DISSERTATION

WHY PRICES MATTER: TERMS-OF-TRADE, STRUCTURAL CHANGE, AND DEVELOPMENT

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ABSTRACT

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This collection of essays identify a method of incorporating measures of competitive advantage into the Balance of Payments Constrained Growth model. By doing so it is possible to identify the role of price competitiveness in open-economy growth and implications for development policy targeted at structural change are addressed. The three papers build upon each other to highlight the role of price competitiveness in trade for developing countries and how this has evolved over the last half century. Driven by findings that relative prices matter for long run growth more than has been commonly recognized in the balance of payments constrained growth literature, this project presents a methodological contribution for theoretical and empirical investigations of trade led growth and open economy development policy. A new measure of relative prices is presented to measure competitive advantage, and in doing so a discussion regarding development policy is facilitated empirically and narratively.

A novel measure of relative trade prices is devised so as to more accurately measure the foreign prices exporters are competing against. This alternative to terms-of-trade and the real exchange rate compares the relative prices of exports based on the composition of a country's export sector. Similarly, a sectorally weighted price of imports is used relative to the price of domestic goods. The purpose of using these alternative measures is to empirically identify *competitive* advantage and present a superior method of showing the competing prices that determine demand in the global market. Identifying a way to better capture the role of prices as a determinant of export and import demand is important for informing development policy generally targeting export led growth. The optimal policy strategies for emerging open economy countries can be informed by understanding

when price competitiveness in trade matters, which industries to pursue, and how to benefit from global income and demand growth.

The first paper is concerned with the relative price measures used in the balance of payments constrained growth framework. Tests of the balance of payments constrained growth model typically focus on income elasticities of demand in the traded sector. The role of price-competitiveness is treated as negligible and often neglected. This paper presents alternative specifications for the terms-of-trade in conventional Keynesian constant elasticity import and export demand equations. It is shown that by taking into consideration the export prices of foreign competitors and prices of domestic substitutes for imports, relative prices become far more relevant in determining import and export demand and the corresponding equilibrium growth rates in a Keynesian framework. The results suggest policy strategies for developing economies given the absence of domestic substitutes for import goods and the dependence on exports as a source of foreign currency.

Paper 2 builds on the findings of the first by estimating the price and income elasticities of demand for traded goods by sector, income level, and periods. The goal is to highlight where competitiveness is vital for export volume growth, whom is most impacted, and how this has evolved in the last half century. These findings could indicate what export sectors to target while moving up the value added ladder and explain why some countries have experienced deteriorating terms-of-trade leading to vulnerability to balance of payments crises and failure to grow through trade. Investigating these determinants by sector is important because developing countries may be limited in what they can produce for export and domestic consumption – what you export matters. By identifying which sectors price competitiveness is most important for it may be possible to suggest policies to move up the value added ladder based on industrial upgrading targeted at particular industries. Looking at how trade demand elasticities vary between income level and have evolved with structural, and correspondingly global institutional, change can provide insight into how different policies instituted have impacted different groups. Estimating the elasticities by sector can inform development policy by identifying the sectors for which countries should pursue improving comparative advantage as well as recognizing which industries grow faster with increasing world

demand. Along similar lines, investigating the way these determinants of demand vary by income levels it is shown how income level and composition of exports influence policy options for 'development states'. Estimating the demand equations by different periods highlights the structural shifts in the global economy and has strong implications for the impact global institutional change have had on developing countries export led growth potential. The observed impact of the New Global Economic Order has implications for understanding how previously emerging countries have fallen into the middle income trap.

The final paper presents an updated case study comparing the experiences of East Asian and Latin American development in the latter half of the 20th century utilizing the findings from the first two papers. Up until the early 1980s both groups of countries appeared to be on similar growth trajectories, however, Latin America stagnated and has since failed to catch up. Using the empirical anlysis from the preceding papers, the East Asian development strategy is analyzed to show that a complimentary combination of demand and supply side policies implemented by the highly interventionist states effectively harnessed an optimal combination of industrial upgrading – targeted at both import substitution and export oriented growth. Compared to East Asia, it is shown that the Latin American group failed to coordinate complimentary policies that both improved productivity and harnessed global demand growth. Although the tools of complementary state policies and targeted protectionism used in the East Asian Model were not exclusively available to that group, it is argued that the strategy is not replicable in the modern era. Using the insights from paper two – which demonstrate that improving competitive advantage may no longer be a viable target for upward mobility – this is justified on the grounds that the structural change that has occurred since the mid 1990s has impaired the ability of developing countries to implement the strategies used by the East Asian group in the 1960s-1990s.

Collectively, this group of essays address the role of state policy for developing countries as well as the constraints faced by small open economies pursuing export led growth. Looking at individual development experiences and analyzing the effects of structural change in the global economy provides insight to what policy options are available to developing countries while pro

viding potential explanations for why some countries have failed. This paper contributes to the literature by providing new insight into how to investigate the role of competitive advantage in trade in a demand led frame work which also has implications for supply side growth policies.

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I would like to thank my family, friends, and faculty for all their support and patience through this process. You know who you are.

DEDICATION

I would like to dedicate this dissertation to Muv.

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1.1 Introduction and Motivation

Conventional research on open-economy demand-led growth uses a basic measure for terms-of-trade to capture price competitiveness, export prices, P_x, relative to import prices, P_m. This ratio is used in models of both export and import demand. While price competitiveness is a vital determinant of import and export volume, using the terms-of-trade measure is most likely not the most useful method to capture this. Price competitiveness is fundamentally a comparison between prices of a producer and their competition. In discussions of an open-economy it is unreasonable to presume the *relative* prices faced by exporters and importers are the same.

Exporters of a given country trade in different goods than importers and face different competition. Producers of exports face competition from exporters of similar goods in competing countries, whereas import decisions are made taking into consideration the availability of domestic substitutes. The significance of this difference and its significance for policy analysis is highlighted by the distinction between high-income and low-income countries' trade composition.

High-income country exporters tend to specialize in goods that are more technology intensive and require a greater level of industrialization. These goods tend to have high-income elasticities of demand and lower price elasticities, i.e. demand for higher value-added goods is less sensitive to price changes but more sensitive to the quality of the products. It is typically the case that there are fewer global competitors and foreign substitutes. A focus on more technology-intensive production at home reduces dependence on imports for advanced goods; thus these countries tend to import primary and intermediate goods, which tend to be more price elastic. Low-income countries have a significantly different composition of traded goods and face more nuanced constraints

to advancement in production of higher value-added goods. Less developed countries (LDC) tend to lack the industrial base necessary for meeting demand, domestic or foreign, for technologically advanced high-value-added goods. It follows that there is greater dependence on imports for provision of advanced capital and luxury goods. One case made for export-led growth policy is that exports provide the necessary foreign currency for purchase of these more capital intensive import goods.

Although the basic premise of demand-led growth for developing open-economies is an improvement of the trade balance, an equally important policy concern addressed in this paper is predicated on import dependence. Export Oriented Industrialization (EOI) emphasizes the long-run policy objective of moving up the value-added ladder. It is often argued that production of goods with higher income-elasticities of demand can lead to higher long-run equilibrium growth rates. This argument might overlook the intermediate step in economic development of reducing dependence on imports. It is therefore argued here that Import Substitution Industrialization (ISI) policies should be a precursor to export led growth policies.[1] A first goal of this paper is to showcase this argument through providing price measures that better capture trade competitiveness and are relevant empirically. In so doing it becomes apparent that conventional protectionist measures in the import sector – motivated by improvement of the trade balance – are detrimental to sustainable growth for developing economies in the absence of technologically advanced industry and domestic substitutes for high end goods. These results provide evidence for the sequence of development policy initially focusing on ISI so as to sustainably transition toward export-led growth.

1.1.1 Anecdotal Evidence: The 'East Asian Miracle'

The classic development success story, the East Asian Miracle (EAM) refers in general to the strategies implemented in the 1960s through 1980s by Japan, South Korea, and Taiwan, and to a lesser extent Singapore and Hong Kong, the latter four becoming known as the 'Asian Tigers'.

[1]This is by no means a new argument. For some of the benchmark work regarding this discussion see [insert citations]

Chang (2003) refers to this as 'Japanese style strategic industrial policy', as the latter countries incorporated elements of Japanese development success a decade or so behind.

The unique success of the EAM led to a wave of literature seeking to explain the reason these nations succeeded while so many other regions failed. In the early 1990s the success was attributed to free markets at work (World Bank 1993), but this analysis was quickly revised, largely by contributions from Krugman (1994) and Page (1994). East Asian 'development states' took an approach focusing on the long game with a combination of selective protectionism and acceptance of the need for foreign trade at early stages of development. The recognition of import dependence stemmed from the shortage of industries capable of producing the capital goods necessary for production of exports and meeting the *domestic* demand for consumption and investment goods. The prior issue required certain types of infant industry protection given the lack of competitiveness in production. The industries to be targeted highlight the heavy hand of 'strategic policy' by the 'development state' and its long game strategy.

Targeted industries were propped up by the development state with a variety of policies to accommodate the need for exports to provide currency to import, and the need of imported capital goods to produce exports. Tariff rebates were provided for imported inputs used in the production of exports, otherwise unavailable domestically. Subsidies and competition restriction were offered to provide the protection needed for infant industries to grow to competitive levels. Part of these subsidies was targeted at assimilating foreign technology. The development states recognized that human capital accumulation was vital to complement advanced production and social provisions were heavily targeted at education. An additional component of the industrial targeting was preferential lending and 'forced' private savings (not in the Post-Keynesian sense). Some countries within this group put strict restrictions on consumption of foreign luxury goods and made private loans for household consumption difficult to attain. This ensured that the foreign currency used for imports was for industrialization purposes. It has been argued that this development model was only successful in the East Asian states due to high cultural savings propensities, but the savings habits were as much imposed by the state as cultural. With the high savings, much of the targeted

investment could be financed primarily by state-owned banks, which lent to targeted industries on preferential terms.[2] All of this can be boiled down to a simplified policy of targeting *accumulation* for the long goal of reducing dependence on foreign goods and increasing export potential while allowing infant industries to survive. In the context of this paper the objects of concern are those that enabled these infant industries to produce competitively and keep prices down. It is important for motivating the following modeling adaptations within this narrative to highlight the East Asian development states started with ISI strategy and transitioned towards EOI as infrastructure allowed movement up the value-added ladder.

1.1.2 Demand-Led Growth through the BPCG Lens

The Balance-of-Payments Constrained Growth (BPCG) model has been a workhorse of Keynesian international economics since its formalization by Thirlwall (1979)[3]. In its baseline form, BPCG states that a nation's long-run growth rate is determined by its export growth and income elasticity of demand for imports. It implies that *growth in an open-economy is exogenous*; export growth is determined by global income growth with income elasticity of demand for exports. While rooted in accounting identities, the model requires an assortment of assumptions to be made "dynamic". The first assumption is the functional form of the export and import demand equations; to derive the equilibrium growth rate consistent with BPCG, known as Thirlwall's law, it is necessary to impose a balanced trade condition and to treat movements in the international terms-of-trade as negligible. The fundamental equilibrium condition – necessary but never directly present within the framework – is that export and import *supply* are perfectly elastic. The implication is that "relative prices *in domestic currency terms* [are rendered] *exogenous*" (Razmi, 2015, p.1584). As a result, Razmi argues that empirical tests of the BPCG model are tests of whether trade is balanced in the long run.

[2] An additional element that highlights the long-run perspective is the source of savings; most of these countries put strict restrictions on foreign capital flows and particularly limited FDI. This became vital in later stages of development, as ownership of the means of production was almost entirely domestic. One condition of IMF bailouts following the Asian Financial Crisis of 1997 was allowing greater foreign ownership of national means of production

[3] Thirlwall's Law is in essence a dynamic version of Harrod's (1939) [static] trade multiplier.

The BPCG model tests long-run equilibrium growth rates for open economies taking into consideration export and import demand. Export and import demand equations are determined by terms-of-trade, $P_T = \frac{P_x}{P_m}$, foreign income, Z, and domestic income, Y, respectively. The volume demanded is determined by the price-elasticity of demand for exports, η, and imports, ψ, and the foreign and domestic income-elasticities of demand for exports, ε, and imports, π. In the baseline model the terms-of-trade for export demand determination is export prices relative to import prices measured in domestic currency, $\frac{P_x}{P_m E}$, where E is the foreign exchange rate. For the import demand equation it is the reciprocal. Solving for the long-run equilibrium growth rate involves imposing balanced trade, taking logs, differentiating with respect to time and solving for Y. The corresponding long-run equilibrium growth rate consistent with the balance of payments constraint, known as Thirlwall's Law, is

$$\hat{Y} = ((1 + \psi + \eta)(\hat{P}_x - \hat{P}_m - \hat{E}) + \varepsilon\hat{Z})\frac{1}{\pi}, \tag{1.1}$$

where hats denote growth rates. The succeeding step assumes that in the long-run changes in the terms-of-trade are negligible, i.e. $(1+\psi+\eta)(\hat{P}_x-\hat{P}_m-\hat{E}) = 0$, and thus the long-run equilibrium growth rate of a country constrained by current account balance is:

$$\hat{Y} = \frac{\varepsilon\hat{Z}}{\pi}.^{4} \tag{1.2}$$

What this implies is that the long-run growth rate of an economy is determined solely by foreign and domestic income elasticities of demand for exports and imports in conjunction with the growth rate of world income. Setting up demand equations with the terms-of-trade this way ensures that $(1 + \psi + \eta)$ is the coefficient in front of $\hat{P}_x$, $\hat{P}_m$ and $\hat{E}$. The argument of this paper is that the corresponding specification can be misleading both from a behavioral and an accounting standpoint.

First, export and import demand equations are behavioral in nature. The role of terms-of-trade in these equations is to capture the effect that export price have on export demand. When choosing

[4]Perraton (2003) referred to equations (1) and (2) as the 'strong' and 'weak' versions of Thirlwall's Law.

to consume a country's exports, foreigners compare between the price of goods from that country compared to the prices of the same goods from competing exporting countries. These prices are not the same as the import prices faced by the domestic country, yet these prices are used in conventional terms-of-trade. Similarly, domestic consumers choose between purchasing imports at those prices and domestic substitutes at domestic prices. The prices of domestic substitutes they are comparing to are not the same prices as those of the country's export, though that is what is used in the equation of import demand determination. The terms-of-trade measure is predominantly used in BPCG literature. Also commonly used in other trade literature is the real exchange rate (RER), using foreign prices, P_f, relative to domestic prices, P_d. The RER does more accurately capture competitiveness of prices between goods produced domestically and abroad, *but* it assumes one good for imports and exports.[5]

Secondly, the balanced trade condition used to solve the equilibrium, $P_x X = P_m EM$, measures the total *value* of exports and imports. As an accounting identity it necessarily uses prices received for the volume of exports, capturing inflow, and the prices paid for the volume of imports, outflow; this is where terms-of-trade is a necessary and appropriate measure.

The trade balance is determined by: a) the quantity of exports and imports as reflected by the demand equations, and b) the net value of those quantities. Consider a drop in the price level of exports relative to foreign competitors. The quantity of exports demanded will rise, but the value of each unit and the corresponding inflow will fall. This is a classic price-versus-quantity effect tradeoff. Which effect wins out depends on the price elasticities of demand for imports faced by domestic and foreign consumers. The *total* effect on output from a change in import prices should not necessarily be of the same magnitude as that of a change in export prices, though baseline specifications using terms-of-trade dictate it is the same, $(1 + \psi + \eta)$. This simplified treatment of prices does not accurately capture determination of the trade balance at a theoretical level taking into consideration economic fundamentals, although it is necessary for deriving the elegantly simple version of Thirlwall's Law. Another relevant shortcoming is that this seriously

[5]In reality the only scenario this relative price ratio is faced is by individuals traveling abroad.

limits discussion of development policy. Many papers have effectively looked at the income-elasticities of demand given what a country exports by disaggregating by sector so as to suggest industries to target in export led growth. But pricing decisions are also important when considering what to export. This is especially true when considering that low-income countries have to take price competitiveness more seriously into account.

There are two methods of addressing these shortcomings. First, the import price level in the export demand equation is replaced with a world export price level, P_r, a weighted index that captures the price levels of competing exports from the rest of the world (ROW) taking into consideration the sectoral composition of a countries exports. The purpose is to highlight that foreign consumers are choosing to get their imports from one country or another and face different prices from different exporters.Similarly, in the import demand equation export prices are replaced with prices of domestic substitutes P_d. Consumers at home choose to buy imports or goods produced at home, given the availability of domestic substitutes. Secondly, relative price ratios are included in the demand equations to capture the effect of competitiveness with other exporters on the trade balance when deriving the long-run equilibrium growth rate consistent with the balance of payments constraint. Hence, the external price ratio, $P_e = \frac{P_x}{P_r}$, captures the effect of a country's *competitive* advantage in exports, while the internal price ratio, $P_i = \frac{P_m}{P_d}$, captures the effect of *competitive* advantage of domestic producers (of domestically absorbed goods). It is then possible to distinguish the effects of competitiveness from the effects of trade *value* on the national account, determined the terms-of-trade, P_T, which captures a countries *comparative* advantage.

1.2 Background and Literature

The equilibrium BPCG rate is a fundamentally demand-side determined rate of growth, and a *long-run* rate at that. If in the long-run the current account must be balanced, then some equilibrating mechanism must be acting to meet that requirement. Countries cannot run sustained trade deficits and the most obvious mechanism to achieve the balance of payments equilibrium is through

exports adjusting.[6] Although simple in its design, the baseline model – and the equilibrium growth rate delivered – lends itself to broad modification and extensions. The purpose of this section is to: a) present the basics of the model, b) highlight the fundamentals with reference to the common criticisms, and c) present a summary of the papers motivating the main extension proposed.

