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Growth and Distribution Regimes Under Global Value Chains: Diversification, Integration and Uneven Development

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Abstract

This article aims to theoretically and empirically study the macroeconomic interactions between productive structure and income distribution in the context of the Global Value Chains (GVC). Firstly, we develop a theoretical framework, inspired by the Structuralist macroeconomic literature, establishing distinct regimes in the scenario of globalized production chains. The regimes are defined in terms of (1) a structure/diversification regime, (2) an integration/GVC regime, both drawn from the Balance of Payments Constrained Model (BPCM) literature, and (3) a functional income distribution regime. The theoretical framework guides the selection of proxies used to characterize each regime, measured using Principal Component Analysis (PCA) scores. That allows us to identify country patterns in a structured typology. Finally, we focus on growth trajectories, estimating the causal relationship between each of the beforementioned regimes and per-capita growth, using IV estimations. The dataset consists of 37 countries, with sources from the World Development Indicators (WDI), World Input-Output Database (WIOD), Trade in Value Added (TiVA), and the Penn World Tables (PWT). On one hand, this article contributes to structuralist growth models that typically estimate demand and distribution regimes independently, thereby offering a unified narrative on regimes of economic growth in the context of GVCs. On the other hand, our typology depicts how growth dynamics vary distinctly by geographical regions and how globalization has retained and accelerated processes of uneven development globally. The results show that (1) developed countries are more inclusive in terms of distribution under GVCs, (2) structural change has been exclusive, and growth patterns have been following a specialized pattern, and (3) the growth pattern has been associated with higher integration, but less diversification.

Keywords: Global Value Chains, Uneven Development, Income Distribution

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1. Introduction

In the classical structuralist tradition, the role of the productive structure defines the position of a country in the international division of labor (Prebisch, 1962). The large literature that has developed from that tradition (Taylor, 2021; Missio et al, 2015; Porcile & Yajima, 2021) focused on the concept of center-periphery, in which countries with different institutional conditions and structural characteristics show a divergent economic behavior - heterogeneity that increases the gap between the developed and the developing world, leading to uneven development. Using north-south models, a number of structuralist contributions discussed the problem of uneven development in terms of (I) price-effects, through a decline in the terms of trade of the periphery (Prebish-Singer hypothesis), and (II) income-effects, through growth constraints, with the Balance of Payments constrained model (Thirlwall, 1979; Thirlwall & Hussain, 1982; Dutt, 2002; Blecker & Setterfield, 2019). For the above traditions, the conditions of the productive structure of the economy play a central role in defining countries' economic possibilities (Cimoli & Porcile, 2014).

To understand the dynamics of the productive structure in the contemporary context, this article focuses on the recent changes in the global pattern of production, which affects the position of a country in the international division of labor. The characteristics of global production, since the 1980s, have undergone major changes in terms of global integration. The verticalized large firm discussed by Chandler (1990) has given rise to a modularized pattern (Sturgeon, 2002), as production chains were disintegrated and outsourced. That resulted in the emerging literature on the Global Value Chains (GVCs) (Gereffi et al, 2005). Many authors have championed GVCs in terms of a window of opportunity for economic development (Sturgeon & Kawakami, 2010), as the "Asian tigers" in South and East Asia, have managed to capture the benefits offered by this new production paradigm. However, the effect of GVC has been captured differently by the different regions of the globe. Despite some notable exceptions (Bair & Werner, 2015; Smichowski et al, 2021) there is a gap in the literature in terms of observing the effect of GVC integration in its macroeconomic implications in the debate of uneven development. That is the first gap this paper aims to address. There has been a recent surge in the modern macroeconomic structuralist literature (Cimoli & Porcile, 2014), but few conciliations with the topic of global production chains. To address this issue, we initially propose a framework that develops two growth regimes: (1) a structure/diversification regime, focused on quantity adjustments, and (2) an integration regime, focused on price-adjustments related to changes in the integration pattern of the economy in terms of GVCs.

Furthermore, another research gap addressed by this paper focuses on linking the discussion of income distribution with the Balance of Payments Constrained Model (BPCM) literature. The classical BPCM literature (Thirlwall, 1979; Thirlwall and Hussain, 1982) assumes that wages track productivity, with a stable ratio between wages and profits. This important tradition focuses on the growth limitations imposed by external constraints. Growth, however, can take different patterns of inclusiveness (Ranieri & Ramos, 2003), with different impacts on the balance of payments (Ribeiro et al, 2016). We argue that it is possible to either grow with income concentration (debates

on conservative modernization) or with a more inclusive and balanced relationship between labor and capital. In order to address the problem of income distribution in the BPCM, and link it to the GVC integration discussion, this article proposes a model of income distribution starting from a fixed coefficients Leontief production function with imported intermediary goods - based on the contributions by Cimoli et al. (2016) and Ribeiro et al. (2016).

Having defined the theoretical framework, we move to an empirical analysis, relating the theoretically constructed distribution regime with the conditions of the economic structure in terms of diversification and integration. Firstly, our empirical strategy measures the three regimes developed in the theory by using a Principal Component Analysis (PCA) inspired by Braunstein et al. (2020). The PCA allows us to observe the bilateral effects between structure, integration and distribution for a pool of developed and emerging economies – classifying them into distinct groups in terms of their different regime characteristics. Finally, we investigate the causal relationship between the regimes and economic development (in terms of per capita growth), using a panel IV analysis.

After this introduction, Section 2 presents the theoretical framework. In Section 3 we present our empirical strategy. We then discuss the data and results in Section 4, followed by the conclusion in Section 5.

2. Theoretical Framework

2.1. Growth rate compatible with balance of payments: Structure and Integration

This section focuses on explaining the basic characteristics of the theoretical model, inspired by the Balance of Payments Constrained Model (BPCM) (Thirlwall, 1979; Thirlwall & Hussain, 1982), which links the growth possibilities of a country to its external constraints. We aim at bridging the BPCM with the growing role of GVC integration on the economic possibilities of a country, as well as its impact on income distribution. The BPCM is a model in which growth is constrained by the conditions of the balance of payments, and it links both demand and supply constraints (Porcile & Yajima, 2021). On the one hand, demand plays a central role in the economy as exports, imports and financial flows define the long-run growth possibilities. On the other hand, supply mechanisms operate as the economic structure affects the elasticities in which the external conditions affect the domestic possibilities (Cimoli & Porcile, 2014).

The supply BPCM conditions have two sub-components: (1) the Structural (diversification) component, which is related to the degree of diversification and technological change in the economic system - captured by the income elasticity of demand for exports and imports (Cimoli & Porcile, 2011, 2014); and (2) the Integration component, which focuses on the strength of the integration of an economy with the rest of the world - captured by the price elasticity of demand for exports and imports (Ahmed et al, 2017; Zhao et al, 2020).

Countries, especially in the developing world, are shown to be constantly constrained by their balance of payments (Jayme, 2020; Blecker, 2021), which is a central issue for a stable

development process. In order to address that, our proposed model starts from the role of external constraints in limiting (and defining) the growth possibilities of a country (Thirlwall, 1979).

2.2. The BPCM model with GVC

In this section, we develop and present a seminal growth and distribution macroeconomic model with GVC that will guide our analysis. We do not present a fully integrated theoretical version of the model between distribution and the BPCM, as that is not a requirement for the intent of our approach in this article, but will be addressed in the PCA analysis. The theoretical model presented in this article has as its aim to guide and justify the choice of variables that we use in the empirical analysis.

Firstly, the BPCM model can be derived from the explicit functions of exports and imports. A country's exports (X) and imports (M) are affected by price-effects (real exchange rate fluctuation) and quantity effects (total output produced by foreign and domestic economies). Exports depend on the real exchange rate (RER) and foreign income, while imports depend on RER and domestic income. Dutt (2002) models the BPCM in the following way:

$$X = \theta_X q^{\nu} \left(Y_f\right)^{\varepsilon} \tag{1}$$

$$M = \theta_M \left(\frac{1}{q}\right)^{\mu} Y^{\pi} \tag{2}$$

In which q represents the Real Exchange Rate (RER); ε is the income elasticity of demand for exports; π is the income elasticity of demand for imports; ν is the price elasticity demand for exports; μ the price elasticity of demand for imports; Y_f is the foreign output or demand and Y represents domestic demand. θ_X and θ_M are constants.

In terms of growth rates, after log deriving equations (1) and (2):

$$\hat{X} = \nu\hat{q} + \varepsilon\widehat{Y_f} \tag{3}$$

$$\widehat{M} = -\mu\hat{q} + \pi\hat{Y} \tag{4}$$

The equilibrium condition for the external sector is one in which both exports (in domestic prices), and net financial flows match the value of total imports, such that the balance of payments does not lead to a secular accumulation of surplus or deficit.

$$PX + F = M \tag{5}$$

In which P represents the terms of trade, and F represents financial flows. After replacing equation (5) in terms of growth rates (Dutt, 2002), and stating that the rate of growth of the economy is compatible with stability in the external sector is given by $\widehat{Y^{BP}} = \hat{Y}$, then:

$$\widehat{Y^{BP}} = (1/\pi)\{(1-\mu-\nu)\hat{q} + [1-(F/M)]\varepsilon\widehat{Y_f} + (F/X)[\hat{F} - (1-\nu)\hat{P}]\} \quad (6)$$

In the long run of the original BPCM model, there are no price-effects, so that $\hat{P} = 0$ and $\hat{q} = 0$, and no long-term effect of financial flows $\hat{F} = 0$. This leads to what is well known in the literature as the Thirlwall's law (Thirlwall, 1979; Blecker, 2021):

$$\widehat{Y^{BP}} = \frac{\varepsilon}{\pi}\widehat{Y_f} \quad (7)$$

In the short-run, however, exchange-rate dynamics and financial flows may affect growth rates through hysteresis effects - price volatility affecting the structure of the economy, and subsequently the income elasticities of demand for exports and imports (ε and π).

Price-effects

The emergence of the GVC framework affects the macroeconomic conditions and possibilities for developed and emerging economies. A macroeconomic strand of the GVC literature focuses on how GVCs have changed the response of the domestic economy to movements in the real exchange rate (Ahmed et al., 2017) measuring how GVCs affect the price elasticity of exports (ν). The literature shows that further integration in GVCs makes a country's output more responsive to exchange rate fluctuations.

Intuitively, the relation between GVCs and price-elasticity is straightforward. A country that further integrates itself in the value chains tends to (a) have a more open trade account. Also, (b) GVC integration increases the share of intermediary goods in total trade, so that exports and imports have a further interrelation, and price dynamics affect products in the same value chain (i.e. importing iron and selling manufactured steel).

The first contribution of this paper is to consider the role of GVC integration in defining the price elasticities of an economy. GVC integration does not necessarily lead to a sectoral decomposition/diversification of the economy, but it affects how exports and imports react to price effects – also affecting the growth of domestic output compatible with external constraints.

Income effects

Income elasticity of exports and imports are central in defining the growth rate compatible with the Balance of Payments. Cimoli & Porcile (2014) and the neo-Ricardian model (Cimoli, 1988)

link income elasticities with the pattern of diversification of the productive structure. In these contributions, each product has a distinct income elasticity of demand, and manufacturing products and high-tech products tend to be more demanded when income grows. For this reason, a country that diversifies towards more complex products tends to have a higher income elasticity.

