectors where the distortion cost can be passed on to consumers. The Non-traded sector will tend to grow faster than the Traded goods sector and, maintaining the factor-intensity, and CRS assumptions of previous Heckscher-Ohlin growth model, this will generate a higher demand for K than for L , resulting in higher r and lower w . The holders of labor assets lose; the holders of capital assets gain. Thus, poverty incidence will tend to rise with a rise in N .

Note that many goods and services produced by many subsectors included in the Services sector—such as power, transportation, insurance, banking and logistics services—also serve as inputs

to the Manufacturing sector. Growth in these subsectors will help boost the Manufacturing sector. They are thus complementary to the latter. This is the complementarity effect of the Service sector on the Manufacturing sector. But in low income countries where capital is scarce, Manufacturing and Services compete for financing—the more the Service sector attracts, the less there is for the Manufacturing sector. This is the substitution effect (non-traded goods are effectively substituted for traded goods). We hypothesize that among low income countries, the substitution effect dominates the complementarity effect. Thus, the growth in the Share of the Service sector will increase poverty incidence.

The third pathway is via the sustainability dimension: Berg and Ostry (2011) showed that growth of economies that exhibit more income equality also tends to be more sustainable. Since there tends to be a lag between growth and poverty reduction, growth that lasts longer also tends to deliver more poverty reduction. If overall economic growth—driven by Manufacturing growth—tends to be more equitable, it will also tend to last longer and thus underpin more poverty reduction than short-lived (boom-bust) growth driven by growth, say, in the Services sector. There is an added dimension: the Service sector, especially the real estate and property development segment, is also associated with boom-and-bust cycles which periodically stymie sustainability.

Our hypotheses: (i) A rise in the share of Manufacturing in GDP reduces poverty incidence and (ii) a rise in the share of the Service sector in GDP increases poverty incidence in low income countries.

V. Evidence from Cross-Country Panel Data

In this exercise, we use the Manufacturing sector as proxy for the Tradeable and the Service sector as the proxy of the Non-tradeable sector. Using a sample of 50 developing economies with GNIs per capita of not more than \$10,000, spanning the period 1983-2013, we first do a simple correlation exercise. **Table 4** gives the result of this exercise. It shows that the percentage share of manufacturing in GDP is negatively correlated with alternative poverty measures. These measures are the poverty headcount ratio—a measure of poverty incidence—which is defined as the proportion of the population that is below the poverty line (either at \$1.90 per day or \$3.10 per day); and the poverty gap—a measure of poverty intensity or depth—which measures the extent to which individuals fall below the poverty line taken as a proportion of the poverty line. The correlation coefficients range from -0.32 to -0.30, suggesting that a larger manufacturing sector contributes to greater poverty reduction in developing economies. While consistent with the first part of our hypotheses, we need to do a more extensive testing.

Table 4. Manufacturing Share in GDP and Poverty Measures

Poverty Measure	Correlation Coefficient
Poverty headcount ratio at \$1.90 a day	-0.32
Poverty gap at \$1.90 a day (%)	-0.31
Poverty gap at \$3.10 a day (%)	-0.32

Source of raw data: World Development Indicators website

To properly test our hypotheses we do a more extensive experiment. To this effect we run a cross country panel data regression of Manufacturing and Service share against various poverty indices, using a sample of 50 low- and lower-income economies with real GNIs per capita of not more than \$10,000 from 1983 to 2013, where each period is an average of five years to minimize the effect of business cycle fluctuations.

Table 5 presents the correlates of poverty indices in system GMM regressions. The first two columns are for poverty gap (\$1.9- and \$3.1) and the second two are for poverty headcount (\$1.9- and \$3.1). This table shows that a higher Manufacturing share associates significantly with lower poverty gap and the poverty head count ratio *ceteris paribus*. Our first hypothesis cannot be rejected. **Table 5** also shows that higher Services share associates significantly with higher poverty gap and poverty headcount ratio. Thus, our hypotheses (ii) cannot be rejected.

Our controls, GNI per capita (*gnipc*) and the Inter-Country Risk Guide (*ICRG*) index, a measure of the quality of institutions, also each associates significantly with lower poverty gap and headcount ratio as expected. A number of period dummies to account for common trend shocks are also included.