1.2.1 Keynesian Convention and Baseline Model

Models following BPCG convention typically begin with the Kaldorian export and import demand equations:

$$X = \left(\frac{P_x}{P_m}\right)^{\eta} Z^{\varepsilon} \tag{1.3}$$

$$M = \left(\frac{P_m}{P_x}\right)^{\psi} Y^{\pi} \tag{1.4}$$

where $\eta < 0, \psi < 0$ are price elasticities of demand, $\varepsilon > 0, \pi > 0$ are income elasticities of demand, X and M are gross exports and imports, P_x and P_m are domestic price of exports and foreign price of imports, and Z and Y are foreign and domestic income levels. For modeling simplicity, E is set to unity; this is justified in the empirical section by using all measures in terms of constant world prices. Taking the natural logs, differentiating with respect to time, and solving for Y assuming balanced trade (i.e. $P_x X = P_m M$) now yields the equilibrium condition:

$$\hat{Y} = ((1 + \psi + \eta)(\hat{P}_x - \hat{P}_m) + \varepsilon \hat{Z})\frac{1}{\pi}, \tag{1.5}$$

On its own, equation (5) contains a great deal of information. The first element on the right hand side, $(1+\psi+\eta)$, implies that if the sum of the absolute values of price elasticities of demand are greater than 1 then an improvement in the terms-of-trade will lower the equilibrium growth rate consistent with the balance of payments constraint. Conversely, if the terms-of-trade improve alone, i.e. $(\hat{P}_x - \hat{P}_m) > 0$, the growth rate will increase. Considering these two elements together is

[6] There is a strand of literature taking into consideration sustained balance of payments deficits financed by capital inflows. The baseline method follows Thirlwall and Hussain (1982) who include the financial account into the trade balance.

the implication of the Marshall-Lerner condition; a nominal depreciation will improve the growth rate provided the sum of the price elasticities exceed unity. *The major caveat here is that a change in the terms-of-trade must be sustained*. The growth rate determined in the BPCG model is a *long-run* equilibrium one; therefore a one-time devaluation will not have a sustained effect on the growth rate consistent with the balance of payments constraint. In order for price or exchange rate changes to affect equilibrium growth, they must be sustained. This provides the justification for the leap to [the weak version of] Thirlwall's Law, namely equation (2). The term $\varepsilon\hat{Z}$ captures the dependence of one country's growth rate on that of the rest of the world (ROW). Its magnitude is determined by the income elasticity of demand, ε, for the country's exports. Finally, there is an inverse relationship between a country's growth rate and its taste for imports, π.

When fluctuations in the terms-of-trade are assumed to be negligible Thirlwall's law becomes:

$$\hat{Y} = \frac{\epsilon\hat{Z}}{\pi} = \frac{\hat{X}}{\pi}.$$

If a nation's growth rate is determined by the world demand for its exports and income elasticity of demand for imports, then a country's growth rate is entirely exogenous. This feature undermines the role of open-economy development policies to grow out of poverty. The other major implication in this simple law is that the supply of exports is infinitely elastic; in other words there is no long-run binding constraint from potential output, capacity limitations, or utilization of resources.

1.2.2 Extensions in the Literature

While the extensive literature has found seemingly endless ways to build on this model this review will focus on two themes: the composition of industry in determining trade demand and the supply constraints to long-run growth. The latter takes into consideration capacity as well as productivity. It can be argued that productivity – to the extent that it influences competitiveness – is equally a determinant of demand as it is supply constraint.

Uneven Development: What You Export (and Import) Matters

Applying a center-periphery model (for example Prebisch (1959), Dixon and Thirlwall (1975), Seers (1962) among many others) to equation (2) shows that there are clear winners and losers when there is specialization in certain sectors across countries. Dutt (2002) and Davidson (1990) point out that less-developed countries producing primary goods for which there is a low-income elasticity of demand will be doomed to a lower growth rate than a more advanced economies producing mostly manufactured goods with higher income elasticities of demand.

A perfect example of import-substitution and export-promotion policies applied to this problem is Araujo and Lima's (2007) multi-sector model. The baseline BPCG model above aggregates income elasticities showing that countries with low ε and high π are constrained to lower growth rates. Effective EOI and ISI growth policies would shift production towards export industries with higher income-elasticies – moving up the value-added ladder as some would suggest – and correspondingly seek policies such that import demand would shift toward less income elastic goods. The authors captured this by taking the baseline model and decomposing the elasticities by sector. Thirlwall's law, equation (2), then becomes:

$$\hat{Y} = \frac{\sum_{j=1}^{s} w_{xi}\varepsilon_j \hat{Z}}{\sum_{j=1}^{s} w_{mj}\pi_j}$$

where subscripts i indicate industry $j = 1, ..., s$ and w_{xj} and w_{mj} capture the share of industry j in exports and imports so as to weight the demand elasticities, ϵ_j and π_j, of those sectors. A follow-up empirical study disaggregating by sectors (Gouvea and Lima, 2010) shows that, as expected, technology-intensive sectors tend to have higher income elasticity of demand for exports. It was also shown that in a Latin American group of countries the sectorally weighted income-elasticities showed minimal change over a long period whereas there was a significant change in a sample of Asian countries which positively increasing their BPCG rate. This suggests that policies implemented by the Asian development states effectively raised their equilibrium growth rates

and correspondingly income levels through strategic industrial policies targeted at moving up the value-added ladder with technological accumulation and infant industry protection.

In order to apply the demand-side framework to development growth policy it is necessary to keep in mind that import and export demand equations are behavioral equations. The trade volume demanded is determined by world and domestic preferences for types of goods; these preferences determine magnitudes of the elasticities of demand. Knowing the dynamics of this can inform how to target policy for demand-led growth.

Capability to Produce

Being a demand-constrained growth framework, any correlation with a capacity constrained growth rate would be pure coincidence (Thirlwall, 2011 p.328). This type of model, in considering rate of growth of demand, is concerned with *actual* output. Neoclassical growth theory argues that the long-run growth rate is supply determined and essentially constrained by factor supplies. This focus on *potential* output-growth falls back on Say's Law to ensure that actual output (demand) growth converges to the supply-constrained long-run rate. The demand-side models face this same shortcoming and similarly need 'Say's Law in reverse' (Cornwall, 1973). This is *implicitly* present in the BPCG model because of the assumption of infinitely elastic export supply. Several papers have addressed this discrepancy by incorporating supply constraints into the BPCG framework both explicitly and implicitly.

Palley (2003) identified the 'internal inconsistency' (p.123) arising in scenarios in which the BOP-determined growth rate deviates from the supply determined growth rate. If the BPCG rate exceeds the capacity growth rate, over utilization will be necessary to pull the steady state supply determined growth rate to the demand determined growth rate, and *vice versa*. The solution suggested by Palley was to endogenize the income elasticity of demand for imports to the degree of capacity utilization. The equilibriating mechanism at work here would be an increasing share of income being spent on imports as higher capacity utilization leads to domestic bottlenecks. This adjustment process is then determined by the demand-constrained growth rate falling to match the capacity constrained rate. Setterfield (2006) argues that this is a 'model of *quasi-*

supply-determined growth' (p.53) and presents an alternative 'sympathetic to the vision' of the BPCG model's demand-side nature. He applies the Verdoon effect wherein productivity growth is influenced by the actual growth rate of output, so that when utilization is high productivity growth to pull the potential (supply) to the actual (demand). This method takes into consideration supply determinants of equilibrium growth but in such a way that demand 'rules the roost.' Thirlwall (2011) suggests a similar mechanism wherein higher export growth fuels investment therein raising the supply-determined growth rate to the demand-determined rate.

Razmi (2015) challenges the significance the BPCG model places on world income growth by presenting a similar 'demand-determined' model that attempts to reconcile the role of capacity in determining the rate of growth by incorporating a supply constraint. He argues that empirical tests of the BPCG model are simply tests to determine if trade is balanced in the long-run. It is highlighted that the output adjusts to any external imbalance generated by world demand and income elasticities. To take into consideration supply constraints Razmi adds separate export and import supply equations where export supply is a function of export prices and capital stock. This addition imposes a supply constraint in which export growth is influenced by investment so that output, relative price and import growth rates are constrained. In an empirical exercise Razmi (2015) shows that adding capital accumulation to the equation significantly weakens the significance of world demand on domestic growth. It can be argued that this explicit addition of capital stock growth as an independent variable along with an export supply specification implies that export growth is supply-led.

Efficiency and Price Competitiveness

The literature addressed in the previous section demonstrates the difficulty of incorporating production constraints while maintaining a model true to the demand-led nature of BPCG. Determining growth in an open-economy supply is necessarily linked with competitiveness. Since Kaldorian trade demand equations are essentially behavioral in nature, it follows that supply *decisions* are informed by competitiveness. This in turn dictates world demand for exports and domestic demand for imports when domestic substitutes exist. This nature of production decision-making is loosely

implied in Setterfield's (2006) 'Verdoonian' adjustment and Thirlwall's (2011, p.329) suggestion that export growth fuels investment; but price competitiveness is only loosely implied in Razmi's (2015) export supply equation. *Considering competitiveness in discussions of growth is necessary for addressing production and absorption decisions in a demand-led framework – especially in the case of developing economies*. In general, competitiveness is concerned with efficiency and relative prices with respect to domestic and foreign goods. It follows that output decisions – in both the domestic and export sectors – would be informed by relative returns to production as determined by demand for goods domestically and globally. This highlights the growth and policy constraints faced by less developed countries within a global economy. It is without question that, for a lower income country short on inputs and far from the technology frontier it is not feasible to enter global competition without some sort of infant industry protection. As demonstrated by the 'East Asian Miracle' of the 1960s-1980s this can take the form of keeping imports affordable where domestic substitutes were absent and subsidizing export industries so as to be able to compete in global markets. In such a scenario – with an absence of domestic substitutes – domestic prices should be a less important determinant of import demand. These 'development steps' need to happen before export led growth can reinforce investment and movement up the value-added ladder. The implication is an alternative causality to what is implied by Razmi; export supply *can* grow if demand allows it through increasing accumulation.

Similarly to Araujo and Lima's multi-sector model, Romero and McCombie (2017) take into consideration varying income elasticities of demand by sector but include technological productivity in conjunction with quality of goods to capture a type of non-price competitiveness in exports. This non-price competitiveness captures a demand preference for countries' exports. They do this by incorporating relative domestic non-price competitiveness – which includes technological competitiveness and productive capacity. The former captures both the varying demand elasticities for goods produced in high/low-tech sectors as well as preferences for goods from particular countries. The latter indirectly addresses the presence of a supply constraint by taking into consideration the relationship between utilization and export volume in the context of a demand determined frame-

work. Keeping true to the nature of the BPCG framework, this suggests that production of exports will adjust to demand as long as a supply constraint is not binding.

Although the literature incorporating productive capacity into the export and import demand framework does factor competitiveness in with production, it leaves little room for discussion of protectionist development state policy supporting price-competitiveness. An effective way to protect a less efficient infant industry in the global market is to cut costs through public subsidies thereby reducing the price of domestic exports for foreign importers. A corresponding method of protecting infant industries is to raise cost of more efficiently produce foreign imports that would otherwise have competitive price advantage over domestically produced substitutes. Using the price of exports, P_x, and the price of imports, P_m, does capture comparative advantage but is not able to portray the effect of price competitiveness for domestic and foreign producers.

1.3 Model with Alternative to Terms-of-Trade

In order to highlight that exporters compete with the ROW for global market share of tradables we replace P_m with P_r in the export equation, now indicating that it is the global price of export goods that domestic exporters compete with. This is determined first by creating a weighted global price level, P_{rj}, for each export sector $j = 1.., s$,

$$P_{rj} = \sum_{i=1}^{n} P_{ij}\omega_{ij},$$

where P_{ij} is the export price level for sector j in the export sector of country $i = 1.., n$, and ω_{ij} is country i's share of global exports in sector j. Each country's unique P_r is determined by

$$P_r = \sum_{j=1}^{s} P_{rj}\delta_j,$$

where δ_j is the share of sector j in the country's exports. The key distinction is that this is not necessarily the price domestic consumers face when importing goods – the composition of import baskets may differ from the export baskets of ROW. P_x is measured in domestic currency and is

also weighted by individual sectors' prices,

$$P_x = \sum_{j=1}^{s} P_{xj}\delta_j.$$

From the viewpoint of import decisions based on price competitiveness, P_d is the price of domestically produced goods absorbed at home. Correspondingly P_m is price of foreign produced imports, where P_m is similarly weighted by the sectoral composition of the country's imports, ρ_j

$$P_m = \sum_{j=1}^{s} P_{mj}\rho_j.$$

One reason to make this distinction is to take into consideration the interventions on price competition that a protectionist government can implement. In the export sector, a government can improve competitiveness through infant industry subsidization, thus driving down P_x by reducing costs for firms that otherwise can not produce as efficiently, and therefore competitively, as foreign producers. Similarly, governments can prop up domestic demand for infant industries' output by imposing trade barriers on foreign imports (which are substitutes for existing domestic goods) that can be produced more efficiently at lower cost elsewhere while subsidizing necessary capital imports. Assorted subsidies such as preferential lending, tax breaks, and competition controls can keep P_d down. In these senses P_x, P_m, and P_d can be considered policy instruments.

Another reason to make this distinction, on theoretical grounds, is that it is not unreasonable to keep price changes in the long run growth rate. In the baseline model, $(\hat{P}_x - \hat{P}_m)$ drops out because a real depreciation (or appreciation) can not be a sustainable change. However, since the prices are now weighted by sectoral composition, even if individual sectors' prices don't change in the long run it is possible for weighted prices to change continually. This is important in the case of ISI and EOI because the goal of development policy targeted at industrialization is to change ρ_j and δ_j, respectively, as countries move up the value-added-ladder.

Substituting the alternative global export price level into (3), the export-demand equation becomes:

$$X = \left(\frac{P_x}{P_r}\right)^{\eta} Z^{\epsilon} \tag{1.6}$$

The contribution here is that the substitute for terms-of-trade considers domestic price of export goods, P_x, relative to the global prices, P_r, they are competing against. While the latter is exogenous, the domestic price of export goods can be considered a possible policy variable. These new measures more accurately capture the relative prices faced by *foreign* importers, which is a crucial determinant of demand for domestic exports.

Along the same lines, replacing export prices with domestic prices into (4), the import demand equation becomes:

$$M = \left(\frac{P_m}{P_d}\right)^{\psi} Y^{\pi}. \tag{1.7}$$

Here the substitute for terms-of-trade captures the relative prices faced by domestic individuals as they determine whether to buy domestic or foreign. As a policy variable P_m can be used by the government to reduce demand for imported consumption goods. Conversely, in the absence of domestic substitutes and the need for foreign capital goods this can be kept low to support industrialization.

Following the steps used to derive the baseline model's long-run growth rate, the newly specified demand equations yield an extended version of Thirlwall's Law:

$$\hat{Y} = \frac{1}{\pi}((1+\eta)\hat{P}_x - (1+\psi)\hat{P}_m + \psi\hat{P}_d - \eta\hat{P}_r + \epsilon\hat{Z}) \tag{1.8}$$

now incorporating four prices.

This addition overcomes the neglect of prices that constrain the applicability of estimates of Thirlwall's Law. An empirical examination of equation (1) would predict that the coefficients on $\hat{P}_x$,$\hat{P}_m$, and $\hat{E}$ to be the same. In the long run these are assumed to be negligible. The model with the expanded price specification now has unique coefficients in front of the four prices that allow for further analysis. Looking at the expanded equilibrium levels of output, equation (7) shows

effects previously obscured. Having separated all price determinants of the trade balance, there is no requirement that the effect of terms-of-trade or RER fluctuations be the same as the effect price changes. This distinction allows for analysis of different price effects in determining growth through trade. It is possible that the use of the same prices for export and import demand explains the negligibility of terms-of-trade often found in conventional tests. Since the price elasticities of demand are negative by hypothesis the signs in front of the prices provide more detail. The sign of the coefficient on P_d is expected to be negative; higher prices of domestic substitutes for goods available from abroad should lead to a leakage as there is increased demand for the [relatively] cheaper foreign imports. Conversely, the negative sign expected on P_r indicates that if prices of competing export goods rise then there will be an increase in demand for exports produced in the home country. The coefficients multiplying export and import prices are no longer required to be negative by the Marshall-Lerner condition. Now the domestic price elasticity of demand for imports is no longer a determinant of the impact of export prices on growth; this is important as *import and export goods may differ significantly for an individual country*. Technologically advanced countries tend to import more primary and intermediate goods and *vice versa*. This is observed in the price-correlation tables; high-income countries' import prices are noticeably more correlated with export prices indicating a pass-through effect due to input costs. The expected signs of P_x and P_m are now ambiguous given the magnitudes of these price elasticities. Even if the Marshall-Lerner condition is binding and the sum of the prices elasticities exceeds unity, it is still possible for the price effects on output from P_x and P_m to differ from the expected negative and positive sign. Looking at the balanced trade condition there are two things that determine inflows and outflows on each respective side. A change in prices affects the value of exports as well as an effect on the quantity demanded. If there is a high elasticity of demand for exports then the latter can outweigh the first and the coefficient on the export price will be negative as is conventionally expected. However, if a country exports goods with low price elasticity of demand, it is possible that $(1 + \eta)$ will be greater than zero; i.e., increased price competitiveness through lower P_x would have a marginal positive effect on increased quantity demanded of exports while an

overall negative impact on on the trade balance. This has implications for intervention from policy makers if one considers the price-elasticities of demand by sectoral composition. If the second effect dominates, supporting price competitiveness can hurt the trade balance. Put alternatively, as countries advance in production the argument for export-price competitiveness will be reversed because of lower elasticity of demand in of exports. The similar intuition and interpretation follows with imports.