The discussion on income and price effects can be summarized by decomposing the BPCM equations into two components, one focused on the diversification conditions of the productive structure, and the other on the degree of integration of the economy to the GVCs.

a. Structural/Diversification component (Ψ): degree of diversification of the economy, proxied by the income elasticity ratio $\left(\frac{\varepsilon}{\pi}\right)$, and how the domestic economy reacts to the growth of the foreign economy ($\widehat{Y_f}$):

$$\Psi = [1 - (F/M)]\frac{\varepsilon}{\pi}\widehat{Y_f} \tag{8}$$

b. Integration component (Ω): related to the reaction of the economy to changes in the real exchange rate (price-elasticity). Price-elasticities (μ and ν) then depends on the conditions of the integration of the economy in the GVCs:

$$\Omega = \frac{\left[(1 - \mu - \nu)\hat{q} + \frac{F}{X}\left(\hat{F} - (1 - \nu)\hat{P}\right)\right]}{\pi} \tag{9}$$

In summary, the growth rate compatible with balance of payments constraints depends on two components, one of diversification and one of integration:

$$\widehat{Y^{BP}} = \Psi + \Omega \tag{10}$$

In the long run of the traditional BPCM of Thirlwall (1979), only quantity effects limit growth $\left(\widehat{Y^{BP}} = \Psi\right)$. The degree of integration has no effects on the long-run growth rate (Ω) unless it is related to a structural change that also affects the diversity pattern and the technological intensity of the economy.

2.3. Supply growth rate and income distribution:

The BPCM does not directly discuss income distribution, and supply constraints are only dealt with indirectly using income elasticities. This section presents some Structuralist contributions that aim at complementing the absence of distribution in the BPCM framework. The Structuralist literature (Taylor, 2021), with the Kaldorian literature on adjustments between supply and demand (Fazzari et al, 2020; Setterfield, 2011; Nomaler et al, 2021) offer a solution to model the determinants of functional income distribution.

The role of imported intermediary goods in total production has been increasing with further globalization of production. Ribeiro et al (2016) and Cimoli et al (2016) offer a framework to capture it using a production function with fixed coefficients (Leontief) with imported intermediary goods as inputs. This newly added share of imported goods offers a link between distribution and GVC integration. From a Leontief production function:

$$Y = \min\left(aL, bM^m, vK\right) \tag{11}$$

In which a is labor productivity, L is total employment, b is the productivity of foreign intermediate goods, M^m is the amount of foreign intermediate goods; v is the productivity of capital and K is the total capital stock comprising domestic capital goods and imported capital goods.

The economy is marked by imperfect competition (Robinson, 1969). In a monopolized goods market, firms apply a mark-up factor over unit variable costs to define prices:

$$P = z\left(\frac{W}{a} + \frac{P^*E}{b}\right) \tag{12}$$

In which z is the mark-up factor and W represents nominal wages. Production costs are then defined by wages and by the increase in the cost of imported intermediary goods.

From the monopolized market we can derive the pattern of functional income distribution. Following the neo-Kaleckian literature (Bhaduri & Marglin, 1990; Blecker, 2002) the wage share represents that part of total income that goes to workers (paid as wages):

$$\sigma = \frac{WL}{PY} = \frac{\omega}{a} \tag{13}$$

In which ω is real wages. As we have intermediary goods in this framework of the open economy, we also consider the part that leaks to the foreign sector:

$$\delta = \frac{P^*EM^m}{PY} = \frac{P^*E}{Pb} = \frac{q}{b} \tag{14}$$

In equation (14), the real exchange rate shows important distribution effects, as a currency depreciation reduces the wage share of the economy without affecting the profit share (that depends on the mark-up only), but increases the outflow of resources. The productivity of the imported intermediary goods also affects distribution, and the higher is the productivity generated

from imported goods, the smaller is the outflow of resources. The profit share is derived such that it only depends on the mark-up level of the economy:

$$\pi = 1 - \sigma - \delta = \frac{z}{1 - z} \tag{15}$$

In this sense, we can observe the factors that define the distribution of income between wages and profits, as well as the leakages to the external sector, which is central in the GVC discussion.

3. Methodological procedure

Most of the empirical works in the literature have focused on estimating income and price elasticities. That is not the aim of this article, as we would like to look at multidimensional elements. Firstly, we defined in the last section a theoretical model to characterize growth and distribution in an economy integrated into GVCs. Both the literature and the model guide which variables should be used to characterize the regimes of **Structure, Integration** and **Distribution**. Secondly, we present measurements for each of the three regimes using a Principal Component Analysis (PCA). Finally, we propose a causal analysis (IV gravity model estimation) between the distinct regimes and per-capita growth.

From equation (10), equations (13) - (15) show the distribution patterns for the wage share (σ), the share of imported intermediate goods (b), and the profit share (π). These equations form the theoretical basis for the construction of the empirical analysis.

Box 1. Main equations

Structure:

$$\Psi = \left[1 - \left(\frac{F}{M}\right)\right]\frac{\varepsilon}{\pi}\hat{Y}_f$$

Integration

$$\Omega = \frac{\left[(1 - \mu - \nu)\hat{q} + \frac{F}{X}\left(\hat{F} - (1 - \nu)\hat{P}\right)\right]}{\pi}$$

Distribution (Wage share):

$$\sigma = 1 - \pi - \delta$$

$$\sigma = 1 - \frac{z}{1 - z} - \frac{q}{b} = \frac{W}{Pa}$$

Based on the theoretical model, Box 1 lists the main equations that identify the key determinants of integration, structure and distribution.

3.1. Data

The data used in this research covers 37 countries for the period 1995 to 2011. The sample comprises a set of open countries that are well integrated into GVCs. The choice of the sample time period is based on data availability. Each country is defined in terms of its particular pattern of structure, integration and distribution. The heterogeneity between countries can be classified under different groups. The regimes are then measured using a Principal Component Analysis (PCA).

3.2. Variables based on the theoretical framework

The theoretical model we developed in section 2 (summarized in Box 1) motivates the choice of indicators used to estimate the PCA scores for integration, structure and distribution. Table 1 lists all the variables used in the analysis. Table 1.A in Appendix 1 lists the source and method of estimation of each variable. The summary statistics are in Table 2.

(Tables 1 and 2 here)

Firstly, we measure economic integration using gross trade in final goods, trade in intermediate inputs (or GVCs), and capital flows. Gross measures of exports and imports (as a share of GDP) in standard trade statistics are inadequate to capture GVC integration, as it double counts the value of intermediate inputs at each stage of production (Koopman et al., 2008). Instead, using the UNCTAD (2013) definition, GVC integration is computed as the sum of domestic value-added in foreign exports (DVA in FX) and foreign value-added (FVA) in exports as a share of total exports. While DVA in FX captures the level of forward participation, FVA captures the level of backward participation in GVCs. For China or India, the share of FVA in exports exceeds that of DVA in exports, which implies that these economies are less integrated in terms of value-added, despite being heavily integrated in terms of gross exports and imports (Timmer et al., 2014; Banga, 2014).

We capture the financial aspect of integration using the net capital account position, which records the nominal values of acquisitions and disposals of non-produced non-financial assets in the balance of payments statistics. It excludes financial transactions and only includes capital transactions in terms of foreign direct investment (FDI) and portfolio investment flows. A surplus in the capital account can help ease an ongoing balance of payments deficit, thereby positively affecting external integration.

Secondly, we characterize economic structure by (a) the share of private credit to GDP, (b) diversification, using economic complexity as a proxy, and (c) technological capability. The private credit to GDP ratio is considered a proxy for investment as higher credit availability can stimulate business decisions and investment.

Economic diversification is measured by the Economic Complexity Index (ECI) (Hidalgo & Hausmann, 2009), which captures the composition of a country's exports, linked to productive output and the economic structure, that combines productive knowledge effectively. ECI works as

a proxy for structural change. A positive and large index value implies that a country exports complex products such as sophisticated chemicals and machines, while a large negative value implies the exports of least complex products such as raw minerals or simple agricultural goods. The literature relates countries with a high degree of economic complexity with higher potential for economic growth relative to countries with a low degree of complexity. The channel to higher growth is a reduction in the external constraints when an economy exports more complex products (Hartmann et al., 2017), positively affecting the income elasticity ratio of the BPCM model.

Improvement in a country's technological capability can be gauged using the share of medium and high-technology exports in the total exports of manufacturing. Across all countries in the sample, medium- and high-tech exports constitute 51% of total manufacturing exports, though we see some important differences between developed and emerging nations (57% and 41% respectively). China stands out within the sample of emerging nations with an average of 50% across the full sample period. Similar to investment and diversification, an increase in the technological content of exported manufacturing goods tends to positively affect economic growth through its positive impact on the economic structure.

Finally, we measure distribution using the following variables: unemployment rate, exchange rate, real hourly wages, domestic prices, labor productivity, and the degree of market concentration. Following the Structuralist literature, we measure distribution in terms of the functional distribution of income (Taylor, 2021; Blecker, 2002), and our index should be interpreted as changes in the wage share.

The unemployment rate is a proxy for the bargaining power of labor, where a higher unemployment rate implies a decrease in workers' bargaining power, thereby increasing the profit share (Bowles & Boyer, 1988). A depreciation of the real exchange rate tends to be negatively associated with the wage share. Emerging nations pursuing an export-led industrialization policy would typically keep the exchange rates depreciated as it makes the cost of labor and the price of exports cheaper in foreign currency. We measure labor productivity using real value-added per worker. Higher labor productivity induces workers to target a higher wage share or firms to target a lower mark-up rate.

Real hourly wages are measured as the ratio of total labor compensation and total hours worked in the industrial sector and expressed in PPP dollars. Higher real wages, *ceteris paribus*, positively affect the wage share by redistributing each additional dollar of income towards wages rather than profits. In the post-Keynesian literature (Bhaduri, 2008; Blecker, 2016), economic growth can go hand in hand with higher real wages in an economy defined by a wage-led demand regime, and conversely, decrease real wages when in a profit-led demand regime.

Gross output prices negatively impact the wage share by redistributing income in favor of profits and by inducing firms to target a higher mark-up rate. Lastly, we calculate the degree of monopoly power or market concentration using the Hirschman Herfindahl index (HHI). The index takes values between 0 and 1. Index values closer to 1 indicates a high degree of domestic market

concentration or more monopoly power for firms. Higher monopoly power allows firms to target a higher profit share.

3.3. PCA Scores

The variables listed in Table 1 are used to estimate distinct scores for integration, structure and distribution. The next step is to find adequate indexes to measure the characteristics of each of the three regimes. The PCA analysis offers an adequate empirical framework to account for the high degree of correlation between variables (Abdi & Williams, 2010). The first component of the PCA score explains the largest amount of variation in the data, with each subsequent component accounting for lesser and lesser variation. In this article, we report the first component of the three selected dimensions (integration, structure and distribution) to map countries into separate regimes of growth for three different periods – the full sample (1995-2011), the pre-crisis period (1995-2007), and the post-crisis period (2008-2011) – assessing any change in country positions due to the potential structural breaks presented by the global financial crisis of 2007-08.