Table 5. Correlates of Poverty Gap and Poverty Head Count Ratio: The Role of Manufacturing

	System-GMM			
	Poverty gap		Poverty headcount ratio	
	\$1.9/day	\$3.1/day	\$1.9/day	\$3.1/day
	1	2	3	4
Poverty measure (-1)	0.528	0.685	0.724	0.872
	[0.010]***	[0.011]***	[0.012]***	[0.010]***
Manufacturing size	-0.063	-0.077	-0.155	-0.059
	[0.022]***	[0.029]**	[0.036]***	[0.035]*
Services size	0.106	0.145	0.192	0.262
	[0.009]***	[0.013]***	[0.033]***	[0.025]***
ICRG	-0.042	-0.096	-0.106	-0.258
	[0.008]***	[0.006]***	[0.012]***	[0.013]***
Real GNI per capita	-0.001	-0.001	-0.001	-0.001
	[0.000]***	[0.000]***	[0.000]***	[0.000]***
Number of observations	195	195	195	195
Number of countries	65	65	65	65
AR(2) Arellano-Bond test	0.753	0.715	0.419	0.423
Hansen p-test	0.477	0.54	0.54	0.582
Number of instruments	64	64	64	64

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Note: The set of regressors included Period 2 to Period 6 (dummies) which are not shown.

The message from these cross-country system GMM regressions is straightforward: when targeting poverty reduction in low income countries, policymakers are well-advised to pay attention to

the quality of growth, that is, adopt policies that privilege those sectors that are more pro poor. We have shown here that the Manufacturing has many features that produce pro-poor outcomes. Manufacturing can be rendered the principal engine of growth through policies that (a) directly reduce the distortions, both market and institutional, as for example making the cost of electricity faced by domestic Manufacturing competitive; and (b) compensate for some of these domestic distortions through a more Manufacturing- and tradable- friendly exchange rate policy as suggested by Rodrik (2008). This poverty reduction effort through higher Manufacturing share is necessarily a long-term project as the poverty reduction effect of growth tends to be governed by long gestation periods. But the inclusion impact is also more permanent. These twin policies are familiar as the strategy package adopted by the People's Republic of China in the last quarter century, by Japan before the Plaza Accords and by the East Asian Miracle economies in the Post WWII period.

VI. Summary

For inclusive growth in low income countries, policy makers must pay close attention not only to the quantity of growth (growth of GNP) but also, and more importantly, to the quality of growth. By quality of growth we mean here which industry sector drives the overall growth. We argue that poverty reduction will be higher if the Tradable goods sector is the main driver and lower if the Non-tradables sector is the main driver. In this paper, we use Manufacturing as proxy for the Tradable goods sector, while the Services sector as proxy for the Non-tradables goods sector.

From the two-by-two Stolper-Samuelson model with Tradables being more labor-intensive, and the additional assumption that owners of labor input are the poor members, owners of capital input the more affluent members of the population, we deduce that the owners of labor win out with a rise in the price (terms of trade) of Tradables, thus, leading to a reduction in the incidence of poverty among the poorer owners of labor; coincident with the rise in the price of Tradables is that the share of Tradables in GDP rises while that of Non-tradables falls. The price of Tradables improves with a more Tradable-friendly exchange rate.

Many subsectors in the Service sector—such as power, transportation, and insurance—produce outputs that serve as inputs to the Manufacturing sector. Growth in these subsectors of Services will also boost Manufacturing. They are complementary to the traded goods sector. Likewise, in low income countries capital is scarce so that Manufacturing and the Services compete for financing—the more capital the Services sector absorbs, the less there is for the Manufacturing sector. This is the substitution effect. We hypothesize that among low income countries, the substitution effect dominates the complementarity effect. Thus, the increased share of the Service sector will increase poverty incidence.

From Rodrik (2008), we know that Tradables are more hamstrung than Non-Tradables by institutional and market distortions. In low income economies where these distortions abound, investments tend to flock to the Non-Tradable sector and away from Tradables. Rodrik shows that a more Tradable-friendly exchange rate levels the playing field for the Tradables by compensating for

these distortions and is behind the growth impetus of growth among countries with an undervalued currency.

Berg and Ostry (2011) have shown that the growth of low income economies with better income distribution tend to be more sustainable than growth of economies with worse income distribution. Since increasing share of Manufacturing associates with better poverty reduction, growth driven largely by the Manufacturing sector should also prove more sustainable than growth driven by the Service sector. The improved sustainability of growth drives poverty reduction. This is one other pathway by which the quality of growth impacts poverty reduction.

We test these hypotheses using a cross-country panel data for low-income economies. The result of the system GMM regressions show that (i) Manufacturing share in GDP correlates significantly with lower poverty gap and poverty incidence; and (ii) Services share in GDP correlates significantly with higher poverty gap and poverty incidence. Thus, which industry sector is driving overall growth affects the extent of poverty reduction. Quality of growth in low income economies matter for poverty reduction! Policymakers in low income countries concerned with sustained and inclusive growth are well-advised to privilege Manufacturing (Tradable sector) growth over Services growth.

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