Another way to make the distinction between the effect of price and quantity changes on the trade balance is to isolate competitiveness. If instead the demand equations are specified with external and internal price ratios to measure competitiveness in global trade, $P_e = \frac{P_x}{P_r}, P_i = \frac{P_m}{P_d}$ then equation (7) would look like:

$$\hat{Y} = \frac{1}{\pi}(\hat{P}_x - \hat{P}_m - \psi\hat{P}_i + \eta\hat{P}_e + \epsilon\hat{Z}) \tag{1.9}$$

where the signs of $\hat{P}_i$ and $\hat{P}_e$ more accurately capture the relevance of price competitiveness. In setting the balanced trade condition, the presence of P_x and P_m now only capture the effect of a change in the *value* of total trade. In essence this identifies a distinction between comparative and absolute advantage. The separate external and internal price ratios now independently capture the volume effect on total flows from export and import demand when analyzing the long-run equilibrium growth rate.

1.4 Empirical Investigation

1.4.1 Data and Methodology

Regressions were run to test levels of exports and imports as well as the corresponding equilibrium long-run growth rates. Three versions of each model were estimated: a) the baseline model with solely export and import prices, b) the model using the global and domestic prices in conjunction with export and import prices, and c) the modified model grouped by country income level. Of concern in the context of this paper are: i) the estimates of the export and import de-

mand equations, ii) the implications of using different prices, and iii) the effect these have on the predicted long-run balance of payments constrained growth rate. Comparisons between high, middle, and low-income country groups were done to highlight the different outcomes given import dependency and the nature of exported goods.

The empirical tests use the Penn World Tables, version 9.0, which provides comprehensive data on national accounts. A balanced panel given the price variables chosen includes 180 countries. The trade data provides price levels and share of exports and imports for 6 sectors: food and beverage, industrial supplies, fuels and lubricants, capital goods, transportation equipment, and consumer goods. The price level for domestic goods used is a weighted price level of domestic absorption including consumption, investment, and government spending on goods produced and purchased domestically.[7] All price measures have been converted to constant world dollars thereby allowing the removal of the nominal exchange rate and allowing the strict comparison of comparative advantage versus absolute advantage. Data used spans the period from 1960-2014.

The reported regressions were run using a fixed-effects model for all countries in the sample. These same tests were then applied to all high-income countries in the group, all middle-income countries, and then to a group of all low and low-middle income countries.[8] Income-level groupings follows the World Bank 2016 income classification scale. High-income countries are those with GNI per capita greater than $12,475, measured with the World Bank Atlas Method. Low and low-middle income countries are defined as those with GNI per capita less than $4,036. The middle income group includes the countries between these two levels.[9]

[7]Ideally, having data on domestic prices for each of the 6 sectors would make it possible to further identify the presence and effect of domestic substitutes.

[8]The decision to group low and low-middle income countries together was based on the similar sectoral composition of exports and imports. See summary statistics in appendix.

[9]It has been pointed out to the author that changes in the classification system over the observed period may fail to accurately capture when countries transition from low to middle income and middle to high.

1.4.2 Trade Volume With Alternative Price Specifications

Taking logs in the modified Kaldorian export equation (5) gives the following estimator to test the validity of a substitute for terms-of-trade price measures:

$$\ln X_{it} = \beta_0 + \beta_1 \ln P_{xit} + \beta_2 \ln P_{rit} + \beta_3 \ln Z_{it} + u_{it} \tag{1.10}$$

where the signs are expected to be: $\beta_1 < 1, \beta_2 > 0, \beta_3 > 0$. In this case β_1 and β_2 measure the price elasticity of demand for exports, considering the respective determinants of terms-of-trade in the theoretical model. It should be the case that the signs should be the same as the baseline model. The intuition of the signs is as follows. Demand for a country's exports should fall with higher prices for that country's exports. Conversely, if prices of competing exports from the rest of the world go up, there should greater demand for the home country's exports. β_3 is expected to be positive because as world incomes grow so does demand for foreign goods.

The same test was done using P_e in place of the separate distinct export prices where the export equation is tested by:

$$\ln X_{it} = \beta_0 + \beta_1 \ln P_{eit} + \beta_2 \ln Z_{it} + u_{it} \tag{1.11}$$

with the expected signs: $\beta_1 < 1, \beta_2 > 0$. In this case β_1 captures the combined effects seen in β_1 and β_2 in the previous test.

The import-demand equation (6) with the alternative to terms-of-trade, defined as the relative prices of imports faced by the home country and price of domestic substitutes, is tested using:

$$\ln M_{it} = \beta_0 + \beta_1 \ln P_{mit} + \beta_2 \ln P_{dit} + \beta_3 \ln Y_{it} + u_{it} \tag{1.12}$$

where the expected signs are $\beta_1 < 1, \beta_2 > 0, \beta_3 > 0$. The intuition behind the signs are analogous to those in the export equation. In this case β_1 and β_2 capture the price elasticity of demand for imports. The economic intuition behind the signs is as follows. A country's demand for imports

should fall if importers are faced with higher prices from ROW. Conversely, if prices for domestic substitutes go up there should be a fall in demand for those and shift toward imports.

Additionally, the modified import demand equation was examined using the internal price ratio, P_i, with the corresponding equation to be tested:

$$\ln M_{it} = \beta_0 + \beta_1 \ln P_{it} + \beta_2 \ln Y_{it} + u_{it}$$

where the expected signs are $\beta_1 < 1$ and $\beta_2 > 0$. In this case β_1 captures the combined effects seen in β_1 and β_2 in the previous test.

Table (1) shows the results for estimates of the export and import demand equations. This is done for the standard terms of trade and then for the model that substitutes global prices and domestic prices into the export and import demand equations, respectively. The results provide compelling evidence for the validity of using alternative price measures for competitiveness in the trade demand equations. Column (1) provides the results for the baseline export demand test. Only export prices prices and foreign income are statistically significant, with the expected signs – this is consistent with the literature. Comparing this with column (2) which replaces the conventionally used import prices with the price of competing foreign goods highlights the relevance of alternative sources as determinants of export demand and competitiveness. The statistical and economic significance of the coefficient on P_r demonstrates this.

The analogous exercise for import demand in columns (3) and (4) show similar results. In the baseline model with conventional terms-of-trade measures (column 3) export prices are not statistically significant. Import prices and domestic income are significant and of magnitudes consistent with economic intuition. When export prices are replaced with domestic prices in column (4) to capture possible competing substitutes produced at home the alternative price, P_d, is significant. This highlights importance of relative prices in determination of import demand that is commonly overlooked in the literature.

These preliminary findings demonstrate the importance of comparing import and export prices with the prices those goods are competing against. Comparing high, middle, and then low income

Table 1.1: Export/Import Volume

	(1) $\ln X$	(2) $\ln X$	(3) $\ln M$	(4) $\ln M$
$\ln P_x$	-0.278^{+}	-0.411***	0.0968	
	(0.147)	(0.114)	(0.0744)	
$\ln P_m$	0.188		-0.365***	-0.893***
	(0.163)		(0.0830)	(0.111)
$\ln P_r$		0.549**		
		(0.167)		
$\ln P_d$				1.136***
				(0.100)
$\ln Z$	2.825***	2.455***		
	(0.153)	(0.191)		
$\ln Y$			1.442***	1.550***
			(0.123)	(0.112)
_cons	-16.51***	-13.94***	-4.445***	-3.191***
	(1.405)	(1.583)	(0.666)	(0.546)
N	9435	9435	9257	9257

Standard errors in parentheses

$^{+}$ $p < .10$, * $p < 0.05$, ** $p < .01$, *** $p < .001$

Table 1.2: Export Demand with Price Ratios by Income Level

	(1) $\ln X$	(2) $\ln X$	(3) $\ln X_{low}$	(4) $\ln X_{middle}$	(5) $\ln X_{high}$
$\ln P_T$	-0.228				
	(0.151)				
$\ln P_e$		-0.424***	-0.374**	-0.430**	-0.150
		(0.114)	(0.131)	(0.140)	(0.260)
$\ln Z$	2.690***	2.669***	2.255***	2.291***	2.337***
	(0.116)	(0.114)	(0.236)	(0.177)	(0.130)
_cons	-15.33***	-14.69***	-12.30***	-11.09***	-10.81***
	(1.024)	(1.061)	(2.213)	(1.627)	(1.513)
N	9435	9435	4036	2742	2657

Standard errors in parentheses

$^{+}$ $p < .10$, * $p < 0.05$, ** $p < .01$, *** $p < .001$

Table 1.3: Import Demand with Price Ratios by Income Level

	(1) $\ln M$	(2) $\ln M$	(3) $\ln M_{low}$	(4) $\ln M_{middle}$	(5) $\ln M_{high}$
$\ln P_T$	0.191				
	(0.142)				
$\ln P_i$		-0.713***	-0.659*	-0.830***	-1.126***
		(0.180)	(0.320)	(0.119)	(0.311)
$\ln Y$	1.481***	1.670***	1.855***	1.845***	1.315***
	(0.122)	(0.0650)	(0.198)	(0.111)	(0.181)
_cons	-5.767***	-4.084***	-4.753**	-5.536***	-0.652
	(0.608)	(0.850)	(1.710)	(1.081)	(2.427)
N	9257	9257	4036	2742	2661

Standard errors in parentheses

$^{+}$ $p < .10$, * $p < 0.05$, ** $p < .01$, *** $p < .001$

countries using these alternative measures to terms-of-trade sheds further light on how composition of imports and exports influences the differing determinants of demand. It would be expected that less industrialized countries will be more dependent on foreign-produced imports for technology-intensive goods. Correspondingly, in early stages of development countries tend towards the export of primary goods. On the other hand, high-income countries with technologically advanced industries are more likely to produce higher value-added goods for both domestic and export markets and therefore the composition of imports will more likely be primary and intermediate goods. These differences are distinctly apparent in tables (2) and (3).

In table (2) a similar exercise is performed, now using the external price ratio, P_e, compared with the conventional terms of trade ratio. Using all countries the observed results are the same as before; the alternative measure for competitiveness is statistically significant in column (2), whereas the terms-of-trade measure is not in column (1). Breaking the sample into income groups in columns (3)-(5) sheds light on the role of competitiveness given a country's income level and sectoral composition of exports. When the external price ratio is used price competitiveness is not significant for high income countries, while the coefficient is statistically significant for low and middle income countries. This highlights that more industrialized countries exporting higher

value added goods with lower price elasticities of demand are less impacted by competition. As expected, world income is a significant determinant of export demand for all income levels. The variation in magnitudes shows that, as would be expected, lower income countries tend to have lower income elasticities of demand for their exports.

The test performed for import demand in table (3) shows similar – if not greater – evidence of competitiveness as a key determinant. In addition, the magnitudes of the elasticities are more reflective of the economic intuition of countries' imports composition given income levels. As with export demand, the conventional terms-of-trade measure is not significant in column (1) but the internal price ratio reflecting competing domestic and foreign prices does capture a significant role of competitiveness in determining import volume. When broken up by income levels, the magnitudes are consistent with the earlier discussion of what countries import. Low income countries tend to import more technologically advance goods – with lower price elasticity of demand – for which there are no domestic substitutes whereas higher income countries tend to import more primary goods. This is reflected in columns (3)-(5) where demand for imports is more price elastic the higher the group's income – when considering relative price ratios. Parallel intuition is observed in the income elasticities. The type of goods mentioned above that low income countries tend to import are more income elastic. This is captured by the coefficient magnitudes of domestic income in columns (3)-(5).

1.4.3 Growth Rates

This section applies the price specifications from the demand equations presented above to the balance of payment constrained equilibrium growth rate. Three regressions were estimated: i) the baseline model (equation 1), ii) the model incorporating competing foreign and domestic prices into the export and import demand equations (equation 7), and iii) the model using import and export prices from the trade balance condition in conjunction with external and internal price ratios from the demand equations (equation 8). The end goal is to disentangle the effect of competitive

ness on demand from the comparative advantage effect on accounts. The equilibrium growth rate with ROW export prices and domestic prices (7) is tested by:

$$\hat{Y}_{it} = \beta_0 + \beta_1 \hat{P}_{xit} + \beta_2 \hat{P}_{mit} + \beta_3 \hat{P}_{dit} + \beta_4 \hat{P}_{rit} + \beta_5 \hat{Z}_{it}. \tag{1.13}$$

When relative prices are used in the export and import demand equations, equation (7) is tested by:

$$\hat{Y}_{it} = \beta_0 + \beta_1 \hat{P}_{xit} + \beta_2 \hat{P}_{mit} + \beta_3 \hat{P}_{iit} + \beta_4 \hat{P}_{eit} + \beta_5 \hat{Z}_{it}. \tag{1.14}$$

There are several differences between the two. In equation (12) $\beta_1 = \frac{1+\eta}{\pi}$ and $\beta_2 = \frac{1+\psi}{\pi}$. Based on theory alone, the expected signs are ambiguous given the magnitude of the price elasticities, which are negative.[10] In equation (13) the price elasticities of demand for exports and imports are absent from these coefficients. In equation (13) the coefficients on P_x and P_m enter solely through the trade balance condition. In the prior equation, (12), their effect on output is felt in the determination of quantity of exports and imports demanded through competitiveness as well as the value of the trade balance. The latter equation lets us observe the effect of demand on output from changing price competitiveness independent from the effect of price change on the value of the trade account. In both cases, β_3 and β_4 reflect the price elasticities of demand for imports and export, respectively.

Table (4) presents the results of these tests for a sample of all countries while table (5) shows the estimates from (12) and (13) when grouped by high, middle, and low-income countries. In column (2) of table (4), when ROW export prices and domestic prices are added the magnitudes of the coefficients on the original export prices don't change and import prices shrinks.

When export and import competitiveness is isolated from terms-of-trade, the effect of changes in cost of traded goods has a bigger impact on country growth rates. This can be explained by the role the value of traded goods has on total inflows and outflows independent of their role as

[10]Though the signs of these are ambiguous in the modeled form, based on intuition it would be expected that the absolute values of η and ψ would be less than one and the signs on the coefficients would reflect this. The results verify this.

Table 1.4: Growth Rate All Countries

	(1) $\hat{Y}$	(2) $\hat{Y}$	(3) $\hat{Y}$
$\hat{P}_x$	0.144***	0.139***	
	(0.0194)	(0.0232)	
$\hat{P}_m$	-0.168***	-0.114***	
	(0.0214)	(0.0192)	
$\hat{P}_d$		-0.194***	
		(0.0270)	
$\hat{P}_r$		0.104***	
		(0.0285)	
$\hat{P}_T$			0.266***
			(0.0273)
$\hat{P}_i$			0.142***
			(0.0243)
$\hat{P}_e$			-0.125***
			(0.0271)
$\hat{Z}$	0.481***	0.534***	0.500***
	(0.0489)	(0.0506)	(0.0492)
_cons	0.0262***	0.0264***	0.0234***
	(0.00203)	(0.00216)	(0.00221)
N	9257	9257	9257

Standard errors in parentheses

$^{+}$ $p < .10$, * $p < 0.05$, ** $p < .01$, *** $p < .001$

Table 1.5: Growth Rate By Income Level

	(1) $\hat{Y}_{low}$	(2) $\hat{Y}_{middle}$	(3) $\hat{Y}_{high}$
$\hat{P}_T$	0.314***	0.220***	0.259***
	(0.0391)	(0.0392)	(0.0723)
$\hat{P}_i$	0.212***	0.0542^{+}	0.108**
	(0.0365)	(0.0291)	(0.0393)
$\hat{P}_e$	-0.195***	-0.0598^{+}	-0.0540
	(0.0426)	(0.0305)	(0.0569)
$\hat{Z}$	0.270***	0.525***	0.776***
	(0.0710)	(0.0733)	(0.110)
_cons	0.0297***	0.0266***	0.0117*
	(0.00331)	(0.00329)	(0.00473)
N	3931	2688	2638

Standard errors in parentheses

$^{+}$ $p < .10$, * $p < 0.05$, ** $p < .01$, *** $p < .001$

determinants of demand. In the world sample both competitiveness ratios are significant in column (3), but similar to column (2) the magnitude of the coefficient on exports is on the smaller side.

1.5 Policy implications: Imports Matter

It is the goal of this paper to demonstrate there are more appropriate ways to measure price competitiveness in trade. In doing so it is possible to show the importance of industrialization and infant industry protection on import substitutability as a precursor to focusing on growth through export promotion. The policy implications argue for a combination of ISI policy – via infant industry protection and selective import price intervention – and transition towards EOI as economies become more advanced. An overarching theme in trade and development emphasizes advancing through industrialization; this is predicated on importing necessary inputs so as to produce higher value-added goods both for export and domestic consumption. Previous studies have clearly shown that moving up the value-added ladder and producing export goods with higher income elasticities of demand is a practical long-run goal for pursuing export led growth. In the case of producing

these more technologically advanced goods, price competitiveness is not an optimal means for improving the trade balance. This is repeatedly observed in the greater effect that global income has on export demand and growth for high-income countries. In cases where countries produce and export primary goods with high price elasticities, and low-income elasticities the common policy prescription is to improve terms-of-trade through exchange rate adjustment. While increasing export volume through this avenue is an effective means of bringing in necessary foreign currency, it seriously inhibits movement up the value-added ladder and can lead to greater chance of currency crisis. It is seen in the export determination equation that global income is a smaller determinant of demand growth. This can be explained by the nature of primary goods exported by low-income countries.