Table 3 presents the total (cumulative) variation explained by the first component of each score, which sheds light on the overall explanatory power of the model. Across all three time periods, integration and structure account for nearly 65% to 68% of the total data variation. Distribution, on the other hand, accounts for nearly 39% to 44% of the total variation in the data across different periods.

(Table 3 here)

Tables 4-6 show the relative contributions (loadings) of each integration, structure, and distribution variable in the first component. Variables are *log normalized* since all original variables have high variation across country and time. We see that the loading scores are correlated, respectively, with the first components of integration, structure, and distribution. The relationship between variables, as prescribed in the theoretical model, shows to be justified in the data.

(Table 4 here)

In Table 4, all measures of external integration are positively correlated with the integration score. The KMO statistic for sampling adequacy is 0.71 (greater than 0.5) – the loadings used to estimate the component score are adequate as it explains nearly 71% of the total variation. All the loadings have the same sign or direction of correlation as specified in the theoretical model. Data corroborates that externally-oriented countries witness an increase in economic growth by easing their balance of payment constraints. From the literature, we observe that countries with a high share of trade in GDP are associated with a profit-led demand regime, as economic growth

increases by leveraging the profit share at the cost of the wage share (Bhadhuri and Marglin, 1990; Blecker and Setterfield, 2019).

(Table 5 here)

In Table 5, all three loadings are positively correlated with economic structure. Higher credit availability, product diversification, and technological capability improve economic structure. Particularly in emerging economies, the co-movement of all three loadings is indicative of productivity-enhancing structural change. From 1995 to 2011, economic complexity and technological capability explain 67% of the total variation in the first component of structure, while private credit to GDP explains 36% of the variation.

(Table 6 here)

Table 6 shows the contribution of each loading in the distribution score. For the full sample period, the unemployment rate, real hourly wages, and labor productivity move in the same direction, positively correlated with the distribution score. On the other hand, exchange rate, prices, and market concentration move in the opposite direction, negatively correlated with distribution. All the loadings have the same sign as predicated in the theoretical model.[3]

3.4 Analysis of the PCA Results

The scores estimated using PCA show distinct patterns. We group countries that depict similar characteristics in terms of integration, structure, and distribution. For a clearer graphical presentation, we average component scores over 17 years such that each country's position is represented using a single data point (see Figures 1-3 and 2.A). The scores reflect context-specific values for each sample country. Countries with similar characteristics are positioned closer to each other. We discuss the mapping of countries for the full sample period (Figures 1-3). The mapping of countries for the pre-and post-crisis samples is in Appendix 2.

Based on the PCA results, we identify distinct trajectories of economic growth associated with each regime of integration, structure, and distribution (Table 7). Those trajectories[4] define how the pattern of growth is linked to certain specific conditions in terms of diversification, integration and distribution.

(Table 7 here)

[3] A key point to note is that the global financial crisis of 2007-08 has no distinct effect on the direction or magnitude of correlation for any of the loadings of integration and structure, but has a notable effect on distribution (as the sign of the distribution loadings changes between the pre-and post-crisis periods).

[4] Braunstein et al. (2019, 2020), using the PCA, develop the concepts of care-led and inequality-led trajectories. We analogously translate those trajectory concepts to our framework of economic diversification, integration and distribution, grounded in the model presented in section 2. Table 7 is then the application of the demand-supply framework seen in Table 3 of Braunstein et al. (2020) to our theoretical framework.

Firstly, in terms of integration, all countries in the sample are open economies that have achieved a notable level of integration into GVCs. However, the countries below and above the x-axis follow uneven trajectories. A group of developed economies (US, UK, Germany, France, Italy, Spain, Japan, and Canada) and emerging economies (India, Indonesia, Turkey, Russia, Brazil Romania, Lithuania, Cyprus, and Greece) are located below the x-axis. External integration in these countries goes hand in hand with a high degree of concentration - gains from integration are redistributed towards profits, or leaked to abroad, rather than distributed towards wages. Rising levels of income inequality (between the top 1% and the rest) in these countries suggest that gains from trade accrue to a small section of businesses and corporations. This trajectory aligns with the insights of Smichowski et al (2020), who propose different developmental regimes or classes associated with GVC integration[5]. They propose that most developed nations show low to high levels of GVC integration but are more likely to capture a high level of value within GVCs. On the other hand, for the rest of the sample countries (except for Australia) above the x-axis, integration goes hand in hand with a relatively smaller degree of capital concentration. Countries below the x-axis depict patterns of "*exclusive integration*" while those above the x-axis depict "*inclusive integration*".

Secondly, developed and emerging nations depict two distinct trajectories in terms of economic structure, as they are located to the right and left sides of the Y-axis respectively. Developed nations have a higher share of investment in GDP, credit availability for the private sector, product and process diversification, and technological capabilities. These countries show a pattern of "*inclusive structural change*" backed by a strong macroeconomic structure and a history of successful structural transformation that moved labor and resources from low-productivity agricultural jobs to high-productivity manufacturing and service sector occupations. Emerging nations to the left of the Y-axis show patterns of "*exclusive structural change*" with significant constraints on the macroeconomic structure and a history of fragmented structural change, usually marked by specialization in the production of less complex products, such as natural resources, or in the GVC activities that capture a smaller amount of value (i.e. the assembly of final goods).

Finally, in terms of the functional distribution of income, all developed nations in our sample are situated on the right of the Y-axis, which means that the redistribution of aggregate income in favor of profits is less severe for those countries. The presence of strong labor market institutions, achieved on the basis of strong labor movements and union success in the past, act as a cushion and resist the decline in wage shares and real wages from greater integration. In this sense, the

[5] Smichowski et al. (2020) identify three classes or developmental trajectories. (1) *Social Upgrading Mirage:* countries with low levels of GVC participation and value capture, but a rise in average investment and social indicators. This class has two sub-trajectories: (1.a) *GVC resource curse*: includes net exporters of primary products (Australia, Chile, Norway), who benefited from the global rise in commodity prices, improving social indicators; and (1.b) *peripheral European countries:* underperformed in terms of value capture in GVCs with short term gains in social indicators due to massive inflows of foreign capital. (2) *Reproduction of the Core*: developed countries characterized by medium to low levels of GVC participation, but high levels of value capture. Dominant stature in GVCs but high levels of unemployment and inequality. (3) *Unequal Growth*: Asian and Eastern European countries, characterized by high levels of GVC participation and investment, slightly lower levels of value capture, and the lowest levels of social improvement in terms of employment and inequality.

conflict between labor and capitalists is less acute. On the other hand, emerging nations on the left of the Y-axis, are characterized by a greater redistribution of trade gains in favor of profits rather than wages. The presence of weaker labor market institutions (Ciarli et al., 2019; Ocampo et al., 2009) combined with a history of state repression against widespread unionization has increased the conflict between labor and capitalists. Furthermore, the presence of leakages in these emerging economies (to the external sectors) is much higher. In this sense, distribution regimes in developed nations facilitate coordination among classes to a larger extent relative to emerging nations where the regime is more exploitative.

4. Regression analysis

4.1. Model, Estimation Specification, and Data

The PCA approach in the previous section helps us group countries that depict similar macroeconomic structures in terms of economic integration, structural change, and income distribution. However, it does not establish a direct and causal empirical relationship between macroeconomic regimes and economic growth. We address this limitation using an econometric analysis, where the PCA estimates are regressed against per capita GDP growth. Econometric estimation (in terms of the growth regression approach) enriches the empirical contribution of this article in multiple ways. Firstly, it helps us empirically evaluate the hypothesized linkages between each regime and economic growth, as proposed in the theoretical model. Secondly, it helps us identify which trajectory within a given regime (for example, exclusive integration) has contributed to economic growth in our sample of countries. Thirdly, using PCA scores as independent variables, we summarize information on multiple determinants of integration, structure, or distribution into one regressor, instead of including each determinant independently, reducing the risks of overdetermination. Finally, regression analysis offers a way to account for the prevailing endogeneity between economic integration and economic growth, by using gravity variables as instruments (IV) for the PCA estimates of integration.

The baseline regression is given by equation (16) for a panel of 37 countries from 1995-2011. We model growth in per capita GDP as a function of the PCA estimates, controlling for a number of other key determinants of growth. The PCA estimates already include several of the key determinants of growth in an open economy – trade and financial flows (integration score), technological content of exports, credit availability and economic diversification (structure score), exchange rate, prices, productivity, and unemployment (distribution score). PCA estimates as regressors allow us to include a wide range of growth determinants in an empirically consistent manner by grouping similar determinants into composite scores, which also accounts for the existing multicollinearity between the loadings of each score. Table 8 reports the correlations between the three PCA scores, where distribution and structure scores are highly correlated. The regression coefficients are expected to be independent (PCA assumption). We only report the results with all three PCA scores as regressors, though the baseline regression remains robust even after excluding one of these scores from the regression.

(Table 8 here)

As control variables, we add other possible determinants of growth that are not included in the three PCA scores. First, we include an income convergence term that is measured by the mean of real GDP per capita ($mean\ GDPpc_{it}$).[6] We expect the convergence term to be negatively correlated with growth for both developed and emerging economies, as the former grows at a slower rate due to decreasing returns to capital compared to the latter countries. Second, we add physical investment (or physical capital), measured by gross fixed capital formation as a share of GDP ($Invt_{it}$). Third, government spending, measured by gross general government final consumption expenditure as a share of GDP (Govt_{it}). Fourth, human capital, measured by the years of secondary education ($Educ_{it}$). We expect physical and human capital to be positively correlated with growth, though government spending can have a cyclical or counter-cyclical effect on growth (Martorano, 2018). τ_i are time dummies for the years 2001 and 2008 to control for any negative shock to GDP growth from the dot-com bubble and the global financial crisis. μ_t are country fixed effects and ϵ_{it} is the error term. The estimation method and data sources for all variables are listed in Table 1.A in Appendix 1 and the summary statistics are shown in Table 9.

$$\widehat{Y_{it}^{BP}} = \alpha\Psi_{it} + \beta\Omega_{it} + \gamma\sigma_{it} + \theta(\mathrm{Controls})_{\mathrm{it}} + \tau_i + \mu_t + \epsilon_{\mathrm{it}} \qquad (16)$$

We incorporate macroeconomic regimes into growth regressions using the three PCA scores. We aim to see whether and how the distinct trajectories within each regime are correlated with economic growth. In other words, does inclusive/exclusive integration, inclusive/exclusive structural change, and cooperative/exploitative distribution determine growth in our sample of countries. This can be achieved by standardizing (or normalizing) the three PCA scores, such that each observation in each score is subtracted and divided by the mean and standard deviation of that score respectively (based on the approach of Braunstein et al., 2019). Each standardized component now has a mean of zero (see summary statistics of each component in Table 9). Standardizing the scores facilitates the interpretation of each regime with respect to growth, and the grouping of developed and emerging nations for the regressions.

The interpretation of the standardized PCA coefficients will differ for each score. If the integration, structure, or distribution coefficients have a positive sign, then inclusive integration, inclusive structural change, and cooperative redistribution of income is associated with higher growth. It implies that the macroeconomic structures of economic growth (or capital accumulation) have actually been inclusive. Alternatively, if the coefficients are negative, it means that the drivers of

[6] Typically, growth regressions measure the convergence term using real GDP per capita in the initial year of the sample period, t_0 (Braunstein et. al, 2019; Frankel and Romer, 1999). The majority of these studies use cross-sectional data or pooled OLS models where time-invariant factors or heterogeneity are assumed to be constant. However, as this term does not change over time, including it in a fixed-effects panel data model will lead to serial correlation. As a result, our estimate of the convergence term is the average of per capita GDP which varies over time, and not the initial level at time t_0.

exclusionary and uneven development such as exclusive integration, exclusive structural change, and exploitative redistribution of income, have been predominant in structuring growth dynamics.

(Table 9 here)

To address the prevailing endogeneity between economic integration and growth, we employ the following regression as specified in equation (2).

$$\widehat{Y_{it}^{BP}} = \alpha\Psi_{it} + \beta(gravity)_{it} + \gamma\sigma_{it} + \theta(\text{Controls})_{\text{it}} + \tau_i + \mu_t + \epsilon_{\text{it}} \qquad (17)$$

We use gravity variables of trade as an instrument for the integration score, specifically, distance (in kms) to and population of the top 10 trading partners for each country. After identifying the top 10 trading partners for each sample country, the gravity IV is constructed as the product of the average distance of the top 10 trading partners and the average population of the top 10 trading partners. Given the panel nature of our dataset and that distance between countries is constant, multiplying distance with population (which changes over time) generates sufficient variation in our instrument. Our gravity variables then satisfy the exclusion criteria of instruments, as they are exogenous and do not directly affect growth, but only through their effect on integration. Gravity models of trade have emphasized that geography affects growth only through its effect on trade and not directly, thus being an appropriate instrument for trade that is robust to institutional specifications (Lewer and Berg, 2003; Frankel and Romer, 1999).

4.2. Results

Tables 10-12 report the regression results for the effect of macroeconomic regimes on growth in real GDP per capita. Table 10 shows the results for the baseline model in equation (16). Columns (1)-(3) respectively report the results without time dummies and country fixed effects for the full, developed, and emerging country samples, (4)-(6) includes time dummies but not country fixed effects, and (7)-(9) includes both time dummies and country fixed effects. The discussion that follows focuses on columns (7)-(9), which is econometrically the most robust of our specifications. Table 11 reports the results for a series of robustness checks using the determinants of each PCA score. Columns (1)-(3) replaces the integration score with measures of trade openness, GVC participation and capital flows; columns (4)-(6) replaces the structure score with measures of economic complexity, private credit to GDP ratio, and the technological content of exports; and columns (7)-(12) replaces the distribution score with unemployment, exchange rate, real hourly wages, productivity, prices and market concentration. Table 12 shows the results for the IV regression using equation (17), where the columns refer to the three country groups. The sign and magnitude of all the key variables and the controls are consistent across all specifications.

(Table 10, 11, and 12 here)

Beginning with the control variables, the income convergence term is systematically negative for all specifications in table 10 and is statistically significant in the full sample and for developed countries, but not for emerging countries. In terms of economic significance, as expected, the

negative effect on growth suggests that emerging nations have grown at a faster pace than developed ones during the sample period, pointing to convergence in income per capita. Investment (as a share of GDP) is positively correlated with economic growth and significant in all specifications. Government spending, on the other hand, has a negative association with economic growth depicting a countercyclical effect. Years of secondary education (or human capital) have the expected positive association with growth and is strongly significant in the full and emerging country samples. In emerging nations, an additional year of secondary education contributes to nearly 2% to 2.5% increase in growth, indicating to the strong role of education and human capital. The effect is not significant for developed countries, except in table 12 where the impact is negative but weakly significant. The regression is robust as the controls behave identically when each of the PCA scores is replaced with its sub-components (or loadings) in table 11 or in the IV regressions in table 12.

Turning to the key variables of interest, the integration coefficient is consistently positive and strongly significant (both statistically and economically) across the majority of specifications in tables 10, 11, and 12. However, the structure score is consistently negative while the distribution score is positive across all specifications, but only significant in tables 10 and 12. The impact of each macroeconomic regime on economic growth and its implications for uneven development is further elaborated below.

Interpreting the integration score, a one standard deviation shift from exclusive to inclusive integration (an increase of 1.63 in the non-standardized integration score) is associated with a 1.6 to 5 percentage point increase in the growth rate (which averages to 2.81%) across specifications. Moving from the strongest inclusive integration score (1.91) to the strongest exclusive integration score (-4.39) is associated with a decrease in growth by the same magnitude. Moreover, we continue to pick up this positive effect on growth in the IV regressions in table 12 (even after accounting for the endogeneity between integration and growth). However, the emerging country coefficient is now strongly significant both statistically and economically, unlike in tables 10 and 11. In IV regressions we check the strength and adequacy of the instrument. We report the F-stat for excluded instruments from the first stage, which is large and statistically significant, thereby suggesting that distance and population of top 10 trading partners are good and strong instruments for integration. In terms of the economic significance of the coefficient, the positive association suggests that economic growth is inclusive when economic integration is associated with low levels of value capture and capital concentration. These results align with studies that have highlighted the pitfalls of neoliberal globalization in the last two decades. The hierarchical nature of production relations in global supply chains combined with '*subordinated*' financialization in emerging economies (Milberg and Winkler, 2013; Bonizzi et. al., 2019), has transformed the structures of growth to one that is exclusionary.

As for the structure score, though the coefficient is systematically negative, it is statistically significant only in some specifications. Particularly in the IV model (table 12), a significant negative effect can be seen in the full and developed country samples. A one standard deviation

shift from exclusive to inclusive structural change (an increase of 1.40 in the non-standardized structure score) is associated with a 1.1 to 1.4 percentage point decrease in the growth rate across specifications. Moving from the strongest inclusive structural change score (1.96) to the strongest exclusive structural change score (-2.67) is associated with an increase in growth by the same magnitude. Here, the economic intuition is that economic growth has been associated with fragmented and exclusionary processes of structural change. In other words, the negative effect on economic growth is being driven by those countries in our sample for which the normalized structure score is less than zero (depicting exclusive structural change). This result reinforces the importance of past studies that have identified and attributed uneven development to external and internal constraints on structural transition (Dutt, 2002; Spinola, 2020; Sasaki, 2021).

The distribution score has a positive correlation with growth in all specifications, but is statistically significant only for the full and developed country samples. This means that economic growth is inclusive when the distribution regime is cooperative and the conflict between labor and capital is less acute. In this sense, the positive effect on economic growth is driven by those sample countries for which the normalized distribution score is greater than zero (depicting cooperative redistribution). Interpreting the coefficient, a one standard deviation shift from exploitative to cooperative redistribution (an increase of 1.54 in the non-standardized distribution score) is associated with a 2.2 to 4.7 percentage point increase in growth across specifications. A movement from the strongest cooperative distribution score (1.26) to the strongest exploitative distribution score (-2.63) is associated with a decrease in growth by the same magnitude. The result is consistent with perspectives that find globalization to be inherently inequality-led, where capital accumulation is increasingly driven by the redistribution of income and wealth in favor of profits (Rodrik, 1998; Piketty, 2013).

Additionally, the robustness checks in table 11 shed some further insight on the hypothesized relationships between macroeconomic regimes and economic growth as proposed in the theoretical model. In specifications (1)-(12), our aim is to see how each loading (or determinant) of each PCA score is correlated with growth. All sub-components of the integration score are positively correlated with growth, though only the two trade measures of trade openness and GVC participation are statistically significant. For the determinants of structure, diversification and the technological content of exports are negatively correlated with growth, while private credit to GDP ratio is positively correlated, but none of these are statistically significant. Finally, all determinants of distribution have the expected sign, particularly the unemployment rate which is negative. However, only hourly wages and labor productivity is significant statistically. This exercise shows that each loading (of a given PCA score) behaves in a manner that is consistent with the behavior of that specific PCA score in the growth regressions.

Thus, the results presented in Tables 10-12 bring forth some interesting insights. Firstly, empirical analysis largely confirms the hypothesized relationships between the three macroeconomic regimes and economic growth as presented in the theoretical model and PCA analysis (as the variables that compose the PCA scores for the three regimes have the expected sign). Secondly,

econometric estimation allows us to ascertain which regimes have been instrumental in structuring economic growth between 1995 and 2011, a period that has been associated with a phase of hyper-globalization in the world economy. The causal analysis shows that integration and distribution are positively correlated with growth, while structure is negatively correlated. Finally, beginning with the distribution regime (I), we find that developed countries show a stronger pattern (or trajectory) of inclusive redistribution. For the integration regime (II), smaller countries tend to have a more inclusive integration pattern than large countries such as Brazil, USA, China and India. For the structure regime (III), it is clear that more diversified economies have a more inclusive pattern, while those that rely on specialization follow an exploitative pattern.

5. Conclusion

This article contributes to the structuralist development macroeconomics tradition, highlighting how further integration in the current global capitalist system presents heterogeneous impacts on domestic macroeconomic structures, giving rise to different growth and distribution regimes. Few structuralist contributions have explicitly modeled the macroeconomic impact of GVCs on long-term economic growth. Our proposed conceptual framework and empirical analysis attempt to offer a seminal contribution to help bridge this gap in the literature.

Furthermore, the article links integration with income distribution. Countries have seen a strong integration of their productive structure in the value chains. However, the impact on the functional income distribution is not clear. The advantage of our framework is that it not only considers profit and wage shares but also leakages, which allows observing the links between integration and distribution. A reduction in wage share may not necessarily result in a redistribution to profits, but rather an increase in the outflow of resources. In this sense, the debate of profit-led and wage-led growth is redefined in terms of open economies. Depending on the patterns of structure and integration, the presence of leakages may reduce the amount of resources moving to domestic consumption and investments towards the import of intermediary goods.

We start developing a simple macroeconomic model of growth and distribution with GVC to guide our analysis. We do not yet present a fully integrated version of the model between distribution and the BPCM, which is not a requirement given our objective in this article, but is a topic for further research. Our conceptual model maps the choice of variables which are then used to motivate the empirical approach at two levels. Firstly, we estimate three indices for integration, structure/diversification, and distribution using Principal Component Analysis (PCA), which allows us to see how each country or group of countries behave in terms of structure and distribution under GVCs. Secondly, we develop and present a causal econometric analysis on per capita GDP growth using the PCA indices as independent variables, which leads us to define distinct growth regimes or developmental patterns (see Table 7).