In early stages of development a degree of infant industry protection is likely the most effective way to industrialize so as to produce high-technology export goods as well as domestic substitutes for imports that a developing economy depends on. Improving price competitiveness with respect to imports by making foreign goods more costly is detrimental to development as low-income countries are dependent on foreign goods for which there are no domestic [or competitive] substitutes. Using domestic prices in place of export prices highlights the reality of this. Export prices are not a significant determinant of imports as the composition of imports for a less industrialized country are likely to be very different from its exports. When using domestic prices this measure for price competitiveness becomes a far greater determinant of import demand. Correspondingly, import demand is more sensitive to income in low-income countries. This can also be explained by the nature of the more technologically advanced goods that *need* to be imported.

The income elasticity of demand for imports in the measure of growth also tends to be greater for low-income countries, reiterating that dependence on foreign imports for high value goods constrains countries to lower growth. The reverse of this is observed in high-income countries with respect to export demand and the prices measuring terms-of-trade. There is a higher correlation (see appendix for price correlation tables) between export and import prices indicating that raw and intermediate goods being imported are more directly connected to price determination of exports.

This phenomena is not observed as greatly with low-income countries since high value-added goods being imported are not as likely to be inputs to primary good exports. The lesser importance of competing export prices for high-income countries can be explained by fewer global producers of more specialized goods.

As low-income countries try to grow through trade, the earliest stages of development should reverse price protectionism. Since imports are necessary for movement up the value-added ladder, their prices should be kept low – until there are domestic substitutes. Export competitiveness should be a secondary goal; the motivating purpose in early stages is solely to acquire foreign currency to import technologically advanced goods. It follows that the long-run objective is to produce high value-added goods (with high-income elasticities) domestically. This will reduce dependence on both imports and price competitiveness.

By sectorally disaggregating the model presented here it would be possible to identify when price competitiveness is detrimental for export-led growth, given what a country exports. Along the same lines, it could be determined the conditions under which protectionist measures to improve domestic price competitiveness – intending to reduce import volume – are detrimental to the trade balance and national accounts, taking into consideration what *needs* to be imported. Import substitution industrialization is only effective at certain earlier stages of development and this could determine the threshold when domestic demand should be more heavily pursued as a growth strategy.

1.6 Conclusion

The paper has shown several key things. Price competitiveness is a more important determinant of import and export demand than is typically acknowledged in the BPCG literature; price distinctions need to be made in order to accurately capture the effect of trade competitiveness on demand and income; and we need a method for addressing these in the BPCG framework in additional to the terms-of-trade measure.

First, global export prices and price of domestic goods were used in the export and import demand equations in place of import and and export prices, respectively. Empirical tests provided a compelling case for their inclusion. In a test of the baseline export-demand equation, import prices are not significant; but when incorporated in their place world export prices are very significant. This validates the first argument of this paper – foreign consumers of exports aren't faced with the same prices as domestic importers. Along the same, lines export prices are not significant in the baseline import demand equation, but when incorporated in their place, domestic price levels are significant. These two findings confirm that more accurate specifications in place of terms-of-trade and relative price levels should be used.

A second inquiry used internal and external price ratios in the place of terms-of-trade prices discussed above. These results were significant as well. The empirical tests show that when using prices in Kaldorian import and export demand equations it is important to take into consideration domestic prices and foreign export prices in conjunction with import and export prices. These considerations are particularly important in the case of determining trade-led growth policies for low-income countries importing high value-added goods for which there are no domestic substitutes and exporting more primary good for which there is greater global competition and demand sensitivity to price changes.

Lastly, it was shown that these results provide a case for development policy starting with an ISI focus and transitioning toward EOI as countries become more industrially advanced. ISI policies argue for keeping import prices low for goods that lack domestic substitutes in early stages of industrialization. Supporting accumulation through imports and protecting infant industries allows for countries to move up the value-added ladder and reduce dependence on import *in the long run*. Concurrently, price competitiveness in exports is only an optimal strategy when countries produce and export primary goods with high price elasticities of demand. As production advances technologically and domestic substitutes become available countries should tend away from price competitiveness and focus on the production of exports with higher income elasticities of demand.

This end outcome is consistent with conventional proposals in BPCG literature but is conditional on intermediate strategic intervention to move up the value-added ladder.

The major contribution of unique price measures to capture competitiveness in trade can provide insight for future policy analyses. By identifying which sectors have been effective at sustaining growth is an obvious first step that has been addressed throughout the literature. Using these novel measures of price competitiveness could identify *which type of development policy* would be optimal for infant industry protection and preventing trade imbalances in the growth process *taking into consideration unique sectoral composition of trade*. Identifying the optimal policies for unique sector could explain differences in development experiences and inform future policy objectives.

Chapter 2

Structural Change and Sectoral Elasticities of Trade Demand

2.1 Introduction

The preceding paper provided a new measure for relative prices to more accurately capture competitiveness in tradeables. It was demonstrated that greater insight into open economy development policy can be gained by using trade prices to capture competitive advantage. Evidence of this was shown by identifying alternative prices elasticities for exports and imports given national income level. This paper seeks to estimate these trade elasticities decomposed by sector, periods of structural difference in world economic order, and income level. The goal is to highlight where competitiveness is vital for export volume growth, whom is most impacted, and how this has has evolved in the last half century. These findings could indicate what export sectors to target while moving up the value added ladder and explain why some countries have experienced deteriorating terms-of-trade leading to vulnerability to balance of payments crises and failure to grow through trade. Investigating these determinants by sector is important because developing countries may be limited in what they can produce for export and domestic consumption – what you export matters. By identifying which sectors price competitiveness is most important for it may be possible to suggest policies to move up the value added ladder based on industrial upgrading targeted at particular industries. Looking at how trade demand elasticities vary between income level and have evolved with structural, and correspondingly global institutional, change can provide insight into how different policies instituted have impacted different groups. Development strategies that were effective in the past may no longer be viable in the presence of *global* structural change – the effectiveness of these past policies in our current era could be determined by whether or not prices are important determinants of export growth now as they were in the past. Investigating determi

nants of export demand based on periods that have experienced significant structural change can provide evidence of changes in the effectiveness of varying state interventions.

The conventional set of policy prescriptions this work has been concerned with is the complementary transition from import substitution industrialization (ISI) to export oriented industrialization (EOI). In early stages of economic development, low income countries often lack the industrial base to produce high value goods – both for domestic consumption and export. If the long run growth strategy is to grow through exports, it would be necessary to import in the early stage to develop an industrial base in order to move up the value added ladder through industrial upgrading and growth of productive capacity. This allows for a country to reduce dependence on imports for domestic consumption as well as the capital goods necessary to produce more technically advanced exports – products with high income elasticities of demand. The baseline version of Thirlwall's Law highlights the importance of this as a *long run* objective. Since the long run rate of growth consistent with the balance of payments constraint is determined by the income elasticities of demand for exports and imports, failure to reduce dependence on imports and export higher value goods constrains a country to lower long run growth. Dutt (2002) and Davidson (1990) highlight that this inevitably leads to uneven development seen in North-South trade relations.

The previous paper contributed a modified version of Thirlwalls Law, $\hat{Y} = \frac{\varepsilon \hat{Z}}{\pi}$, that captured both terms-of-trade and competitiveness in the import and export demand equations separately:

$$\hat{Y} = \frac{1}{\pi}(\hat{P}_x - \hat{P}_m - \psi \hat{P}_i + \eta \hat{P}_e + \epsilon \hat{Z}). \tag{2.1}$$

It tends to be the case that high value-added – technologically intensive – goods have high income elasticities of demand and low price elasticities of demand. Conversely, basic and primary goods tend to have low income elasticities of demand and high price elasticities of demand – it is therefore important to be competitive in these sectors to sustain export demand. As shown in the preceding paper, price elasticities of demand for tradeables are not a statistically significant determinant of export or national output growth. The key policy mechanisms of industrial strategy for improving competitive advantage are those targeted at reducing costs for firms in unique sectors to move up

the value-added ladder while using trade policy to influence prices. While this strategy is vital to maintaining high demand for a country's exports in the early stages of development, the long term risk of failing to produce less price sensitive goods is the deteriorating terms of trade – if a country is receiving less per unit of export it can purchase fewer imports with foreign reserves coming in. It is for this reason that ISI can only be an intermediate step in open economy growth strategy. By pursuing policy to produce goods for export and domestic absorption – which would otherwise have to be imported – it is possible reach a higher growth rate consistent with the balance of payments constraint.

The objective of this paper is to estimate both the price and income elasticities of demand by sector to highlight which sectors are more dependent on price competitiveness for maximizing export volume. Along the same lines it will be shown that trade in higher value added sectors – those requiring a more advanced state of industrialization – tends to be less determined by relative prices. To highlight the role of structural changes in the last half century these are estimated by periods and income levels to demonstrate how shifts in global economic order have changed the rules of the game and show who is most impacted. The institutional developments and structural changes to the nature of global trade have clearly changed the role of price competitiveness in trade and it appears that it has been to the hindrance of developing countries pursuing export led growth strategies.

2.2 Data Decompostion

While a great many studies have been done to determine the income elasticities for trade in the BPCG frame work (see Thirlwall (2011) for a comprehensive survey of this literature), until the release of the recent Penn World Tables version 9.0 (Feenstra et al, 2015) price data has been unavailable at the sectoral level. The trade sectors with available price data are drawn from the UN Statistics Division Broad Economic Categories (BEC). This data groups all export and import flows into six main categories. The number of each category described will be the one used in the empirical section of this paper: 1) food and beverages, 2) industrial supplies not elsewhere speci

fied[11], 3) fuels and lubricants, 4) capital goods (exception transportation goods), 5) transportation equipment, and parts and accessories thereof, and 6) consumption goods not elsewhere specified[12].

The BEC was designed as way to categorize Standard International Trade Classification (SITC) data into end-use categories in a way that is compatible with the three basic classes of goods in the System of National Accounts (SNA): capital, intermediate, and consumption goods. BECs 1, 2, and 3 are broken up into primary and processed. With the exception of food and beverages mainly for household consumption, everything in these are considered intermediate goods. Category 4 is composed of capital goods (final) and intermediate goods (parts and accessories). The key distinction between the capital goods category and the prior three is that the components that are considered intermediate are parts and accessories, as opposed to commodities/raw materials. The transportation equipment category is the only to include all three classes of goods from the SNA[13]. Lastly, the consumer goods category captures durable, semi-durable, and non-durable consumption goods that do not fall into the food and beverage or transportation equipment categories.

Although price data is currently only available for the broad six categories, they can broadly be characterized by the differing degrees of industrialization necessary to produce. Similarly, it can be observed based on income level which type of countries tend to produce each. From this it can be determined who is affected by changes in the role of competitiveness. It is typically the case that the primary and basic processed goods captured in the food and beverage and industrial supplies categories would be lower value-added – requiring less industrialization to produce. Based on economic intuition demand for these types of goods is expected to be more price elastic and less income elastic.[14] Following economic intuition it is naturally the case that non-primary intermediate goods and final goods (capital and consumption classes) require progressively greater levels

[11]This category broadly captures all intermediate goods, both primary and processed, that do not fall into the other five categories

[12]For a more detailed breakdown of the categories see United Nations Statistical Division (2002).

[13]Although motor spirits are consumed by households, the BEC omits this from the consumption goods class as it is also a crucial component of industry and therefore treats it as intermediate.

[14]With regards to the household consumption portion of food and beverage, this is Engel's Law.

of industrialization. From this generalization it can be expected that consumer goods, transportation, and capital goods are successively more income elastic and less price elastic. In the previous paper it was shown that for high income countries price competitiveness was not significant[15] as a determinant of export demand and income growth and correspondingly had a higher income elasticity of demand for their exports. Not surprisingly, the fuel and lubricants category poses a unique interpretation and much of the story is captured by looking at different income levels. This category is primarily composed of oil (primary), refined oil materials (intermediate), and motor spirits (consumption and intermediate), for which all economies are dependent. In addition to the universal dependence on oil, there tends to be a strong correlation between endowment and national income. Simultaneously, this is a sector where prices are more autonomously determined by the endowed group, particularly OPEC[16]. The results provide for an interesting – though intuitive – interpretation.

Using these generalizations of the nature of production of these categorized exports it is easy to determine what countries would be more likely to produce. Low income countries' exports would be expected to be more heavily composed of primary goods – those requiring lower levels of industrialization – captured in the food and beverage and industrial supplies category. Conversely, one would expect high income countries' exports to have a greater composition of capital goods and transportation equipment – more technology intensive goods. Middle income countries would be expected to have a sectoral compositions somewhere in... the middle. Again, the share in exports of fuels and lubricants category is going to be more intensely determined by endowment and therefore countries with a greater endowment tend to be higher income. These expectations are confirmed in table 1 which shows the mean share of each category's output in total exports for income groups.

Data for domestic prices, P_d, is only available decomposed by basic domestic absorption categories: consumption, investment, and government. Similarly to the previous paper, this does

[15]See discussion of price setting in later section.

[16]That influence appears to possibly be decreasing with the advent of affordable techniques of producing alternatives to crude oil.

Table 2.1: Sector Share of Exports by Income Level

	Low Income	Middle Income	High Income
Food and Beverages	0.338	0.249	0.140
Industrial Supplies	0.376	0.304	0.286
Fuels and Lubricants	0.131	0.200	0.209
Capital Goods	0.017	0.053	0.145
Transportation Equipment	0.015	0.030	0.086
Consumption Goods	0.123	0.164	0.134

Table 2.2: Sector Share of Imports by Income

	Low Income	Middle Income	High Income
Food and Beverages	0.175	0.134	0.102
Industrial Supplies	0.327	0.338	0.296
Fuels and Lubricants	0.096	0.104	0.101
Capital Goods	0.173	0.202	0.216
Transportation Equipment	0.126	0.117	0.154
Consumption Goods	0.102	0.105	0.130

limit discussion of domestic substitutability. The motivation in this paper for using this relative price measure as opposed to export prices is to reduce the effect of pass through costs – import prices are very influential on determining export prices through intermediate inputs and therefore there is endogeneity to be avoided. An exception to this concern may be the rising importance of global value chains. As the results will show, the role of price competitiveness has significantly decreased and the correlation between import and export prices has risen. With intermediates from other countries making a more significant portion of final goods it may be the case that part of the decrease in importance of relative price competitiveness may be a result of the unavoidable pass through costs of foreign components of national exports.

In focusing on the evolution of the role of prices and concern with the deteriorating terms-of-trade faced by “South" countries, elasticities are estimated for different periods. The grouping of periods are partly based on availability of data but primarily based on the evolution of global economic structure. Data from the Penn World Tables spans as far back as 1950, however in early periods data is sparse or absent for many countries. The half a century of globalization this paper is concerned with begins in 1965, starting with consideration of decolonization – although the trend began in the wake of World War II. For the sake of a paper on global economic trade and policy it is reasonable to treat the start of this modern wave of decolonization as the early 1960s[17] – notably with United Nations General Assembly Resolution 1514[18] and the formation of OPEC in 1960 followed by the formation of UNCTAD in 1964. Following the collapse of the Bretton Woods system and oil shocks of the early 1970s, the Jamaica Accords of 1976 marked the initial rise of the influence of the IMF. The period of 1975-1982 saw the rapid acceleration of Latin American debt – largely denominated in foreign currency[19] – following the rebounding surge of oil prices in the mid-70s. This corresponded with and was exacerbated by the Volker shocks of the early 1980s. The period around 1995 saw the most explicit structural shift [toward free trade] following the

[17] This paper by no means is suggesting that colonial economic influence on trade patterns has disappeared.

[18] “Declaration on the Granting of Independence to Colonial Countries and Peoples"

[19] see discussion of this in paper three.

formalization of NAFTA in 1994 and the establishment of the WTO 1995. Additionally there was a second wave of debt and balance of payment crises for emerging countries in the mid/late 1990s with the Tequila Crisis in late 1994 and the Asian Financial Crisis in 1997 – these marked a visible increase in the power and influence of the IMF which imposed major financial restructuring. In the context of this paper and the discussion of development policy and trade competitiveness these institutions largely cut away much of the policy influence sovereign governments could have over competitiveness[20]. Chang (2003b) argues that these institutions did not *explicitly* impair developing countries from implementing protectionist policies, however Amsden and Takashi (2000) demonstrate there was a clear decrease in price intervention by the countries most vulnerable – the results of this paper unambiguously corroborate their story by showing prices ceased to be significant determinants of trade *for low income countries* with the rise of these institutional forces. 2001 saw the China Shock marked by their admittance to the WTO. The pure scale of China as a player in the global export market significantly shaped the nature of price determination and competition in export sectors. Not only is China able to cut costs but they are so large that they act as price setters – particularly for raw goods for which demand has skyrocketed as a result of rapidly expanding production for both export and domestic consumption. The period following 2008 saw the commodity price boom and the global financial crisis. A drop in commodity prices followed by a boom in 2008-2009 greatly impacted developing countries' export revenue, particularly the middle income group investigated, and the impact of the global financial crisis had rippling effects as the wealth effect cut into export demand for manufactured goods globally. Each of these periods are marked by clear structural changes that highlight the effects of international economic forces, and the results demonstrate many implications for development outcomes.

Income-level groupings follow the World Bank 2016 income classification scale. High-income countries are those with GNI per capita greater than $12,475, measured with the World Bank Atlas Method. Low and low-middle income countries are defined as those with GNI per capita less

[20]How this affected individual regional development is discussed more in depth in the following paper.

than $4,036. The middle income group includes the countries between these two levels.[21] Unless otherwise mentioned, all aggregate measures are in per capita terms.