The results support our overarching claim that economic development is uneven across countries and geographical regions. Our regime classification offers a distinct perspective over dualistic models of economic growth (like wage-led and profit-led growth). It allows us to identify a wide

variety of growth regimes depending on which trajectory of integration, diversification and distribution characterizes a country's macroeconomic structure. The most inclusive regime of economic growth is one in which integration and structural change is inclusive and distribution is cooperative, while the most exclusive regime of growth is one where integration and structural change are exclusionary and distribution is exploitative. Individual countries can lie in any position within this spectrum. We find that larger developed and emerging nations exhibit a pattern of exclusive integration in which greater integration into GVCs is associated with high levels of value capture and concentration of trade gains. However, differences in economic structure differently impact the distributional conflict between labor and capital in the two country groups. In developed nations, trade gains stimulate investment in innovation and skill development of labor, leading to greater diversification which puts an upward pressure on wages. Combined with strong labor market institutions, this allows for a greater degree of income redistribution. In emerging nations in contrast, despite an increase in investment, the lack of a diversified economic structure puts a downward pressure on wages, which alongside weak labor market institutions and higher leakages of external resources worsens the distributional conflict.

This article offers an initial contribution to the literature on the macroeconomics of GVCs. It can be further developed in several ways. Firstly, to fully integrate the model, (1) by adding the distribution dimension to the BPCM in a complete and structured model, and (2) by further developing the link between GVC and price elasticities. Also, (3) the empirical analysis can be further specified using cluster analysis and developing new measures of GVC integration – which can help us address our small sample limitation for emerging and developing countries.

6. References

Abdi, H., & Williams, L. J. (2010). Principal component analysis. *Wiley interdisciplinary reviews: computational statistics*, 2(4), 433-459.

Andreoni, A., & Tregenna, F. (2020). Escaping the middle-income technology trap: A comparative analysis of industrial policies in China, Brazil and South Africa. *Structural Change and Economic Dynamics*, 54, 324-340.

Ahmed, S., Appendino, M., & Ruta, M. (2017). Global value chains and the exchange rate elasticity of exports. *The BE Journal of Macroeconomics*, 17(1).

Banga, R. (2014). Linking into Global Value Chains Is Not Sufficient: Do You Export Domestic Value-Added Contents? *Journal of Economic Integration*, Vol. 29, No. 2, June, pp. 267-297.

Bhaduri, A., and S. A. Marglin (1990). Unemployment and the real wage: the economic basis for contesting political ideologies. *Cambridge Journal of Economics* 14 (4): 375–93.

Bhaduri, A. (2008). On the dynamics of profit-led and wage-led growth. *Cambridge Journal of Economics*, 32(1), 147-160.

Bair, J., & Werner, M. (2015) 'Global production and Uneven Development', in Taylor, P., Newsome, K., Bair, J., Rainnie, Al (2015) *Putting Labour in its Place*, New York: Palgrave Macmillan.

Bhaduri, A., & Marglin, S. (1990). Unemployment and the real wage: the economic basis for contesting political ideologies. *Cambridge journal of Economics*, 14(4), 375-393.

Blecker, R. A. (2016). Wage-led versus profit-led demand regimes: the long and the short of it. *Review of Keynesian Economics*, 4(4), 373-390.

Blecker, R. A. (2002). Kaleckian macro models for open economies. In Foundations of international economics (pp. 126-160). Routledge.

Blecker, R. A. (2021). New advances and controversies in the framework of balance-of-payments-constrained growth. *Journal of Economic Surveys*.

Blecker, R. A., & Setterfield, M. (2019). Heterodox macroeconomics: Models of demand, distribution and growth. Edward Elgar Publishing.

Bonizzi, B., Kaltenbrunner, A. and Powell, J. (2019). Subordinate Financialization in Emerging Capitalist Economies. Greenwich Papers in Political Economy 23044. University of Greenwich, Greenwich Political Economy Research Centre.

Bowles, S., & Boyer, R. (1988). Labor discipline and aggregate demand: a macroeconomic model. *The American Economic Review*, 78(2), 395-400.

Braunstein, E., Bouhia, R., & Seguino, S. (2020). Social reproduction, gender equality and economic growth. *Cambridge Journal of Economics*, 44(1), 129-156.

Braunstein, E., Seguino, S., & Altringer, L. (2019). Estimating the role of social reproduction in economic growth. CWE-GAM Working Paper Series: 19-02. Program on Gender Analysis in Economics (PGAE). American University, Washington, DC.

Chandler, A. D. (1990). Strategy and structure: Chapters in the history of the industrial enterprise (Vol. 120). MIT press.

Ciarli, T., Lorentz, A., Valente, M., & Savona, M. (2019). Structural changes and growth regimes. *Journal of Evolutionary Economics*, 29(1), 119-176.

Cimoli, M. (1988). Technological gaps and institutional asymmetries in a North-South model with a continuum of goods. *Metroeconomica*, 39(3), 245-274.

Cimoli, M., Lima, G. T., & Porcile, G. (2016). The production structure, exchange rate preferences and the short-run—Medium-run macrodynamics. *Structural Change and Economic Dynamics*, 37, 13-26.

Cimoli, M., & Porcile, G. (2011). Global growth and international cooperation: a structuralist perspective. *Cambridge Journal of Economics*, 35(2), 383-400.

Cimoli, M., & Porcile, G. (2014). Technology, structural change and BOP-constrained growth: a structuralist toolbox. *Cambridge journal of economics*, 38(1), 215-237.

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

Fazzari, S. M., Ferri, P., & Variato, A. M. (2020). Demand-led growth and accommodating supply. *Cambridge Journal of Economics*, 44(3), 583-605.

Frankel, J. and Romer, D. (1999). Does Trade Cause Growth? *The American Economic Review*. Vol. 89, No. 3 (June), pp. 379-399.

Gereffi, G., Humphrey, J., & Sturgeon, T. (2005). The governance of global value chains. *Review of international political economy*, 12(1), 78-104.

Hartmann, D., Guevara, M. R., Jara-Figueroa, C., Aristarán, M., & Hidalgo, C. A. (2017). Linking economic complexity, institutions, and income inequality. *World development*, 93, 75-93.

Hidalgo, C. A., & Hausmann, R. (2009). The building blocks of economic complexity. Proceedings of the national academy of sciences, 106(26), 10570-10575.

Jayme, F. G. (2020). Balance-of-payments-constrained economic growth in Brazil. *Brazilian Journal of Political Economy*, 23, 63-86.

Koopman, R., Z. Wang, and Shang-Jin Wei (2008). How much of Chinese exports is really made in China? Assessing domestic value-added when processing trade is pervasive. NBER Working Paper, 14109.

Lewer, J. & Berg Van Den, H. (2013). How Large Is International Trade's Effect on Economic Growth? *Journal Of Economic Surveys*. Vol. 17, No. 3.

Nomaler, Ö., Spinola, D., and Verspagen, B. (2021). R&D-Based Economic Growth in a Supermultiplier Model. *Structural Change and Economic Dynamics*, 59:1–19.

Martorano, B. (2018). Cyclicality of Fiscal Policy in Latin America over the period 1990-2015. *Review of Development Economics*, 22(1), 67-90.

Milberg, W. and Winkler, D. (2013). *Outsourcing Economics: Global Value Chains in Capitalist Development*. New York, Cambridge University Press.

Missio, F., Jayme, F. G., & Oreiro, J. L. (2015). The structuralist tradition in economics: methodological and macroeconomics aspects. Brazilian Journal of Political Economy, 35, 247-266.

Ocampo, J. A. (2016). 10. Balance-of-Payments Dominance: Implications for Macroeconomic Policy. In Macroeconomics and Development (pp. 211-228). Columbia University Press.

Ocampo, J. A., Rada, C., & Taylor, L. (2009). Growth and policy in developing countries. Columbia University Press.

Oyvat, C., O. Öztunalı and C. Elgin (2020). Wage-led versus profit-led demand: A comprehensive empirical analysis. *Metroeconomica* 71 (3): 458-486.

Piketty, T. (2013). Capital in the 21st Century. Cambridge, MA: President and Fellows, Harvard College.

Porcile, G., & Yajima, G. T. (2021). New Structuralism and the balance-of payments constraint. In Thirlwall's Law at 40. Edward Elgar Publishing.

Prebisch, R. (1962). The economic development of Latin America and its principal problems. Economic Bulletin for Latin America.

Ranieri, R., & Ramos, R. A. (2013). Inclusive growth: Building up a concept (No. 104). Working paper. Washington, DC: International Policy Centre for Inclusive Growth.

Ribeiro, R. S., McCombie, J. S., & Lima, G. T. (2016). Exchange rate, income distribution and technical change in a balance-of-payments constrained growth model. *Review of Political Economy*, 28(4), 545-565.

Rodrik, D. (1998). Symposium on globalization in perspective: an introduction. *Journal of Economic Perspectives*, *12*(4), 3-8.

Robinson, J. (1969). The economics of imperfect competition. Springer.

Sasaki, H. (2021). Thirlwall's law, uneven development, and income distribution. *Metroeconomica*, 72(3), 592-611.

Setterfield, M. (2012). The remarkable durability of Thirlwall's Law. In Models of Balance of Payments Constrained Growth (pp. 83-110). Palgrave Macmillan, London.

Smichowski, B. C., Durand, C. and Knauss, S. (2021). Participation in global value chains and varieties of development patterns. *Cambridge Journal of Economics*, 45, 271–294.

Sturgeon, T. J. (2002). Modular production networks: a new American model of industrial organization. *Industrial and corporate change*, 11(3), 451-496.

Sturgeon, T. J., & Kawakami, M. (2010). Global value chains in the electronics industry: was the crisis a window of opportunity for developing countries? World Bank.

Spinola, D. (2020). Uneven development and the balance of payments constrained model: Terms of trade, economic cycles, and productivity catching-up. *Structural Change and Economic Dynamics*, 54, 220-232.

Taylor, L. (2021). Reconstructing macroeconomics. Harvard University Press.

Thirlwall, A. P. (1979). The balance of payments constraint as an explanation of international growth rate differences. *BNL Quarterly Review*, 32(128), 45-53.

Thirlwall, A. P., & 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.

Timmer, M. P., Erumban, A. A., Los, B., Stehrer, R., & De Vries, G. J. (2014). Slicing up global value chains. *Journal of economic perspectives*, *28*(2), 99-118.

UNCTAD (2013). Global Value Chains: Investment and Trade for Development. World Investment Report. Geneva: United Nations Conference on Trade and Development.

Zhao, Y., Fei, X., Wu, C., & Hashmi, S. M. (2020). A global value chain (GVC) model for determining changes in global output caused by currency appreciation. *The Journal of International Trade & Economic Development*, 29(4), 482-493.

Tables and Figures

Table 1. List of Variables for PCA

Integration variables	**Economic Structure variables**	**Distribution (Wage Share) variables**
GVC Participation (μ, v)	Private Credit to GDP Ratio	Unemployment rate
Backward Participation in GVCs (u, v)	Economic Complexity Index (or Diversification)	Exchange rate (q)
Exports + Imports as a share of GDP (Trade Openness)	Medium and High-tech Exports as a share of Manufactured Exports	Real Wage per hour (for unit labor cost (W/a))
Net Capital Account (F)		Domestic Prices (Gross Output)
		Value added per worker (Productivity) (a)
		Hirschman Herfindahl Index (for degree of Monopoly power)

Table 2: Summary Statistics for PCA (1995-2011)

Variable	**Obs.**	**Mean**	**Std. Dev.**	**Min**	**Max**
Integration Variables					
GVC participation	629	45.41	9.15	22.24	69.10
FVA share of gross exports	629	25.82	9.76	5.62	51.50
Trade Openness (X+M/GDP)	629	69.15	30.29	14.74	167.18
Net capital account	629	3.00E+08	2.72E+09	-1.65E+10	1.22E+10
Structure Variables					
Private credit to GDP	629	82.96	57.80	1.02	355.23
Economic Complexity Index	629	1.07	0.68	-0.48	2.86
Medium-high-tech X share of Manufactured X	629	51.27	16.43	14.48	85.39
Distribution Variables					
Unemployment rate	629	8.05	3.82	2.05	22.68
Exchange rate	629	260.00	1382.38	0.05	10389.90
Gross output prices	629	355.54	790.58	86.24	5781.80
Value added per worker	629	128659.90	83307.36	6257.60	304348.30
Real wage per hour	629	14.21	11.80	0.21	48.05
Hirschman Herfindahl index	629	0.11	0.13	0.03	0.71

Note: Summary statistics are for a sample of 37 countries.

Table 3. Cumulative Variation explained by First Component

Variable	**1995-2011**	**1995-2007**	**2008-2011**
Integration score	0.6678	0.6672	0.6840
Structure score	0.6567	0.6551	0.6660
Distribution score	0.3946	0.3944	0.4358

Table 4. Loadings of First Component – Integration score

Variable	1995-2011	1995-2007	2008-2011
GVC participation (%)	0.5485	0.5507	0.5401
Backward Participation in GVCs (%)	0.5859	0.5876	0.5736
X + M as a share of GDP (Openness)	0.5720	0.5717	0.5704
Net Capital Account (F)	0.1692	0.1570	0.2321

Note: All variables are logged and are means over the specified period. Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is a useful test post-estimation, as it shows whether the number of loadings used is adequate for creating a composite score. For 1995-2011, with these four measures, KMO stat for the structure score is **0.7142** which suggests that sampling is adequate and using PCA is justified (rule of thumb says that KMO stat > 0.5 is adequate).

Table 5. Loadings of First Component – Structure score

Variable	1995-2011	1995-2007	2008-2011
Private Credit to GDP Ratio (%)	0.3604	0.3737	0.2991
Economic Complexity Index (or Diversification)	0.6575	0.6543	0.6785
Medium and High-tech Exports as a share of Manufactured Exports (%)	0.6617	0.6575	0.671

Note: All variables are logged and are means over the specified period. For the full sample period, the KMO stat for sampling adequacy is **0.5484**.

Table 6. Loadings of First Component – Distribution score

Variable	1995-2011	1995-2007	2008-2011
Unemployment rate	0.0091	-0.0337	0.1021
Exchange rate (q)	-0.3615	-0.3418	-0.3708
Real Wage per hour (W/a)	0.6122	0.6184	0.5893
Value added per worker (Productivity) (a)	0.6118	0.6117	0.5794
Prices (Gross Output, Industry)	-0.3457	-0.3535	-0.4111
Hirschman Herfindahl Index	-0.0255	-0.019	0.0057

Note: All variables are logged and are means over the specified period. For the full sample period, the KMO stat for sampling adequacy is **0.5647**.

Table 7. Classifying Integration, Structure and Distribution Regimes

Based on the PCA analysis, each of the regimes can have distinct trajectories.

	Trajectory 1	**Trajectory 2**
Integration	**Inclusive Integration** Relatively smaller degree of capital concentration. Value capture and gains from GVC trade are more equally distributed among firms in these countries. Integration is associated with an increase in investment leading to technology catching-up and skill development of labor. Growth is stable.	**Exclusive Integration** High degree of capital concentration – few firms capture the majority of value within GVCs. Gains from integration are unequally distributed among firms, increasing income inequality. Integration also increases investment, but does not lead to technological upgrading or skill development of labor. Growth is volatile and highly susceptible to external demand conditions.
Structure	**Inclusive Structural Change** Strong macroeconomic structure and a history of successful structural transformation that moved labor and resources from low-productivity agricultural jobs to high-productivity manufacturing and service sector occupations. Highly diversified export basket and higher investment in innovation leading to high levels of product, process and functional upgrading. Growth is stable.	**Exclusive Structural Change** Significant constraints on the macroeconomic structure and history of fragmented structural change. Pockets of economic efficiency coexist with rising informality of employment. Constraints on structural change are partly external and partly internal, and tied to the history of post-colonial development and institutions. Growth depends on natural resources and exports of primary products. Low levels of diversification and innovation lead to low levels of economic upgrading in GVCs. Growth is unsustainable and unequal.
Distribution	**Cooperative Distribution Regime** Redistribution of aggregate income in favor of profits is less severe. Presence of strong labor market institutions achieved on the basis of strong labor movements and union success in the past, continues to act as a cushion and resist the decline in wage shares and real wages from greater integration. In such regimes, the conflict between labor and capitalists is less acute and facilitates coordination among classes to some extent. Growth enhances equity rather than efficiency.	**Exploitative Distribution Regime** Greater redistribution of trade gains in favor of profits rather than wages, as well as greater leakages. The presence of weak labor market institutions combined with a history of state repression against widespread unionization increases the conflict between labor and capitalists, making the regime exploitative. Growth enhances efficiency rather than equity.

Note: The classification of regimes is inspired by the four-fold typology of growth and social reproduction in Braunstein et. al (2020), while the specific characteristic of each regime is motivated by Smichowski et al. (2020).

Table 8: Correlation matrix for standardized PCA scores (1995-2011)

	Integration	Structure	Distribution
Integration	1.0000		
Structure	0.1811	1.0000	
Distribution	0.0558	0.6216	1.0000

Table 9: Summary Statistics for Regression analysis (1995-2011)

Variable	Obs.	Mean	Std. Dev.	Min	Max
GDP growth	629	2.81	3.89	-14.46	14.35
Real GDP pc (const USD)	629	24640.81	12321.68	1561.71	53227.76
Investment (share of GDP, %)	629	23.71	4.89	4.45	43.93
Government spending (share of GDP, %)	629	18.19	4.05	5.69	27.94
Years of secondary schooling	629	6.72	1.00	5.00	9.00
Integration score (standardized)	629	0.00	1.00	-4.39	1.91
Structure score (standardized)	629	0.00	1.00	-2.67	1.96
Distribution score (standardized)	629	0.00	1.00	-2.63	1.26
Integration score	629	0.00	1.63	-7.17	3.13
Structure score	629	0.00	1.40	-3.75	2.75
Distribution score	629	0.00	1.54	-4.05	1.94
Average Distance (kms)	629	3225.00	2283.14	655.09	9680.26
Average Population (millions)	629	1.60e+08	9.08e+07	3.65e+07	3.59e+08
IV	629	6.65E+11	7.44E+11	2.74E+10	3.26E+12

Note: Summary statistics are for a sample of 37 countries.

Table 10: GDP growth and PCA scores

Dependent Variable: GDP pc growth	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	All	Developed	Emerging	All	Developed	Emerging	All	Developed	Emerging
Real GDP pc, mean, lag 1	-0.000***	-0.000***	-0.001***	-0.000***	-0.000***	-0.001***	-0.000***	-0.000***	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment	0.329***	0.305***	0.376***	0.349***	0.329***	0.393***	0.349***	0.329***	0.393***
	(0.043)	(0.056)	(0.085)	(0.043)	(0.055)	(0.087)	(0.058)	(0.081)	(0.107)
Govt. Spending	-0.423***	-0.760***	-0.279	-0.450***	-0.825***	-0.274	-0.450*	-0.825***	-0.274
	(0.102)	(0.114)	(0.206)	(0.102)	(0.112)	(0.206)	(0.229)	(0.136)	(0.482)
Education (secondary)	2.115***	-1.049	2.442**	2.000***	-1.227	2.312**	2.000**	-1.227	2.312***
	(0.603)	(0.975)	(0.966)	(0.599)	(0.951)	(0.975)	(0.836)	(1.054)	(0.713)
Integration	2.512***	2.996***	1.596*	2.718***	3.257***	1.763**	2.718***	3.257***	1.763
	(0.383)	(0.368)	(0.841)	(0.386)	(0.364)	(0.856)	(0.828)	(0.817)	(1.526)
Structure	-0.364	-1.194**	0.328	-0.435	-1.331***	0.260	-0.435	-1.331	0.260
	(0.434)	(0.506)	(0.919)	(0.431)	(0.498)	(0.923)	(0.546)	(0.890)	(1.328)
Distribution	2.429**	5.250***	1.331	2.157*	5.122***	1.217	2.157	5.122***	1.217
	(1.088)	(1.443)	(1.996)	(1.121)	(1.543)	(2.024)	(2.204)	(1.622)	(4.279)
y01				-0.804	-0.729	-0.633	-0.804*	-0.729**	-0.633
				(0.523)	(0.484)	(1.192)	(0.471)	(0.272)	(0.991)
y08				-1.584***	-2.076***	-1.278	-1.584***	-2.076***	-1.278
				(0.543)	(0.479)	(1.261)	(0.403)	(0.372)	(0.822)
Constant	-0.429	28.861***	-8.730	-0.168	29.824***	-8.497	-0.168	29.824***	-8.497
	(4.442)	(7.678)	(6.991)	(4.412)	(7.492)	(7.008)	(5.909)	(9.788)	(5.105)
Country FE	N	N	N	N	N	N	Y	Y	Y
Year Dummies	N	N	N	Y	Y	Y	Y	Y	Y
Observations	592	384	208	592	384	208	592	384	208
R-squared	0.328	0.492	0.244	0.341	0.520	0.249	0.341	0.520	0.249
Groups	37	24	13	37	24	13	37	24	13

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11: Robustness Checks – GDP growth and subcomponents of PCA scores