2.3 Models Tested

The empirical goal of this paper is to estimate price and income elasticities of traded goods. Export and import demand equations follow the constant elasticity form of the preceding paper:

$$X_j = (P_{ej})^{\eta} Z^{\varepsilon} \ , \ M_j = (P_{ij})^{\psi} Y^{\pi}.$$

The variables η and ψ are the price elasticities of demand for exports and imports, respectively. Foreign income (Z) elasticity of demand for a country's exports is ε and the domestic income (Y) elasticity of demand for imports is π. External and internal price ratios used as a determinant of competitive advantage in trade are $P_e = \frac{P_x}{P_r}, P_i = \frac{P_m}{P_d}$, where P_x and P_m are conventional export and import prices weighted by sectoral prices of a country's traded goods. The world export price level, P_r, is determined by summing the price level of each sector in each country $s = 1, ..., n$ weighted by ω, their share in global export of goods in the given sector $j = 1, ..., 6$. This price is then weighted by sectoral composition of the individual country's exports, δ.

$$P_{rj} = \sum_{s=1}^{n} P_{js}\omega_{js} \ , \ P_{rs} = \sum_{j=1}^{6} P_{rj}\delta_{js},$$

All prices have been converted into constant 2014 World dollar levels – thus eliminating the complication of nominal exchange rate volatility.

When log linearized, the demand equations to be tested for each country are:

$$\ln X_{jt} = \beta_0 + \beta_1 \ln P_{ejt} + \beta_2 \ln Z_t + u_t$$

[21] It has been pointed out to the author that changes in the classification system over the observed period may fail to accurately capture when countries transition from low to middle income and middle to high.

$$\ln M_{jt} = \beta_0 + \beta_1 \ln P_{ijt} + \beta_2 \ln Y_t + u_t$$

Fixed effects regressions were run to estimate sectoral elasticities by income level as well as period, reported with robust standard errors. See the appendix for full tables of results.

2.4 Observations

In general, most of the empirical results are consistent with basic economic intuition. As table 1 shows, low income countries tend to export less technologically intensive goods with lower value added in production – typically primary and basic manufactures. Tables 3 and 4 show that as expected these sectors have higher price elasticities, and lower income elasticities. Conversely, high income countries are more likely to export technologically advanced manufactured goods – such as capital, [durable] consumption, and transportation goods – with lower price elasticities and higher income elasticities. It was shown in the previous paper that for this group price competitiveness in exports was not significant when considering the full sample period – confirming the effectiveness of advanced EOI policies in reducing dependence on interventionist trade policies.

2.4.1 Exports by Sector

When looking at the full panel by sector the estimated elasticities provide verification of expectations. The income elasticities by sector are perfectly consistent with economic intuition – all statistically significant. Capital goods, followed by transportation goods then durable manufactures have the highest income elasticities. The fuel and lubricants category has a much lower income elasticity of demand. This is not surprising since all countries – regardless of income level – require oil based goods for both production and consumption. The exact same pattern in income elasticities of demand was observed for imports as well by decade and income groups.

With regards to the price elasticities, the only category where prices are not a significant determinant of export volume in any test is transportation goods. This could largely be due to specialization of intermediates and the heterogeneity of goods produced by different countries and the limited number of countries producing certain goods in this category. For example, the ship build

ing industry has always been dominated by a small group of countries, while countries producing aircraft parts tend to specialize in unique intermediate components – thus a limited role of price competition due to less international competition[22]. This is further verified by the smaller sample of countries with the transportation equipment category.

Table 2.3: Export Volume By Sector

	(1) $\ln X_1$	(2) $\ln X_2$	(3) $\ln X_3$	(4) $\ln X_4$	(5) $\ln X_5$	(6) $\ln X_6$
$\ln Z$	1.983***	2.737***	1.376***	4.295***	3.474***	3.609***
	(0.137)	(0.120)	(0.231)	(0.154)	(0.172)	(0.171)
$\ln P_{e1}$	-0.145					
	(0.137)					
$\ln P_{e2}$		-0.333**				
		(0.120)				
$\ln P_{e3}$			-0.671***			
			(0.130)			
$\ln P_{e4}$				-0.289^{+}		
				(0.163)		
$\ln P_{e5}$					-0.198	
					(0.226)	
$\ln P_{e6}$						-0.352^{+}
						(0.182)
constant	-11.75***	-17.86***	-6.660**	-34.38***	-27.30***	-27.23***
	(1.231)	(1.077)	(2.071)	(1.378)	(1.539)	(1.531)
N	8655	8690	7119	8354	8029	8298
adj. R^2	0.337	0.562	0.121	0.633	0.463	0.516

Standard errors in parentheses

$^{+}$ $p < .10$, * $p < 0.05$, ** $p < .01$, *** $p < .001$

Subscripts on variables denote the BEC: 1=food and beverage, 2=industrial supplies, 3=fuels and lubricants, 4=capital goods, 5=transportation equipment, 6=consumer goods

[22]In 2016, 67% of all ships and components are produced in three countries, South Korea, China, and Japan. In the same period, 66% of internal combustion engines for aircraft came from three countries, while 65% of aircraft tires came from three different countries, and 66% of final small aircraft come from one country, China. Source SITC.

Table 2.4: Export Volume By Sector

	$\ln X_1$	$\ln X_2$	$\ln X_3$	$\ln X_4$	$\ln X_5$	$\ln X_6$
$\ln Z$	1.559***	2.736***	0.993**	4.517***	3.647***	3.115***
	(0.229)	(0.175)	(0.348)	(0.180)	(0.219)	(0.288)
$\ln P_{x1}$	-0.148					
	(0.136)					
$\ln P_{r1}$	0.431*					
	(0.189)					
$\ln P_{x2}$		-0.333**				
		(0.120)				
$\ln P_{r2}$		0.333*				
		(0.167)				
$\ln P_{x3}$			-0.571***			
			(0.137)			
$\ln P_{r3}$			0.867***			
			(0.166)			
$\ln P_{x4}$				-0.281+		
				(0.163)		
$\ln P_{r4}$				0.118		
				(0.193)		
$\ln P_{x5}$					-0.190	
					(0.226)	
$\ln P_{r5}$					0.0757	
					(0.259)	
$\ln P_{x6}$						-0.360*
						(0.181)
$\ln P_{r6}$						0.708**
						(0.255)
constant	-7.346***	-17.10***	-1.581	-35.85***	-28.50***	-21.64***
	(2.193)	(1.692)	(3.242)	(1.677)	(2.141)	(2.809)
N	8655	8690	7119	8354	8029	8298
adj. R^2	0.340	0.562	0.123	0.633	0.463	0.518

The greatest variability in results between tests is the food and beverage category. When using the external price *ratio*, prices are not significant determinants of export demand for this category. However, when tested with country export price and world export price it is the case that world price is significant. An intuitive explanation for this might be that countries producing goods in the lowest value-added sector are price takers – initially this would suggest that industrial policy to improve competitiveness is this sector would be less effective. This result is better explained when differentiating between income levels. All price specifications for this category are statistically significant for the low income country group and not at all significant for middle and high income groups. This same pattern is observed for the industrial supplies category – which captures less capital intensive intermediate goods. Interestingly, there is almost no variation in the magnitude of the price or income elasticities of this category for estimates with different price specifications, time periods, and income groups – for both export and import tests. The policy relevance of this finding is that in *early stages* of export-led growth, competitiveness in exports of basic intermediate goods is the most vital for improving one's balance of payments situation. These low income countries are dependent on foreign currency for industrial upgrading as they pursue ISI, and complementary EOI, policies. By improving competitiveness they can increase export *volume* so as to minimize the risk of growing current account deficits as they import capital goods necessary for this industrialization. Latin America is a perfect example of how this failed; as a result of focusing on industrial upgrading and neglecting commodity and primary industries that were their exported source of reserves they became dependent on foreign capital flows to finance higher value imports – leading to an unsustainable balance of payments position.

With the exception of fuels and lubricants, the relative magnitudes of price elasticities are as expected between sectors. The estimated price elasticities for fuels and lubricants are of a noticeably greater magnitude than the others. Although this is counter to the intuition that demand for oil is highly inelastic the result is easily explained by endowment. The number of countries exporting goods in this category is limited – many countries aren't endowed with the raw material and only those with convenient port access to crude oil producers have practical opportunity for

processing goods in this category. As a result the high significance of fuel and lubricants for all income groups, all decades, and all price specifications is capturing the strong correlation between the exogenous volatility/determination of the price of oil and its determination of the value of exports for countries dependent on it as a source of foreign reserves.

2.4.2 Exports by Income and Period: 1965-1981, 1982-1994, 1995-2000, 2001-2007, 2008-2014

Estimating export demand by period for income levels sheds light on the impact of trade liberalization and demand growth from emerging economies at the end of the 20th century. The broad trend is initially captured by the estimates for the full panel by period. All estimated income and price elasticities of export demand are significant with the exception of prices in the periods between 1995-2000 and 2001-2007. In the same periods there is noticeable increase in the magnitude of the income elasticity. With the exception of the fuel and lubricant categories, this pattern is observed for individual sectors in the same periods.

The period of 1995-2000 captures the solidification of the New Global Economic Order – marked by the WTO and NAFTA's formation as well as the rise of influence of the IMF in the wave of sovereign debt crises in that era. This is clear evidence that the structural change of enforced free trade did impact low and middle income countries ability to implement policies to improve their external position. As international regulations regarding free trade became more heavily enforced price controls because a less viable option, as Amsden and Takashi (2000) demonstrate. Corresponding with this, the wake of the Tequila Crisis and explosion of the Asian Financial Crisis demonstrated that exchange rate intervention became a vulnerability with the rise of international financial markets (speculation).

The period following 2001 reflects another structural change with regards to countries' market power – the China Shock. Joining the WTO in 2001, China's role in trade determination was severalfold. First off, the labor market effects of exposed foreign trading competitors – particularly low and middle income countries – had a lasting effect and accelerated the race-to-the-bottom (Autor

et al. 2016). Policy measures concerned with cutting costs were less viable ways of improving competitiveness. On the other hand, the rising import demand resulting from the emergence of China as a middle income country had a significant effect on export demand for less developed countries. Income elasticity of demand for low-income countries showed a substantial increase, highlighting the increased demand for inputs to Chinese exports as well as heightened import demand as Chinese incomes rose rapidly. The role of the rise of China in the global market can not be overemphasized, particularly when discussing price competitiveness. Even before entering the WTO China had been accumulating substantially while upgrading industrially, therefore prepared to make a massive entrance. China had an effect on prices through several channels. They had such a scale effect on exports that they benefited from being able to price out competitors. The rise of China had a unique impact on global prices through a demand shock since they were both an exporting behemoth and emerging middle income country. A huge increase in production for export and domestic absorption led to growth in demand for raw materials. The scale effect of China meant they were not price taking and not vulnerable to the effects of deteriorating terms-of-trade. Unlike a typical small open economy, China's size as a consumer of raw goods gave them a monopsonistic power that constrained the ability of exporting countries to ramp up their prices. This is seen in the results of price competitiveness not being a significant determinant of export demand for the period following China's entrance to the WTO.

The period following 2008 marks not only the global financial crises but of equal importance, the commodity boom of the late 2000s. The first obvious factor driving the commodity boom was the continued rise of the BRIC countries' – particularly China – output and therefore demand for raw materials (Carter et al., 2011). Secondly, commodities became a popular market for speculative investors following the housing bubble – it has been suggested that commodity prices might be a better indicator of overall economic bubbles (Epstein, 2008).

An interesting pattern was observed for income determination of trade demand in the period of 1975-1984 that could be reflecting the rise of emerging markets. There was a clear rise in the role of world income on export demand growth for middle income countries. While income

Table 2.5: World Export Demand By Period

	(1) $\ln X$	(2) $\ln X_{65}$	(3) $\ln X_{82}$	(4) $\ln X_{95}$	(5) $\ln X_{01}$	(6) $\ln X_{08}$
$\ln Z$	2.590***	2.833***	1.742***	3.814***	2.407***	2.027***
	(0.117)	(0.193)	(0.318)	(0.505)	(0.165)	(0.321)
$\ln P_e$	-0.456***	-0.233*	-0.379**	0.614	0.672	-1.997**
	(0.122)	(0.0997)	(0.118)	(0.548)	(0.617)	(0.671)
constant	-14.01***	-16.59***	-6.734*	-27.60***	-14.88***	-5.296
	(1.092)	(1.649)	(2.858)	(5.070)	(1.980)	(4.087)
N	8770	2442	2305	1257	1446	1092
adj. R^2	0.566	0.392	0.072	0.161	0.387	0.147

Standard errors in parentheses

$^{+}$ $p < .10$, * $p < 0.05$, ** $p < .01$, *** $p < .001$

elasticities spike for high and low income exporters in the period following 1995, this effect was observed starting in the mid 1970s for countries in the middle income group. World income as a determinant of export demand more than doubled in this period. In this same period, there was an initial spike in these elasticities for the food/beverage and industrial supplies categories, and to a lesser extent consumer durables – the sectors making the predominant share of middle income exports. This can easily be attributed to rise in “South-South" trade openness and consumption growth in the emerging middle income countries. In the same period a large number of countries moved from the low to middle income groups and the share of [non-oil] trade between these groups also rose. Mirroring this, income as a determinant of import demand from low income countries rose substantially as did import sensitivity to prices for both low and middle income countries. The opposite of this trend was observed for high income countries – while early export-led growth was fueled by high income demand growth, income change from the wealthy group was a smaller determinant of demand for middle income exports in the decade following the oil shocks. The exception to these trends was the fuel and lubricant category. Each consecutive decade saw a decrease in the income elasticity of demand as well as a sequential rise in the price elasticity of demand with significance in all decades except prices in the most recent period.

Table 2.6: Export Volume Low Income

	(1) $\ln X$	(2) $\ln X_{65}$	(3) $\ln X_{82}$	(4) $\ln X_{95}$	(5) $\ln X_{01}$	(6) $\ln X_{08}$
$\ln Z$	2.164***	2.203***	1.683**	3.738***	2.342***	3.069***
	(0.225)	(0.295)	(0.637)	(0.805)	(0.323)	(0.499)
$\ln P_e$	-0.413**	-0.290*	-0.452*	1.736	1.147	-0.737
	(0.143)	(0.115)	(0.217)	(1.665)	(1.167)	(0.928)
constant	-11.54***	-12.05***	-7.243	-30.98***	-16.90***	-19.90***
	(2.116)	(2.547)	(5.714)	(8.977)	(4.622)	(5.442)
N	3682	1266	996	470	461	261
adj. R^2	0.380	0.278	0.048	0.134	0.333	0.258

Standard errors in parentheses

$^{+}$ $p < .10$, * $p < 0.05$, ** $p < .01$, *** $p < .001$

Table 2.7: Export Volume Middle Income

	(1) $\ln X$	(2) $\ln X_{65}$	(3) $\ln X_{82}$	(4) $\ln X_{95}$	(5) $\ln X_{01}$	(6) $\ln X_{08}$
$\ln Z$	2.271***	2.792***	1.525***	3.729***	2.461***	1.226^{+}
	(0.192)	(0.333)	(0.347)	(0.548)	(0.413)	(0.724)
$\ln P_e$	-0.459**	-0.350*	-0.420*	0.158	0.0623	-2.430*
	(0.148)	(0.135)	(0.164)	(0.440)	(1.122)	(1.005)
constant	-11.00***	-15.73***	-4.581	-25.57***	-14.12***	2.984
	(1.739)	(2.942)	(3.091)	(5.397)	(3.742)	(8.534)
N	2479	686	619	387	360	327
adj. R^2	0.551	0.410	0.153	0.319	0.322	0.086

Standard errors in parentheses

$^{+}$ $p < .10$, * $p < 0.05$, ** $p < .01$, *** $p < .001$

Table 2.8: Export Volume High Income

	(1) $\ln X$	(2) $\ln X_{65}$	(3) $\ln X_{82}$	(4) $\ln X_{95}$	(5) $\ln X_{01}$	(6) $\ln X_{08}$
$\ln Z$	2.327***	2.710***	2.417***	2.729***	1.899***	1.178*
	(0.141)	(0.198)	(0.301)	(0.687)	(0.207)	(0.462)
$\ln P_e$	-0.161	0.483	-0.317	1.573+	1.372	-1.940*
	(0.275)	(0.289)	(0.191)	(0.874)	(1.045)	(0.833)
constant	-10.73***	-14.74***	-11.18***	-18.44**	-10.43***	3.713
	(1.649)	(1.597)	(2.651)	(5.488)	(2.681)	(5.861)
N	2609	490	607	340	570	635
adj. R^2	0.605	0.532	0.215	0.126	0.361	0.058

Standard errors in parentheses

$^{+}$ $p < .10$, * $p < 0.05$, ** $p < .01$, *** $p < .001$

High income countries showed a trend not observed in the other groups for the periods of 1995-2000 and 2008-2014. Unlike low and middle income countries, price competitiveness *was* a significant determinant of demand for the high income group during these periods. When considering the entire sample period prices are not significant but are very significant in the most recent decade. In addition to this significance the magnitudes are of interest. Income elasticity of demand for exports for high income countries was lower and the estimated price elasticity of demand for exports was higher than any other test for country, decade, or sector. This change could be perhaps be explained in part by the formation of the European Union which increased “North-North" competition through cost cutting, primarily through wage suppression made possible by significantly increased labor mobility – an effect similar to the China Shock in the same transition period.