Dependent Variable: GDP pc Growth	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Real GDP pc, mean, lag 1	-0.001***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment	0.334***	0.369***	0.344***	0.347***	0.345***	0.346***	0.311***	0.344***	0.355***	0.339***	0.329***	0.347***
	(0.054)	(0.054)	(0.054)	(0.058)	(0.057)	(0.058)	(0.076)	(0.056)	(0.056)	(0.062)	(0.064)	(0.056)
Govt. Spending	-0.474**	-0.328	-0.417*	-0.443*	-0.447*	-0.442*	-0.451**	-0.507**	-0.531***	-0.401*	-0.526**	-0.496**
	(0.214)	(0.218)	(0.235)	(0.225)	(0.237)	(0.228)	(0.184)	(0.203)	(0.192)	(0.200)	(0.203)	(0.198)
Education (secondary)	1.747**	1.915**	2.461***	1.967**	1.896**	1.963**	1.883**	1.928**	1.951**	1.991**	1.910**	1.914**
	(0.823)	(0.900)	(0.817)	(0.861)	(0.910)	(0.860)	(0.753)	(0.794)	(0.760)	(0.897)	(0.845)	(0.796)
Integration				2.661***	2.625***	2.668***	2.704***	2.658***	2.597***	2.387***	2.595***	2.735***
				(0.816)	(0.783)	(0.834)	(0.770)	(0.758)	(0.761)	(0.818)	(0.778)	(0.783)
Structure	-0.646	-0.046	0.332				-0.279	-0.442	-0.084	-0.575	-0.597	-0.340
	(0.513)	(0.604)	(0.470)				(0.532)	(0.599)	(0.588)	(0.583)	(0.631)	(0.535)
Distribution	2.060	1.433	1.966	2.243	2.151	2.118						
	(2.035)	(2.174)	(2.188)	(2.146)	(2.250)	(2.219)						
GVC Participation	0.381***											
	(0.063)											
X+M share of GDP		0.098***										
		(0.031)										
Net Capital Account (log)			0.303									
			(0.369)									
ECI (log)				-1.353								
				(1.764)								
Private credit to GDP					0.002							
					(0.008)							
Medium and High-Tech Exports						-0.012						
						(0.034)						
Unemployment rate							-0.097					
							(0.097)					
Exchange rate (log)								0.529				
								(1.705)				
Wage per hour									0.103**			
									(0.039)			
Productivity (VA per worker) (log)										3.993*		
										(2.060)		
Gross Output prices (log)											0.712	
											(1.030)	
HH Index (log)												3.704
												(5.129)
Constant	-11.783*	-9.918	-12.756	1.197	0.821	0.798	1.315	-1.033	1.128	-45.654*	-2.439	-0.552
	(5.844)	(6.226)	(9.882)	(6.652)	(7.230)	(6.577)	(5.582)	(6.083)	(5.361)	(23.060)	(6.538)	(5.993)
N	592	592	592	592	592	592	592	592	592	592	592	592
R-squared	0.401	0.330	0.282	0.341	0.340	0.340	0.339	0.337	0.343	0.347	0.339	0.337
Groups	37	37	37	37	37	37	37	37	37	37	37	37

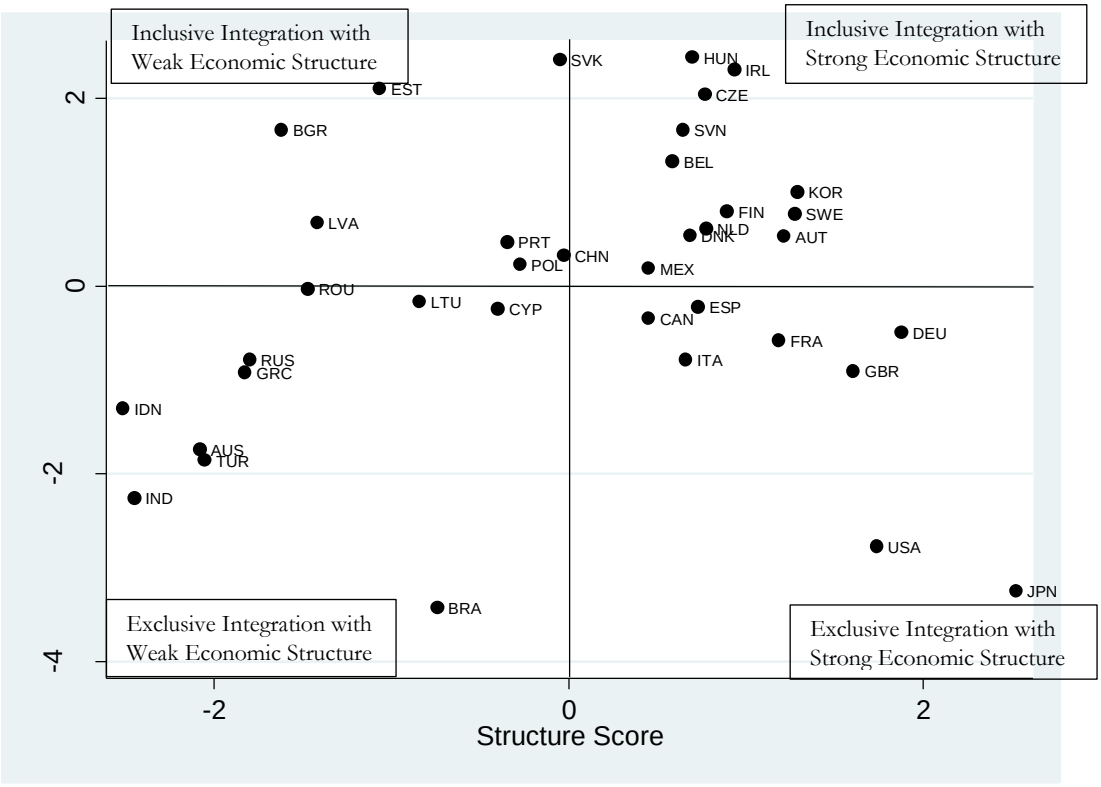
Note: Results in Columns (1)-(12) are for the full country sample, with country fixed effects, and year dummies for year 2001 and 2008.

Table 12: Growth and PCA scores: IV Regressions

Dependent Variable: GDP pc Growth	(1)	(2)	(3)
	All	Developed	Emerging
Integration	4.855***	4.782***	4.981***
	(0.819)	(0.942)	(1.586)
Structure	-1.052**	-1.442***	-1.239
	(0.486)	(0.508)	(1.121)
Distribution	2.249**	4.668***	2.058
	(1.143)	(1.583)	(2.080)
Real GDP pc, mean, lag 1	-0.000***	-0.000***	-0.001***
	(0.000)	(0.000)	(0.000)
Investment	0.353***	0.345***	0.361***
	(0.044)	(0.057)	(0.089)
Govt. Spending	-0.477***	-0.852***	-0.201
	(0.104)	(0.115)	(0.211)
Education (Secondary)	1.636***	-1.642*	1.884*
	(0.623)	(0.990)	(1.003)
y01	-0.958*	-0.927*	-0.813
	(0.536)	(0.502)	(1.209)
y08	-2.065***	-2.345***	-2.106
	(0.577)	(0.508)	(1.323)
Country FE	Y	Y	Y
Year Dummies	Y	Y	Y
F-stat for excluded instruments (1^{st} stage)	163.73	63.32	79.31
Observations	592	384	208
R-squared	0.304	0.496	0.192
Groups	37	24	13

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Integration score is instrumented with a gravity measure of average distance and the average population of the top 10 trading partners for each country. The large and statistically significant F stat for excluded instruments reported in the table shows that the IV is a strong instrument. Moreover, the Sargan statistic for the overidentification test of all instruments, not reported here, are statistically significant at 1% which implies that the equations in the IV model are exactly identified.



Note: Each country point is the average of the two scores across time.

Figure 1: Mapping of Regimes, Full Sample, 1995-2011: Integration and Structure

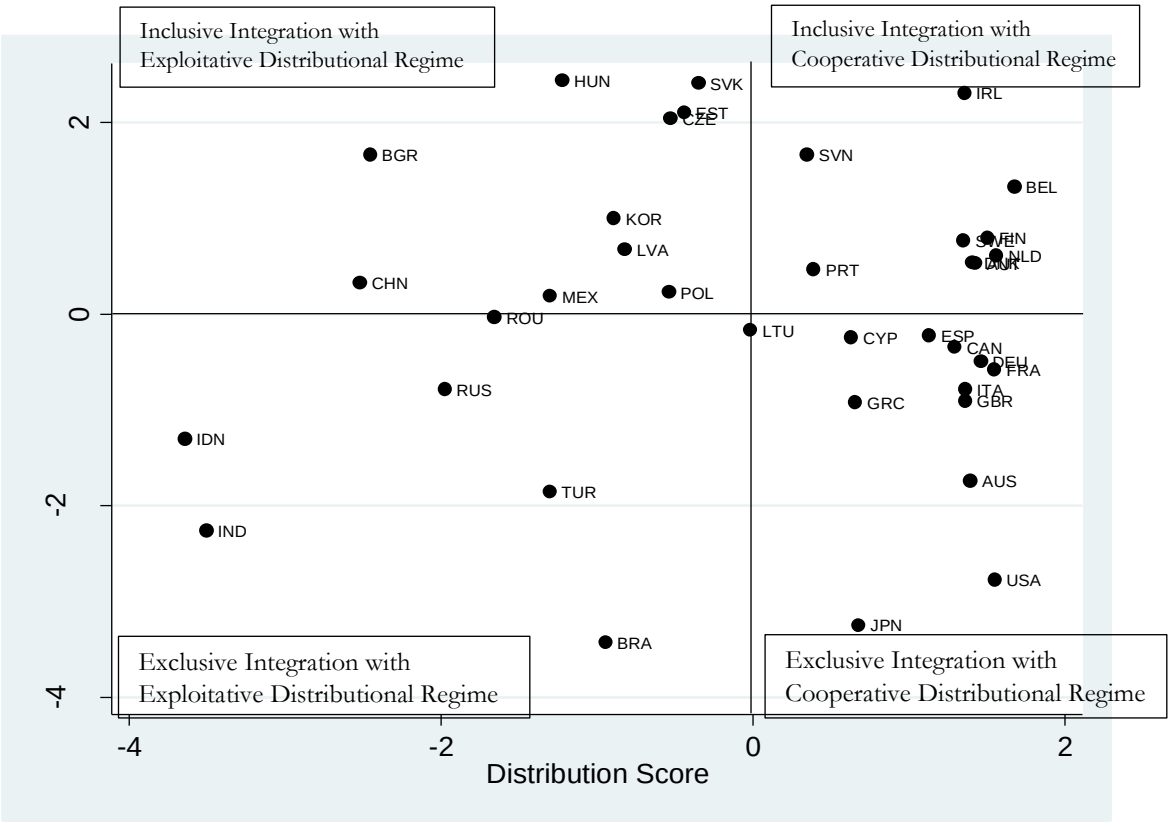


Figure 2: Mapping of Regimes, Full Sample, 1995-2011: Integration and Distribution