2.5 Summary and Implications

Most of the observations in this paper are consistent with economic intuition while highlighting some important historical trends with regards to structural change and the viability of certain export led growth strategies. Not surprisingly, low income countries are more dependent on competitiveness – particularly in sectors of basic and primary goods with many global suppliers of homogenous goods – as a determinant of trade growth. This is made clear by the significance

and magnitudes of the price elasticities for both countries and the sectors in which they exports. Findings with regards to higher income countries are consistent with this intuition; the price elasticities of the sectors that high income countries are more prone to export from are lower, and not significant in many cases. This is also seen when looking at the high income group for the entire period – competitive advantage in prices is not significant. However, these observations become nuanced when looked at in the context of global structural change.

In all the periods prior to the emergence of the New Global Economic Order in the mid-1990s *competitive* advantage was an important determinant of demand for countries exporting primary and basic manufactured goods. This matters because during that period some countries were able to improve their competitive advantage with protectionist trade policies and in doing so join the high income country group by the end of the 20th century. In the same period it was seen that price competitiveness was not as important a factor for determining export demand for high income countries. Income elasticities were higher for this group in this period showing that producing higher value-added goods allows for greater benefit from world demand growth and reduced need for state intervention.

Not surprisingly, the era of globalization and trade liberalization reduced the role of price competition, or more likely, the opportunity for developing countries to intervene to improve competitive advantage. In the periods following the formalization of the WTO prices ceased to be a statistically significant determinant of export demand *for low income countries*. This is important because it demonstrates that with the new world order developing countries trying to grow through trade may have far *fewer policy options at their disposal*, and what options they have may be less effective. Curiously, it was not until this rise of the liberal institutions' power that prices became important determinants of demand for the high income countries – those countries producing goods with demand less influenced by prices. This begs the question: *who* gains from trade under the New Global Economic Order and what have been the benefits of this induced structural change?

Table 2.9: Export Volume By Period

	(1) $\ln X$	(2) $\ln X$	(3) $\ln X$	(4) $\ln X$	(5) $\ln X$	(6) $\ln X$
$\ln Z$	2.561***	1.386***	2.289***	1.550^{+}	2.918**	2.964***
	(0.192)	(0.406)	(0.567)	(0.901)	(0.945)	(0.563)
$\ln P_x$	-0.454***	-0.208*	-0.393**	-0.0294	0.696	-1.739*
	(0.120)	(0.0963)	(0.136)	(0.977)	(0.626)	(0.727)
$\ln P_r$	0.473**	0.670***	0.0815	-1.207	-1.103	-0.00770
	(0.171)	(0.173)	(0.294)	(1.060)	(1.045)	(1.397)
_cons	-14.83***	-4.966	-11.98*	-3.561	-17.35*	-15.38***
	(1.605)	(3.429)	(4.685)	(9.006)	(7.578)	(4.033)
N	8770	2442	2329	1077	1446	1092
adj. R^2	0.566	0.404	0.093	0.169	0.388	0.157

Standard errors in parentheses

$^{+}$ $p < .10$, * $p < 0.05$, ** $p < .01$, *** $p < .001$

Table 2.10: Export Volume Low Income

	(1) $\ln X$	(2) $\ln X$	(3) $\ln X$	(4) $\ln X$	(5) $\ln X$	(6) $\ln X$
$\ln Z$	2.606***	1.429*	2.676**	1.102	4.868*	3.512***
	(0.421)	(0.569)	(0.907)	(1.523)	(2.169)	(0.662)
$\ln P_x$	-0.440**	-0.281*	-0.428*	1.999	1.172	-0.749
	(0.138)	(0.112)	(0.215)	(1.681)	(1.110)	(0.802)
$\ln P_r$	0.161	0.537*	-0.352	-3.679*	-3.149	-0.571
	(0.263)	(0.265)	(0.434)	(1.839)	(2.267)	(1.508)
_cons	-16.07***	-6.217	-15.92*	-0.233	-34.28+	-23.16***
	(3.527)	(4.785)	(7.632)	(15.09)	(17.48)	(5.221)
N	3682	1266	996	470	461	312
adj. R^2	0.384	0.280	0.056	0.153	0.382	0.265

Standard errors in parentheses

+ $p < .10$, * $p < 0.05$, ** $p < .01$, *** $p < .001$

Table 2.11: Export Volume Middle Income

	(1) $\ln X$	(2) $\ln X$	(3) $\ln X$	(4) $\ln X$	(5) $\ln X$	(6) $\ln X$
$\ln Z$	2.116***	0.400	1.944***	3.252***	3.234**	2.328***
	(0.253)	(0.631)	(0.413)	(0.661)	(1.123)	(0.506)
$\ln P_x$	-0.443**	-0.254*	-0.424*	0.150	0.128	-1.376
	(0.148)	(0.112)	(0.161)	(0.441)	(1.099)	(1.069)
$\ln P_r$	0.552**	1.016***	0.0879	-0.470	-0.757	-0.985
	(0.197)	(0.208)	(0.235)	(0.565)	(1.051)	(2.097)
_cons	-10.82***	3.589	-8.759*	-20.34**	-20.06*	-8.473+
	(2.148)	(5.364)	(3.551)	(6.256)	(9.262)	(4.363)
N	2479	686	619	387	360	327
adj. R^2	0.552	0.454	0.158	0.318	0.324	0.121

Standard errors in parentheses

+ $p < .10$, * $p < 0.05$, ** $p < .01$, *** $p < .001$

Table 2.12: Export Volume High Income

	(1) $\ln X$	(2) $\ln X$	(3) $\ln X$	(4) $\ln X$	(5) $\ln X$	(6) $\ln X$
$\ln Z$	2.111***	2.334**	2.455***	3.609***	0.669	0.372
	(0.196)	(0.830)	(0.475)	(0.989)	(0.485)	(0.640)
$\ln P_x$	-0.203	0.472	-0.315	1.270	1.119	-2.009*
	(0.271)	(0.303)	(0.191)	(1.762)	(1.061)	(0.873)
$\ln P_r$	0.379	-0.360	0.285	-0.794	-0.144	4.110**
	(0.263)	(0.516)	(0.302)	(1.989)	(1.177)	(1.280)
_cons	-9.415***	-10.47	-12.20**	-23.61*	2.397	2.780
	(1.647)	(6.952)	(3.939)	(9.885)	(3.948)	(5.078)
N	2609	490	607	400	510	635
adj. R^2	0.606	0.532	0.214	0.169	0.322	0.076

Standard errors in parentheses

$^{+}$ $p < .10$, * $p < 0.05$, ** $p < .01$, *** $p < .001$

Chapter 3

Structural Change and Different Flavors of Industrial Upgrading: A[nother] Comparison of East Asian and Latin American Experiences

3.1 Overview

A great deal of literature has developed since the 1980s discussing the development experiences of East Asia and Latin America – with broadly varying analyses explaining the success of the prior and failure of the latter through the second half of the 20th century. In the post-war period up until the mid-1970s both groups appeared to be on a similar growth trajectory however there was a clear divergence by the beginning of the 1980s. This paper seeks to contribute to the discussion by incorporating insights regarding competitive advantage and strategic trade policy from the previous papers into prevailing explanations of the differing experiences in the context of institutional and structural change. It is argued that the development state model of East Asia is *no longer* replicable due to structural changes in the global economy.

In the period of 1950-1981 both East Asia and Latin America saw average annual per capita growth rates above 5% – almost double that of the wealthy 'Northern' countries in the same period[23]. East Asia maintained this trajectory through the end of the 20th century whereas Latin America abruptly stagnated in the early 80s beginning with a wave of debt crises. The successes and failures have been endlessly debated since the mid 80s. Starting with Amsden's (1985, 1989) definitive analysis of the East Asian Miracle (EAM) followed by others' (Wade (1990) and Chang (1993a) for example) elaborations, superior explanations for the effectiveness of the East Asian

[23]It is crucial to acknowledge that Latin America's emergence began much farther back. Ocampo (2013) and others identify three unique waves of growth: the period between 1870 and the great depression, the recovery to 1960, and 1960 forward. For the sake of comparison between experiences this paper is concerned primarily with the latter, as East Asia saw almost no growth until the post-war era.

development model have been developed – largely built on analysis of institutional design, social planning, and forward-looking policy. The Latin American experience (failure) has been equally analyzed with substantially less debate due to the unambiguous nature of its downfall – clearly resulting from unsustainable financial positions, corrupt power structure, and short-sightedness with the advent of neoliberal globalization. Much of the reason for the ongoing debate surrounding the EAM is the question of its replicability (Chang, 2003a). Social, institutional, and cultural heterogeneity of unique geographic regions naturally enable this argument – the fault with these challenges is that policy and institutional structure is replicable in many respects. The purpose of research in growth and development is to find ways to improve economic outcomes, therefore determining causes of success and failure is fundamentally important.

Both groups realized pursuit of industrial upgrading was necessary for reducing dependence on foreign supply, vulnerability to fickle international demand, and inducing productivity growth. The key distinction here was the motivation – Latin America had an inward perspective concerned exclusively with ISI whereas the East Asian group had a long-term outward view. As Palma (2003, p.143) perfectly summarizes: “In contrast to East Asia, Latin America understood ISI and manufactured-export-led growth as being two successive stages, and found it particularly difficult to switch from the first to the second." As has been argued in the previous two papers, import substitution and export orientation are complementary strategies. Both industrial policies serve different purposes but are mutually dependent on each other for success. Although the Washington Consensus would argue that it would be beneficial to export according to comparative advantage, East Asia sought both to improve their position by specialization through industrial upgrading and therefore not only improving their comparative advantage – ‘endogenously created’ as Palma (ibid.) puts it – but developed a competitive advantage and minimized the effect that deteriorating terms-of-trade had on developing countries’ external position (Dutt, 2003).

3.2 The 'Development State' and Strategic Upgrading

The East Asian model of industrial upgrading could be considered a textbook example of optimal macroeconomic management not focused on price stability[24]. These countries promoted industrial development, strategically targeting those with high productivity growth potential, positive technological spillover, and complementary investment. These variations of infant industry protection included crucial exports subsidies, particularly in the form of tariff rebates for inputs used in the production of export goods (Amsden, 1985). This highlights the awareness of export targeted growth even in early stages of ISI. Another strategic policy complementing managed competition was subsidies for further assimilation of foreign technology. This was supported by public sector education and training in conjunction with spending on private and public sector R&D to maximize technological spillover. In an effort to maintain self reliance, FDI was strictly restricted: while 6% of Korean multinationals were wholly-owned that number was 60% for Brazil (Ffrench-Davis et al., 1994). Policies to repress consumption demand facilitated the domestic savings necessary for investment – capital that the largely publicly owned banks could direct to targeted industries. Furthermore, imported consumption goods were significantly discouraged through heavy tariffs and taxes to minimize foreign exchange expenditure thus facilitating the decreasing current account deficits through the period of ISI.

The Latin American model could be compared to this as baseline ISI without strategy, adaptability, and farsightedness. During the post war era the shift to ISI policy was more inwardly directed as commodity-export-led growth was viewed as ineffective and industrial upgrading was targeted at manufacturing for domestic consumption (Wells, 1988). Despite the per capita income growth of Latin American countries, the highly unequal distribution of income did not reduce import demand. Although manufacturing grew an unprecedented 6.5% annually from 1950-1981, the redirection of resources led to capacity shortages for primary commodity export demand (Marglin and Schor, 1990). The foreign exchange constraint from the declining export growth was

[24]With the exception of Taiwan, all these countries tolerated high inflation in exchange for 'pro-investment macroeconomic policy' (Chang, 1993b).

exacer bated by deteriorating terms-of-trade – creating an unsustainable dependence on foreign capital. Herein lies the key distinction between strategies, or lack thereof. East Asia was able to reduce import demand strategically by targeting sectors with export growth potential – sectors that experienced improving terms of trade – while maintaining autonomy from international finance.

Figures 1-6 show the composition of exports for a group of East Asian and Latin American countries from 1962-2016, broken up by SITC 2 categories. The graphs of South Korean and Singaporean exports clearly show the big push from the late 1960s to mid 1990s – about a decade behind Japan – towards exports of technologically intensive goods. These are goods that benefit more global income demand growth and for which there is less demand sensitivity to relative prices[25]. In the previous paper it was shown that these goods have lower price elasticities of demand; once the structural shifts of the mid 1990s reducing the role of competitive advantage for less advanced economies occurred a majority of these countries exports were already of goods. Conversely, the graphs of Brazil, Argentina, and Chile's export composition shows a maintained dependence on primary goods for which demand is highly sensitive to prices. There was very little adjustment to changing global demand or insulation from the structural change that occured with the New Global Economic Order. The graphs of Brazilian and Chilean exports show the commodity boom of the late 2000s. By failing to industrially upgrade with and EOI focus this group remained constrained to the fickleness of global demand for primary goods and is now trapped in production of low value added export goods for which they are now price takers, as seen in paper two has become the case for basic goods produced by low and middle income countries. This is evidence of how the structural change and transition towards price taking and failure to invest in the future has placed these countries in the middle income trap..

Besides the more outwardly looking approach, a major component of East Asia's success was the type of structure of industrialization. Not only did these countries increase overall capacity, but productivity and competitiveness was a key focus. Although the East Asian development states heavily supported industries, this support was withdrawn for industries that were low performance

[25]Note automobiles and capital goods compose the majority of the machinery category.

Figure 3.1: Korean Exports: 1962-2016

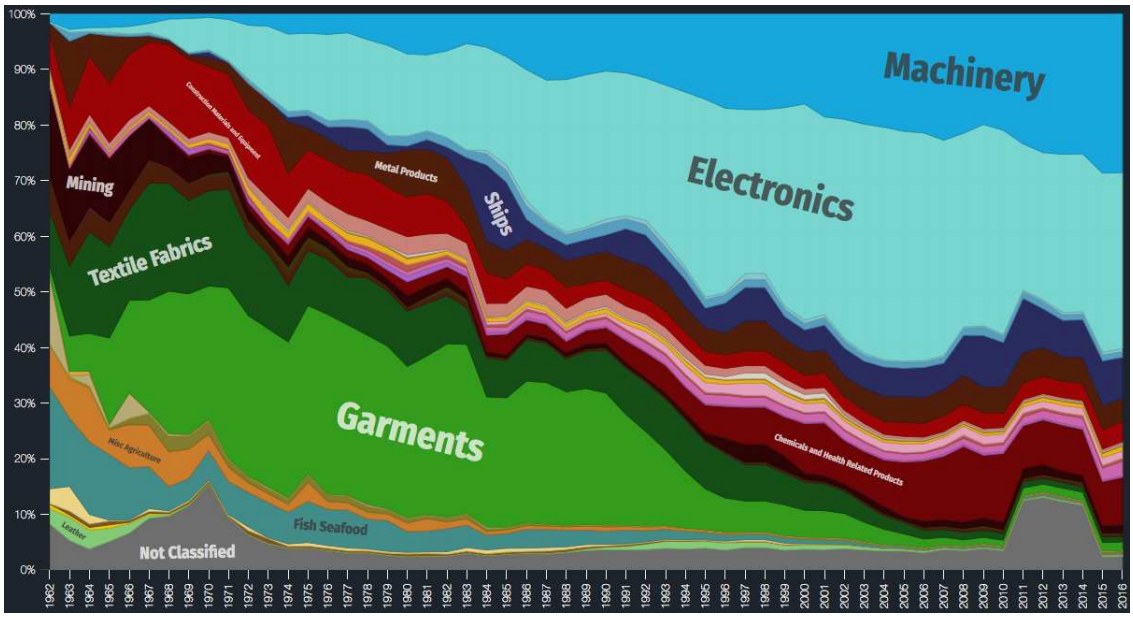


Figure 3.2: Singapore Exports: 1962-2016

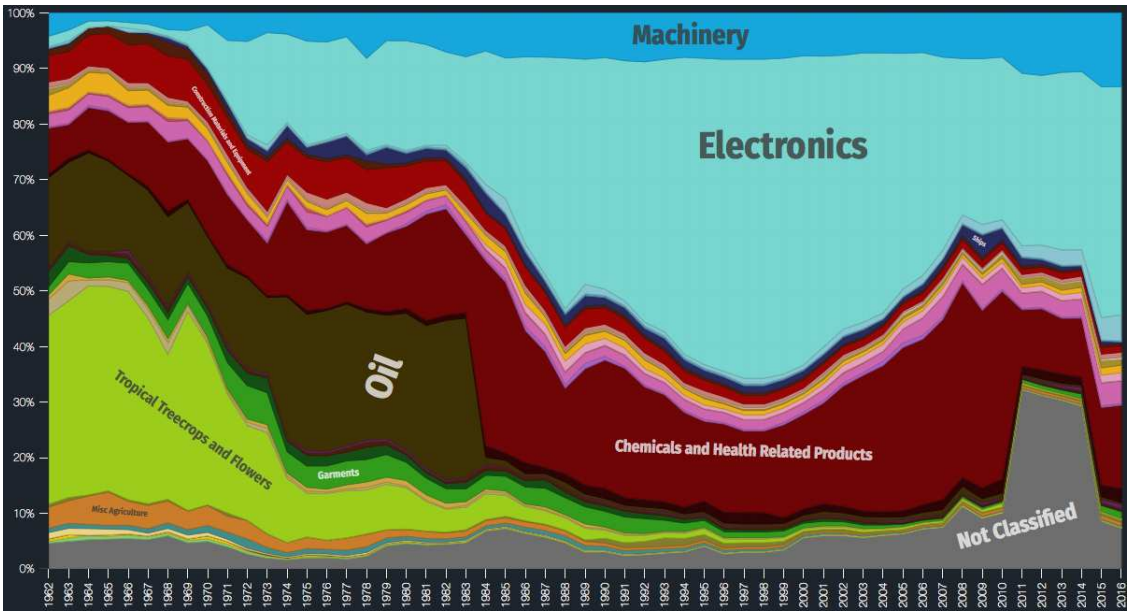


Figure 3.3: Japan Exports: 1962-2016

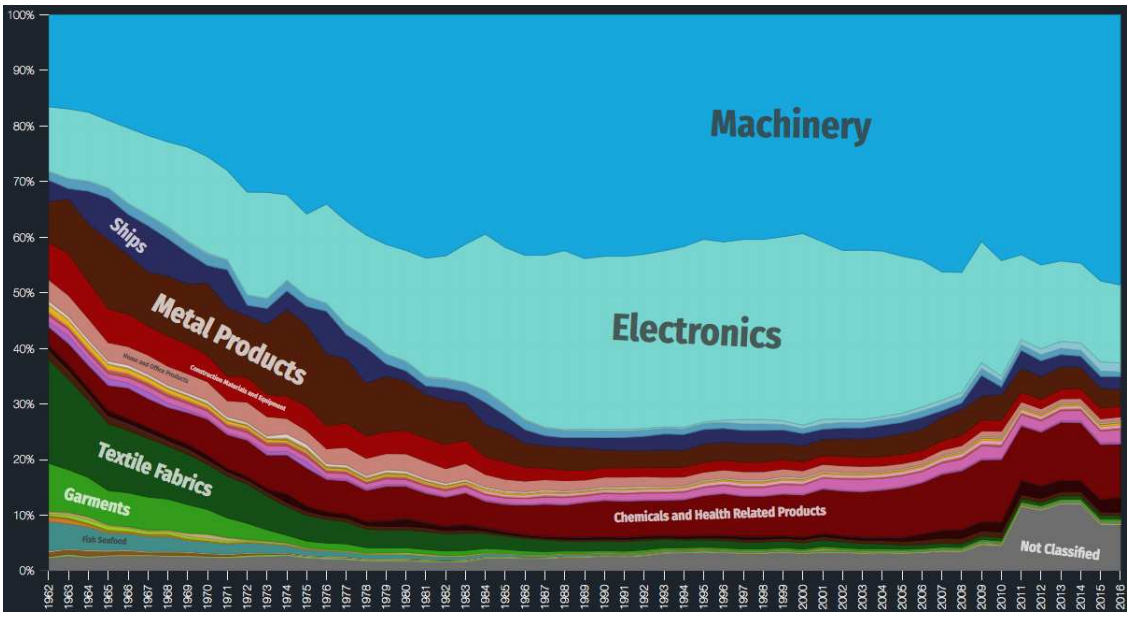


Figure 3.4: Brazil Exports: 1962-2016

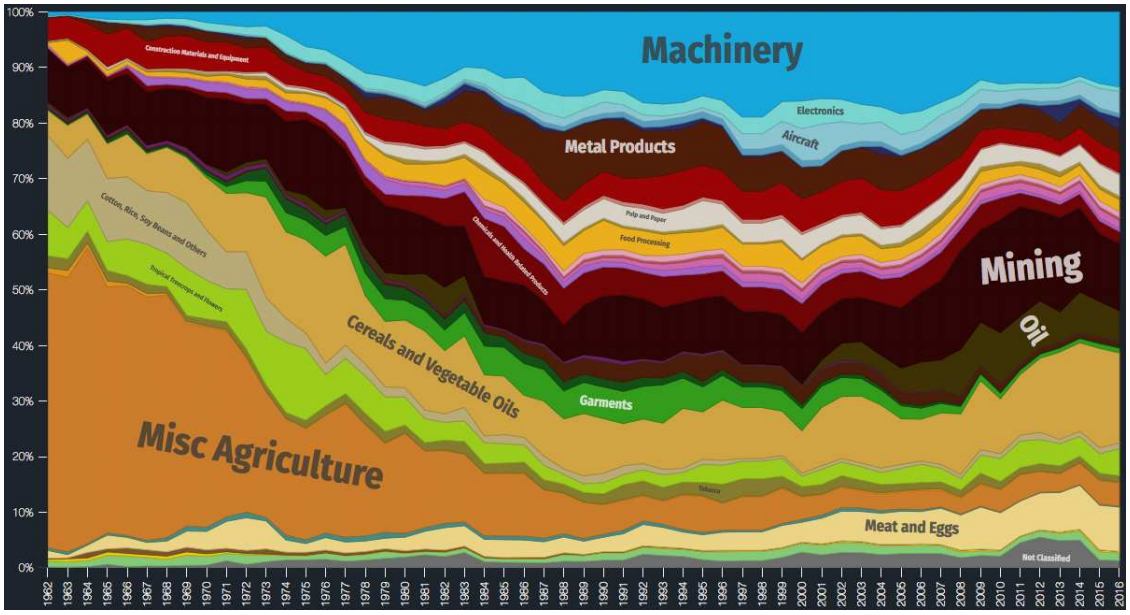


Figure 3.5: Argentina Exports: 1962-2016

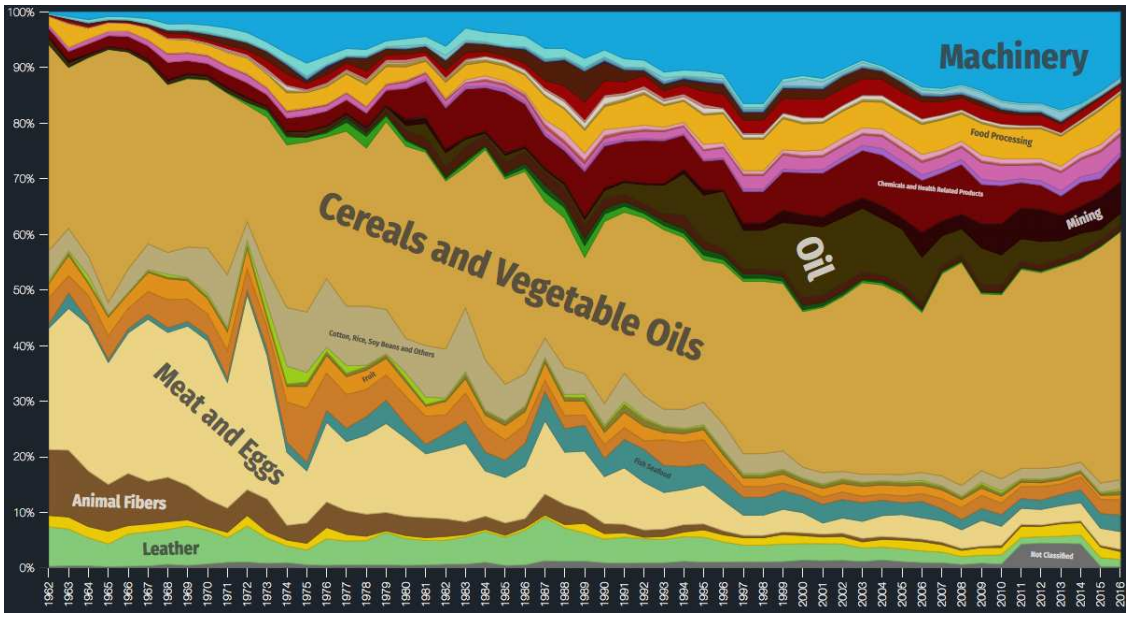
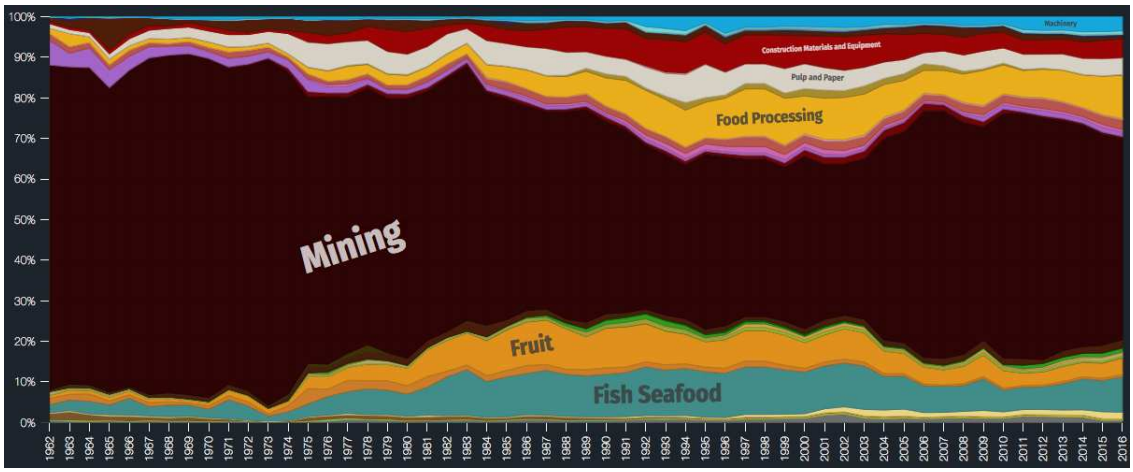


Figure 3.6: Chile Exports: 1962-2016



or ‘outgrew need for protection’ (Chang 2003 p.116). Productivity policy was not just related to a big push for output growth but targeted at creating economies of scale. Sectors targeted were those that not only had superior terms of trade but also could produce more competitively. An example is the Japanese and Korean prohibition of luxury automobile production – this limited the variety and therefore reduced the unit cost of passenger cars (Amsden and Kim, 1985). Latin America on the other hand failed to enact this ‘Schumpeterian’ upgrading (Dosi et al. 1990) as political elite and concentrated wealth resulted in insulation of sluggish firms and lack of productivity growth.

3.3 The Role of Structural Change

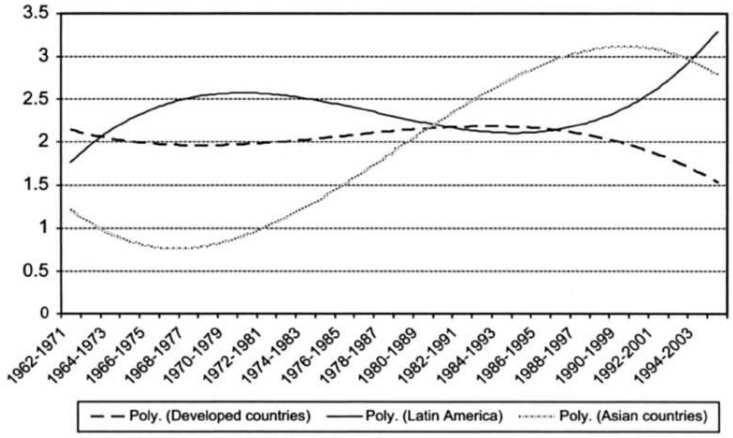
3.3.1 Comparative Advantage

In the baseline version of Thirlwall’s Law the difference in growth rates is equal to the ratio of income elasticities of demand for exports (ε) to the income elasticities of demand for imports (π). It is therefore the case that structural changes toward production in more technologically intensive sectors with correspondingly higher international demand growth is an effective strategy for improving one’s situation. Dosi et al. (1990) identify these as sectors with ‘Schumpeterian’ and ‘Keynesian’ efficiency. Sectors that exhibit ‘Schumpeterian’ efficiency are those which create greater technological externalities and correspondingly have higher technological opportunities and rates of innovation. ‘Keynesian’ efficiency on the other hand considers sectors where internal *and* external demand grows at higher rates and therefore further stimulate increases in production and investment. Though these do not necessarily go hand in hand, it is typically the case that sectors which demonstrate one of these fit the other category. This distinction is crucial to comparing the effectiveness of industrial upgrading and long-run growth trajectories of the two groups. Considering the narrative from above it is clear that Latin America failed to improve in either category while East Asia effectively pursued ‘Schumpeterian’ and ‘Keynesian’ efficiency upgrading in such a way that they piggybacked off each other. For an open economy, structural change to improve these is vital for closing the income gap – both by improving trade performance in a way that domestic growth further benefits from world growth as well as raising potential output.

Considering the type of ISI pursued by each group this provides a clear insight to why Latin America failed to converge. The Latin American approach to ISI was that of producing for domestic consumption and growing simply through increased output. Though this did effectively raise the group to middle income status and result in a substantial increase in manufacturing through to the early 1980s, it hurt the upward potential from industrial upgrading. As a result of focusing on manufacturing for domestic consumption they failed to improve terms-of-trade due to primary goods being the main composition of export, thus keeping a low ε, while the rapidly rising income [of the upper class] resulted in a rising income elasticity of demand for imports. By not upgrading with export orientation, the deteriorating terms-of-trade made them more vulnerable to external imbalances – particularly in the absence of export capacity growth. Due to the primary nature of export goods, Latin American countries failed to benefit from world import demand growth. Cimoli et al. (2010) perform rolling regressions estimating the evolution of the π for different groups of countries between 1962 and 2003, shown in figure 7. There is a clear rise in the period between 1962 and the early 1980s for Latin America and then another from the early 1990s on. East Asia on the other hand shows a *decline* in π for the period leading up to the mid 1970s – clearly capturing the strategic policies discouraging imports of consumption goods. Unlike Latin America, from the early 1980s until the end of the 1990s there was consistent rise in π. The reason this did not harm East Asian growth was because it was matched by a greater rise in ε in the same period – a clear demonstration of structural change improving 'Keynesian efficiency'.

Araujo and Lima (2007) present a multi-sectoral version of Thirlwall's Law in which the respective income elasticities are determined by the elasticities of each sector weighted by that sector's share of national exports and imports. This makes it possible for countries to raise their balance of payments constrained growth rate by upgrading production to industries with higher ε. The East Asian strategy of industrial upgrading effectively followed this by shifting towards more technologically-advanced and productive sectors and effectively combined advancements in 'Schumpeterian' and 'Keynesian' efficiency. Looking at the change in composition of exports and imports for a select group of East Asian countries it is clear that the composition of tradeables

Figure 3.7: East Asian and Latin American Income Elasticities of Demand for Imports



Source: Cimoli et al., 2010.

shifted in a way that is favorable to the predicted growth rate of the multi-sector Thirlwall's Law. Using this multi-sector model, Gouvea and Lima (2010) estimate the income elasticities of sectors over time for a group of Latin American and Asian countries. Differentiating sectors by technological intensity they clearly demonstrate that in fact the Asian countries effectively raised their balance of payments constrained growth rate by pursuing domestic production of more technologically advance goods with much higher income elasticities; this is evidence of supply upgrading and demand adaptation. Their estimates of Latin American π rose faster than ε. The growth rate predicted by the multi-sector Thirlwall's Law was consistent with the observed values for both groups.

3.3.2 Competitive Advantage

What these studies – and the rest of the literature – fail to take into consideration is the role these types of structural shifts have on competitiveness in the face of deteriorating terms-of-trade for primary and commodity exports. The discussion in these papers is concerned with improving countries' *comparative* advantage. East Asia did this by boosting industrial productivity with technological improvements for both export and domestic absorption whereas Latin America's focus on ISI for domestic consumption neglected its export sector. Increasing 'Schumpeterian' efficiency, as a component of structural change, is equally important in terms of competitiveness.

By *producing* more efficiently through technological improvement the structural gain is raising potential output and lowering unit labor costs – not simply producing more income elastic goods. This is highlighted by East Asian assimilation of foreign technology and limitation of product variety identified by Amsden and Singh (1994). Specialization helped these countries produce more competitively and absorb larger global shares of exports. As shown in the previous paper and Gouea and Lima (ibid), these are sectors with lower price elasticities and they also have fewer global competitors. Cimoli et al. (ibid) show that not only did East Asia improve the technological specialization compared to Latin America, but this comes hand in hand with greater world export shares of individual sectors. This matters because as the amount of foreign competetion falls, so does the role of price competitiveness – clearly demonstrated by the lack of significance of price measures for high income countries and technologically advanced goods seen in the previous paper.

The modified Thirlwall's Law presented in paper one highlights that not only is improving comparative advantage – captured by $\frac{\varepsilon}{\pi}$ – vital for raising the constrained growth rate, but improving *competitive* advantage – higher ψ and lower η – has the same effect. Although Latin America's import substitution strategy did increase domestic output, the lack of focus on export output in fact impaired their competitiveness and the lack of movement up the value-added ladder prevented them from benefitting from global growth while exporting goods that face deteriorating terms of trade.

3.3.3 What Didn't Work, What Could Have?

It is worth noting that not all of the East Asian countries succeeded nor implemented the same model of state activism. The generalizations of the EAM in this paper are primarily concerned with what are considered the first-tier NICS: Japan, Taiwan, South Korea, and Singapore[26]. A group of countries – including Thailand, Malaysia, and Indonesia among others – have been identified as the second-tier NICS of South East Asia. This group of countries have not seen the same long

[26]Hong Kong is included in the first-tier group but did not pursue the same line of state intervention industrial policy (Chang, 2003a).

run success and appear to be victims of the middle income trap. These countries took longer to rebound from the Asian Financial Crisis of the late 1990s and have since remained in the middle income group. Countries in the middle income trap often see a loss in export competitiveness as wages rise with income and they are unable to move up to production of high value added markets. The second-tier East Asian NICS trapped at middle-income level generally have: (1) low investment ratios; (2) slow manufacturing growth; (3) limited industrial diversification; and (4) poor labor market conditions (Asian Development Bank, 2012). Something this group failed to do as they emerged was harness the growing domestic demand from rising middle income purchasing power. The first-tier group incorporated into the development model industrialization directed at producing for domestic consumption as well as export. If we are to consider the second-tier middle income trap in the context of global structural change a key constraint could be the rising importance of global value chains. In an era where production of final goods comes from inputs of so many origin countries, EOI can hit a wall if export revenue becomes dependent on intermediates and input. For the second-tier Asian NICS this could be an explanation of their failure to move to higher value added markets.