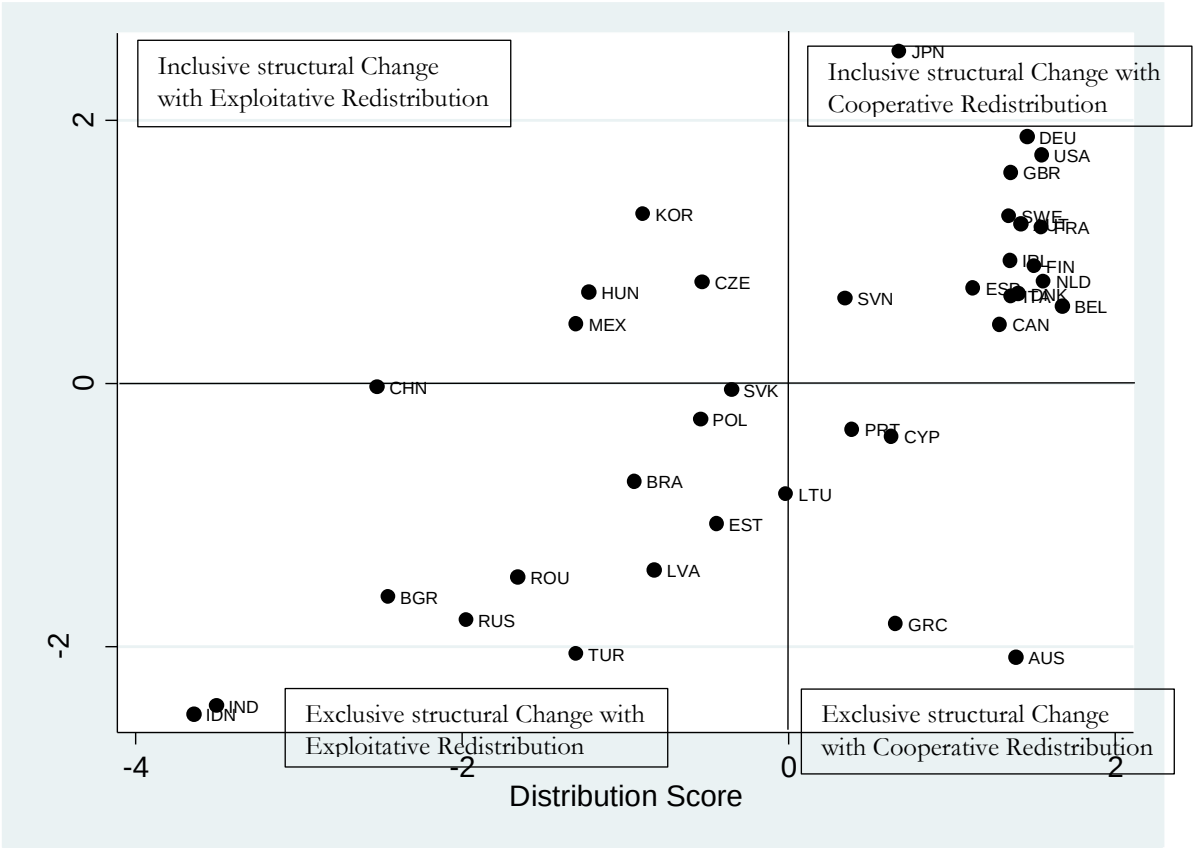


Figure 3: Mapping of Regimes, Full Sample, 1995-2011: Structure and Distribution

Appendix 1: Description of Sample Countries and Variables used

Table 1.A. Estimation Method of above variables

Integration	Estimation method
GVC Participation (μ, v)	$GVCParticipation\ as\ a\ share\ of\ Gross\ Exports\ (\%) = \left(\frac{DVAinForeign\ Exports}{GrossExports} + \frac{FVAinExports}{GrossExports}\right)$ ***Source:*** TIVA 2016 release
Backward Participation in GVCs (u, v)	*FVA in Exports as a share of Gross Exports (%)* ***Source:*** TIVA 2016 release
Exports + Imports as a share of GDP	Gross Exports as a % o GDP + Gross Imports as a % of GDP ***Source:*** TIVA 2016 release
Net Capital Account (F)	Net Capital Account (BOP, current USD) ***Source:*** WDI, WB. Missing values extrapolated.
Economic Structure	
Private Credit to GDP Ratio	Domestic credit to private sector (% of GDP) ***Source:*** WDI, WB
Economic Complexity Index (or Diversification)	***Source:*** Atlas of Economic Complexity database, Center for International Development, Harvard University.
Medium and High-tech Exports as a share of Manufactured Exports	Medium and high-tech exports (% manufactured exports) ***Source:*** WDI, WB
Distribution variables	
Unemployment rate	***Source:*** WDI, WB ***Definition:*** Unemployment refers to the share of the labor force that is without work but available for and seeking employment.
Exchange rate (q)	ER = (national currency/US dollar) ***Source:*** PWT 9.1
Real Wage per hour (W/a)	Real wage per hour = $\left(\frac{Total\ Labor\ Compensation\ in\ Industry\ in\ PPP\ dollars}{Total\ Hours\ worked\ in\ Industry}\right)$ ***Source:*** Socio Economic Accounts (SEA) of the World Input-Output database (WIOD), 2014.
Value added per worker (Productivity) (a)	$Value\ Added\ per\ worker = (VAPW\ in\ Agriculture + VAPW\ in\ Industry + VAPW\ in\ Services)$ ***Source:*** WDI, WB. Missing values extrapolated.
Prices (Gross Output)	Price Index. ***Source:*** Socio Economic Accounts (SEA) of the World Input-Output database (WIOD), 2014.
Hirschman Herfindahl Index (for degree of Monopoly power)	Index of market concentration ***Source:*** WITS (World Integrated Trade Solution) database, WB. Missing values extrapolated.
For Regression Analysis	
Income convergence	Real GDP per capita (millions, current USD) ***Source:*** Penn World Tables (PWT), version 9.1.
Investment	Gross Fixed Capital Formation, as a share of GDP (%) ***Source:*** WDI, WB.
Government spending	Gross general final government consumption expenditure, as a share of GDP (%)

	Source: WDI, WB.
Years of secondary education	Secondary education, duration (years), median ***Source:*** WDI, WB.
IV	IV = (average distance of country i from top 10 trading partners) * (average population of top 10 trading partners for country i)
Distance (kms), i to j	Distances between country i and j is: $d_{ij} = \left(\sum_{k \in i} (\text{pop}_k / \text{pop}_i) \sum_{\ell \in j} (\text{pop}_\ell / \text{pop}_j) d_{k\ell}^{\theta} \right)^{1/\theta}$ where popk designates the population of agglomeration k belonging to country i. The parameter – measures the sensitivity of trade flows to bilateral distance dk. The distwces calculation sets θ equal to -1, which corresponds to the usual coefficient estimated from gravity models of bilateral trade flows ***Source:*** CEPII, the GeoDist database.
Population, country j	Population, total **Note:** We calculate the average of the total population of the top 10 trading partners (j) for each country (i). We use the total population instead of the working-age population, as the foreign demand for country i's exports depends on the total population of trading partners, and not just their working-age population. ***Source:*** WDI, WB.

Table 1.B. Country List

Developed		**Emerging**		
		Eastern Europe	**Asia**	**Latin America**
Austria (AUT) Belgium (BEL) Denmark (DNK) Finland (FIN) France (FRA) Germany (DEU) Greece (GRC) Ireland (IRL) Italy (ITA) Netherlands (NLD) Portugal (PRT) Spain (ESP) Sweden (SWE) United Kingdom (GBR) Australia (AUS) Canada (CAN) Japan (JPN) United States (USA)	Czech Republic (CZE) Estonia (EST) Hungary (HUN) Poland (POL) Slovakia (SVK) Slovenia (SVN)	Bulgaria (BGR) Cyprus (CYP) Romania (ROU) Latvia (LVA) Lithuania (LTU)	China (CHN) Indonesia (IDN) Republic of Korea (KOR) India (IND) Turkey (TUR) Russia (RUS)	Brazil (BRA) Mexico (MEX)

Source: The sample consists of 37 countries, which is organized as per the WESP, UN classification of countries. The number of emerging nations is limited by the availability of data on value-added trade and real hourly wages.

Appendix 2: Mapping of Macroeconomic Regimes, Pre- and Post-Crisis Samples

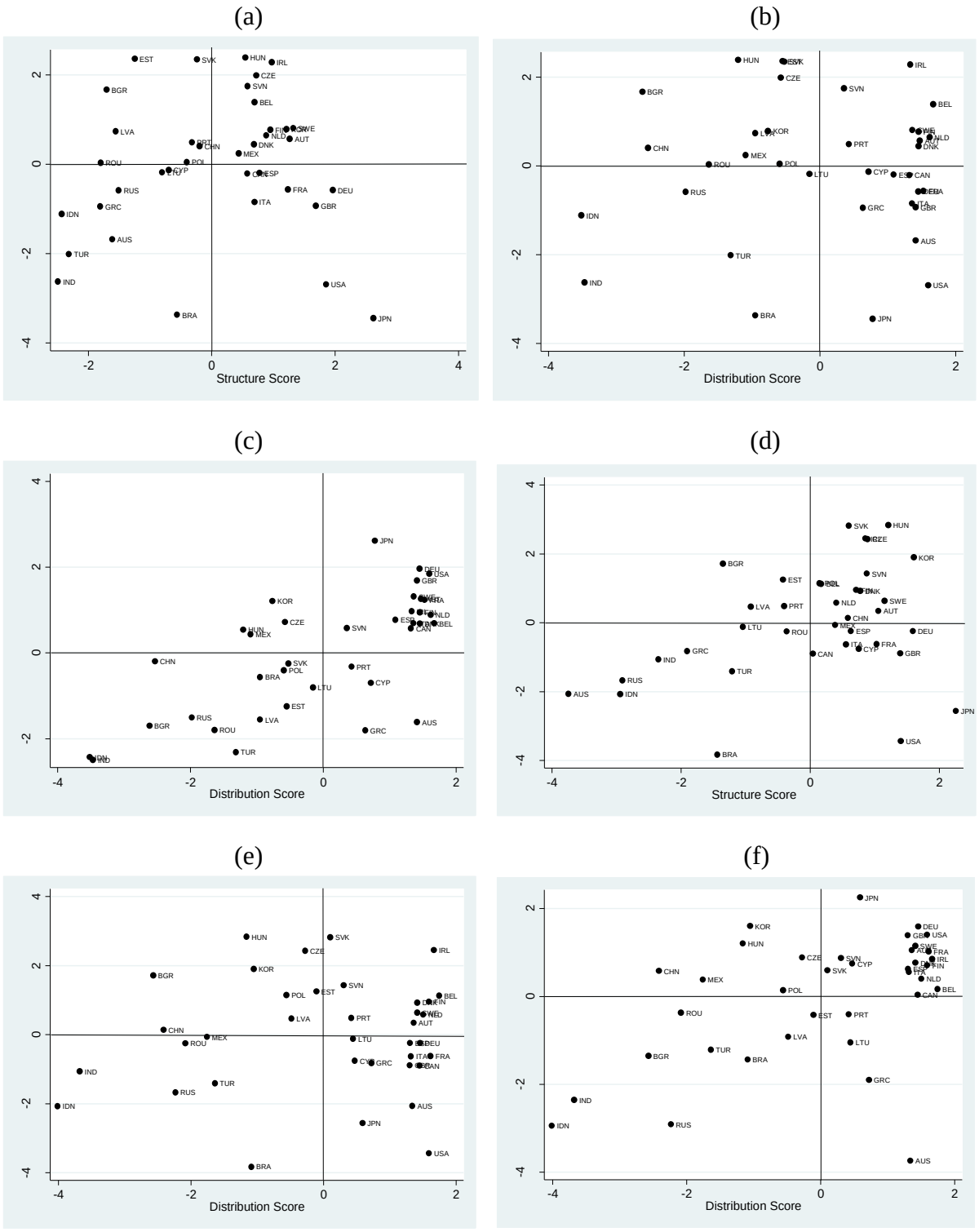


Figure 2.A: Panel (a) Pre-crisis sample, 1995-2007: Integration and Structure; (b) Pre-crisis sample, 1995-2007: Integration and Distribution; (c) Pre-crisis sample, 1995-2007: Structure and Distribution; (d) Post-crisis sample, 2008-2011: Integration and Structure; (e) Post-crisis sample, 2008-2011: Integration and Distribution; (f) Post-crisis sample, 2008-2011: Structure and Distribution