Much of Latin America has also fallen into the middle income trap for similar but different reasons. While the second-tier Asian countries probably entered the game late, much of Latin America failed to rise when they had the opportunity. This is partly a result of focus on ISI with failure to effect export led growth and partly attributed to the resource curse. High income inequality and inefficient use of resource revenue are highlighted by the Sub-Saharan-Africa experience. Many countries facing the middle income trap have failed to direct resource revenue in a forward looking manner. More than 90% of exports for Equatorial Guinea, Nigeria, and Angola come from minerals – as a result this dependence on resource revenue has led to misaligned exchange rates, political authoritarianism, high inequality, and decline in non-resource sectors (Brookings 2018). Similarly, much of the missed opportunity of Latin American growth in the 1960s and 1970s could be linked to commodity wealth going to an elite few and not towards infrastructure, education, and export diversification.

What could have been an alternative? Looking towards Botswana highlights what could have been done. Botswana has benefited from diamond wealth and has not fallen to the resource curse by pursuing policies that prevent the conventional symptoms of the middle-income trap. They used their resource wealth to pursue economic diversification, implemented strict fiscal restraints to shield themselves from fluctuations, and have invested their resource revenues in a sovereign wealth fund for the use of future generations (African Development Bank, 2012). Looking at Latin America, each incidence of commodity price boom has led to exchange rate misalignment, excess borrowing, and isolated distribution of wealth with no forward looking investment in education or infrastructure. As a result, any possible opportunity for improved competitive or comparative advantage has been squandered. With the role of Chinese demand and the price taking commodity exporters are faced with it is very likely the case that the opportunity has passed.

3.4 Replicability of EAM with Global Structural Change?

The question of replicability is determined by the context as well as the development model. Most of the debate about replicability is concerned with whether the East Asian development model could be replicated in other regions. Although the [weak] arguments against replicability are largely founded on the uniqueness of 'Confucian' culture, this is rather misleading[27]. To begin with, Confucian culture existed for centuries before the 1950s, when the Miracle began (Chang, 2003a). More importantly, what this argument is grounded on is the institutional design that arose from this culture. It is clear that although the quality of institutions does determine the prudence of strategic policy, there is no reason to assume that institutions can not evolve or replicate the strategies capable of implementing similar industrial upgrading. The basis of the East Asian strategy was a collection of prudent demand and supply side policies. Effecting the demand side-policies – those targeted at influencing import and export prices through tariffs, rebates, and exchange rate management in addition to pursuing export sectors for which demand grows faster – are not exclu

[27]Krugman (1994) went so far as to claim that the entirety of East Asian success was based on 'Soviet style accumulation' and that none of the success should be attributed to prudent state policy.

sive to geographic region. Similarly, the supply-side policies that were implemented are not unique or exclusive to a single group – forcing innovation and productivity growth through technology assimilation in addition to increasing capacity through capital accumulation and firm incentivization. It is the complementarity of these strategies that had such a noticable impact – and it is the significance of this complementarity that may suggest the EAM is not replicable in the modern era of globalization.

As a theoretical model, the East Asian strategy is perfectly replicable. A few lines of reasoning do point away from replicability of the East Asian miracle in reality, though they are somewhat circumstantial. The first is luck. As was pointed out that 'Schumpeterian' and 'Keynesian' efficiency do not necessarily go hand in hand. Increasing 'Keynesian' efficiency includes targeting sectors for which world demand grows faster. Cimoli et al. (ibid, p.390) refer to the vagaries of the 'commodity lottery' – increase in international demand for some goods does not necessarily coincide with the technological intensity of sectors. It is possible that East Asia 'got lucky' and targeted technology intensive export sectors which produced goods that just 'happened to' see increasing global demand. By creating a technological intensity index of manufacturing, Cimoli et al. (ibid.) clearly capture structural change improving Schumpeterian efficiency in East Asia but not in Latin America – something that is *strategy* based, not luck – whereas they argue there is not an effective way of empirically capturing the effect of regional Keynesian efficiency.

The second, and insurmountable, issue of circumstance is international structural change and the 'new international trading order' marked by the rise of the WTO, NAFTA, IMF etc.. East Asia benefited by implementing protectionist trade policy in an era were this degree of autonomy was more tolerated. Chang (2003b) argues that although there are stricter restriction on tariffs and infant industry protection there is still much wiggle room, loopholes, and grey area for developing countries to intervene in trade. These include policies such as an allowance of 5-10 years to cut tariffs, 8 year infant industry protection, and the balance-of-payments clause allowing emergency tariffs. Although the WTO does not require total elimination of tariffs, Amsden (2000) shows that in the beginning years of the WTO there *was* a drastic fall in trade protection among developing

and middle income countries. Supporting this is evidence from the preceding paper that since the formation of the WTO in 1995 price intervention ceased to be a significant determinant of demand, *particularly for low income countries and those exporting primary goods/commodities* – whereas prices did become a significant determinant of trade demand between high income countries. Without the option of strong protectionism and corresponding trade targeted industrial policy it may not be as viable to replicate the effectiveness of competitive advantage as seen in the early stages of EAM.

In addition to policies reducing trade intervention, the trade-related intellectual property rights (TRIPS) agreement of the WTO may present another modern barrier to replicating the EAM. A large part of the Schumpeterian upgrading arose from the assimilation of foreign technology and production methods. With the rise in intellectual property rights this may not be as feasible, at least while maintaining domestic ownership of production. Part of the East Asian strategy included minimal foreign firm ownership and public support for R&D that would have higher likelihood of technological spillover. It is argued (for example National Law Center for Inter-American Free Trade, 1997) that a benefit of protection of intellectual rights is the encouragement of FDI. The reality is that patent protection is a small determinant of FDI decisions and foreign ownership of intellectual property would prevent autonomy for public competition intervention. There is ample evidence that stronger patent laws result in higher prices[28] and greater abuse of monopoly power by transnational corporations in LDCs with limited anti-trust enforcement (Chang, 2001). Most importantly, stronger patent law enforcement (for foreign owned intellectual property) means royalty payments and profit repatriation which can only harm countries with already precarious balance of payments positions. While East Asia subsidized its domestic industry it kept income payment outflows low (relative to other low/middle income countries) until the 1990s.

Another possible reason for the irreplicability of the holistic competitive advantage strategy not related to institutional developments is the nature of production of final goods. The role of global value chains in modern production means import prices are greater determinants of export

[28] See open letter from the Royal Society to *The Financial Times* (2001) for example.

prices. The previous paper proposed that using the alternative measures of competitiveness avoided capturing the effect of pass through costs when considering investigation of competitive advantage. It is very likely the case that with imports being such a large component of exports the potential for improving competitive advantage through raising Keynesian efficiency is no longer a viable strategy – particularly with exogenously determined intermediate prices.

There is no reason to suggest that the strategies of industrial upgrading and state management enacted could not be replicated, in theory. Active institutional involvement in internal structural change is by no means constrained to a geographic region – East Asia didn't even have the beneficial initial condition of resource endowment[29]. However, in reality, the strategy may not be viable with the new world economic order. The methods of structural change and heavy handed intervention in trade targeted industrial upgrading may not be permissible with new restrictions on trade protection and [domestic] Schumpeterian innovation.

3.4.1 The Chinese Exception?

The question naturally arises as to whether China is an exception to the irreplicability of the first tier east asian model. Although the modern global economic structure minimizes the potential for replicating the protectionist measure to improve price competitiveness, China has clearly benefited from low cost high volume exports. A simple explanation for this is the scale effect – China is not a *small* open economy. China's entrance to the global market prevented any smaller economies from having a competitive advantage. As the results showed in the previous paper, the period following China's admission to the WTO saw the effects of price competitiveness cease to be a significant determinant of export demand. Preceding the period of unprecedented export growth China proactively pursued ISI – in the period leading up nearly 50% of GDP was investment spending. Corresponding with this was an element of crazy competitiveness built into the industrial structure, heavily influenced by state support of state owned enterprise.

[29] See Brookings Institute (2018) paper on Wakandanomics for a discussion on the effective use of natural endowment to induce technical change.

Although the productivity growth and complementary industrial push of the 1990s enabled a downward cost push in domestic production, the role of China in determining the global role of price determination came from the scale of demand. The fact that China contributed so much to share of both export and import volume meant that they were not price takers. This ability to price out competition and set prices as a monopsony eliminated the ability of smaller open economies from benefiting from any potential competitive advantage. China's terms-of-trade *have* declined as a result, but the volume of exports more than compensates. The declining barter terms-of-trade have been more than offset by the exploding income terms of trade.

So, is this a modern example of the original East Asian model? Yes and no. It is a sort of hybrid of the supply side capacity growth seen in the first tier model with an alternative mechanism driving competitive advantage. The sequence of their experience is more analogous to the Latin American strategy with the advantage of scale. Pursuing ISI and setting up for EOI is more akin to what Palma (2003) identified as something Latin America failed to do. The Chinese scale effect is the big distinction – the pure size has made competitiveness policies less important for the demand side of their export led growth. If anything, this has been an impairment for Latin America more than anyone. China's price setting power affects exporters of raw material more than anyone else, although it has shown a significant effect on neighboring Asian exporters of intermediate goods. Yes, China has effectively implemented a growth strategy parallel to the supply side methods of the first tier East Asia countries. But no, the demand side component of their competitive advantage comes primarily from an alternative mechanism – and the scale that they have benefited from is not replicable.

3.5 Closing Remarks

It could be suggested that the East Asian model was an example of complementary demand and supply side policies. By pursuing industrial upgrading there was a marked rise in productive capacity; this worked because there was a simultaneous combination of policies to ensure there would be demand for domestically produced goods from developing industries. Internally, this

was observed in the measures to minimize domestic competition for fledgling firms – *with growth potential* – while encouraging domestic consumption of domestically produced goods. Externally, protectionist policies had both supply and demand side components by improving competitiveness while the industrial policies targeted increasing supply of goods for which there would be greater world demand growth.

The New Global Economic Order has implemented structural change such that demand side economic policies are ineffective tools for open economy growth. While policies to improve productivity have not necessarily been impaired it is the complementarity that has been lost. Demand side policies with respect to increasing price competitiveness provide the foreign currency necessary for industrial upgrading – the crucial component of ISI and EOI – seem less viable. Given the structural changes that have occurred, first with the free market trade liberalization and then with the Chinese colossus eliminating room for competitive advantage improvements, there is little room for price intervention. It was shown that in fact relative prices have become significant for high income countries. A cynical view might be that the era of financialization has made it in the interest of the hegemony to keep developing economies dependent on capital flows as a source of currency for necessary imports and therefore maintaining precarious balance of payments positions.

Akin to Palma's statement in the beginning of this paper, Ocampo (ibid. p.28) suggests Latin America must find nuanced ways to do more than increase productivity, "more successful productive development efforts mounted by East Asian countries both indicate that high growth rates cannot be achieved simply by ensuring that the macroeconomic situation is sound and by specializing according to static comparative advantages. Proactive production sector strategies are also needed." This must include proactive technology policies complemented by educational reform. Export basket diversification and industrial upgrading are more important than simply increasing potential output. In the absence of effective direct demand side policy option concerned with competitive or comparative advantage the only means for and directed demand-led growth would be by

upgrading to produce goods that experience greater Keynesian efficiency, in turn benefiting from more world demand growth and becoming less constrained by deteriorating terms-of-trade.

Bibliography

Amsden, A. H. (1985), 'The division of labour is limited by the rate of growth of the market: the taiwan machine tool industry in the 1970s', *Cambridge Journal of Economics* **9**(3), 271–284.

Amsden, A. H. (1989), 'Asias next giant-how korea competes in the world-economy', *Technology Review* **92**(4), 46–53.

Amsden, A. H. (1991), 'Diffusion of development: The late-industrializing model and greater east asia', *The American Economic Review* **81**(2), 282–286.

Amsden, A. H. (1992), *Asia's next giant: South Korea and late industrialization*, Oxford University Press on Demand.

Amsden, A. H. (1994), 'Why isn't the whole world experimenting with the east asian model to develop?: Review of the east asian miracle', *World Development* **22**(4), 627–633.

Amsden, A. H. and Hikino, T. (2000), 'The bark is worse than the bite: new wto law and late industrialization', *The Annals of the American Academy of Political and Social Science* **570**(1), 104–114.

Amsden, A. H. and Kim, L. (1985), *The role of transnational corporations in the production and exports of the Korean automobile industry*, Division of Research, Harvard Business School.

Amsden, A. H. and Singh, A. (1994), 'The optimal degree of competition and dynamic efficiency in japan and korea', *European Economic Review* **38**(3-4), 941–951.

Araujo, R. A. and Lima, G. T. (2007), 'A structural economic dynamics approach to balance-of-payments-constrained growth', *Cambridge Journal of Economics* **31**(5), 755–774.

Autor, D. H., Dorn, D. and Hanson, G. H. (2016), 'The china shock: Learning from labor-market adjustment to large changes in trade', *Annual Review of Economics* **8**, 205–240.

Carter, C. A., Rausser, G. C. and Smith, A. (2011), 'Commodity booms and busts'.

Chang, H.-J. (1993), 'The political economy of industrial policy in korea', *Cambridge Journal of Economics* **17**(2), 131–157.

Chang, H.-J. (2003), *Rethinking Development Economics*, Anthem Press, New York.

Chang, H.-J. (2011), 'Institutions and economic development: theory, policy and history', *Journal of Institutional Economics* **7**(4), 473–498.

Cimoli, M. and Porcile, G. (2010), 'Global growth and international cooperation: a structuralist perspective', *Cambridge Journal of Economics* **35**(2), 383–400.

Cimoli, M. and Porcile, G. (2013), 'Technology, structural change and bop-constrained growth: a structuralist toolbox', *Cambridge Journal of Economics* **38**(1), 215–237.

Cornwall, J. (1973), 'Growth and stability in a mature economy', *The Economic Journal* **83**(331), 946–949.

Davidson, P. (1990), 'A post keynesian positive contribution to theory', *Journal of Post Keynesian Economics* **13**(2), 298–303.

Dixon, R. and Thirlwall, A. P. (1975), 'A model of regional growth-rate differences on kaldorian lines', *Oxford Economic Papers* **27**(2), 201–214.

Dosi, G., Pavitt, K., Soete, L. et al. (1990), 'The economics of technical change and international trade', *LEM Book Series* .

Dutt, A. K. (2002), 'Thirlwall's law and uneven development', *Journal of Post Keynesian Economics* **24**(3), 367–390.

Dutt, A. K. et al. (2003), 'Income elasticities of imports, north-south trade and uneven development', *Chapters* .

Gouvêa, R. R. and Lima, G. T. (2010), 'Structural change, balance-of-payments constraint, and economic growth: Evidence from the multisectoral thirlwall's law', *Journal of Post Keynesian Economics* **33**(1), 169–204.

Harrod, R. F. (1939), 'An essay in dynamic theory', *The Economic Journal* **49**(193), 14–33.

Krugman, P. (1994), 'The myth of asia's miracle', *Foreign affairs* pp. 62–78.

Lanzafame, M. (2013), 'The balance of payments-constrained growth rate and the natural rate of growth: new empirical evidence', *Cambridge Journal of Economics* **38**(4), 817–838.

Lawson, T., Palma, J. G. and Sender, J. (1989), 'Kaldor's contribution to economics: an introduction', *Cambridge Journal of Economics* **13**(1), 1–8.

León-Ledesma, M. A. and Thirlwall, A. P. (2002), 'The endogeneity of the natural rate of growth', *Cambridge journal of Economics* **26**(4), 441–459.

Page, J. M. (1994), 'The east asian miracle: an introduction', *World Development* **22**(4), 615–625.

Palley, T. I. (2003), 'Pitfalls in the theory of growth: an application to the balance of payments constrained growth model', *Review of Political Economy* **15**(1), 75–84.

Perraton, J. (2003), 'Balance of payments constrained growth and developing countries: an examination of thirlwall's hypothesis', *International Review of Applied Economics* **17**(1), 1–22.

Prebisch, R. (1959), 'Commercial policy in the underdeveloped countries', *The American Economic Review* **49**(2), 251–273.

Razmi, A. (2010), 'Exploring the robustness of the balance of payments-constrained growth idea in a multiple good framework', *Cambridge Journal of Economics* **35**(3), 545–567.

Razmi, A. (2015), 'Correctly analysing the balance-of-payments constraint on growth', *Cambridge Journal of Economics* **40**(6), 1581–1608.

Romero, J. P. and McCombie, J. S. (2017), 'Thirlwall's law and the specification of export and import functions', *Metroeconomica* .

Seers, D. (1962), 'A model of comparative rates of growth in the world economy', *The Economic Journal* **72**(285), 45–78.

Setterfield, M. (2006), 'Thirlwall's law and palley's pitfalls: a reconsideration', *Growth and Economic Development: Essays in Honour of AP Thirlwall* pp. 47–59.

Thirlwall, A. P. (1979), 'The balance of payments constraint as an explanation of the international growth rate differences', *PSL Quarterly Review* **32**(128).

Thirlwall, A. P. (2011), 'Balance of payments constrained growth models: History and overview', *PSL Quarterly Review* **64**, 307–351.

Thirlwall, A. P. and Hussain, M. N. (1982), 'The balance of payments constraint, capital flows and growth rate differences between developing countries', *Oxford Economic papers* **34**(3), 498–510.

Wade, R. (1990), *Governing the market: Economic theory and the role of government in East Asian industrialization*, Princeton University Press.

Wade, R. (2010), 'After the crisis: Industrial policy and the developmental state in low-income countries', *Global Policy* **1**(2), 150–161.

Wells, L. T. (1998), 'Multinationals and the developing countries', *Journal of International Business Studies* **29**(1), 101–114.