Financial Development, Growth Strategies and Structural Transformation

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Abstract

Strategizing economic growth and development in developing countries remains a daunting task for several years. Developing countries for long suffer from the many characteristics of underdevelopment. These range from slow economic growth to high levels of unemployment and poverty, increased population explosion with little or no corresponding increase in productive capabilities. For decades too, the economic literature has shown that several private and public sector-led strategies have failed to guarantee long term economic progress especially in developing countries. Whether mainstream or heterodox, what constitute appropriate growth strategies for developing countries is complex and highly debatable. This thesis therefore generally seeks to ignite better understanding of the strategies for growth and their determinants as well as to renew the debate on the essentials for strategizing growth in developing countries. The thesis attempts to provide some evidence on this general objective by investigating three specific topics in three empirical chapters. This is in addition to introductory and concluding chapters.

Chapter one motivates the thesis and specifies the objectives particular to each empirical chapter. Chapter two focuses on providing evidence on the role of financial development in determining whether developing countries follow or defy their comparative advantage. This area has been largely ignored in the literature on finance and development. Using dynamic panel data spanning across 132 developing countries and two-step system generalized method of moments (GMM), the results of this chapter mainly show that financial development in terms of the depth of banking sector tends to lead to comparative advantage – following (CAF) growth strategy but it tends to lead to comparative advantage – defying (CAD) in terms of financial efficiency. Based on these findings, chapter three introduces the analysis of financial and trade liberalization, interventionists policies and economic diversification in resource-rich developing countries. The empirical evidence reported in this chapter suggest that though liberal and interventionists policies matter in promoting economic diversification – in terms of enhancing manufacturing, the interaction of these policies with regulation could lead to an expanding services sector at the expense of manufacturing in resource-rich countries. Chapter four explores whether global value chains (GVCs) – related

trade and conventional trade play a role in the structural transformation of resource-rich and non-resource-rich developing countries. The results show that the share of domestic value added in gross GVC-related exports and conventional trade have the tendency to aggravate employment and value addition respectively in the agricultural sector of Non-Resource-Rich Countries (NRRCs). In Resource Rich Countries (RRCs), the findings show that conventional trade have negative and significant impact on value-added in manufacturing while the share of foreign value added in gross GVC-related trade reports positive and significant impact on share of labour employment in services but not on the value added in the sub-sector.

Thus, the findings of the thesis tend to have implications for what constitute an appropriate development strategy in developing countries. Overall, the findings imply that all hope is not lost in developing countries. Given their factor endowments, developing countries could harness them with the appropriate combination of interventionists and liberal policies as well as the right mix of domestic and foreign value addition in promoting economic diversification and structural transformation. It remains however, a challenge for these countries to draw a line between what constitutes effective strategies or policies thereby leaving room for further research as suggested in chapter five of the thesis.

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Author's Declaration

I declare that the thesis does not include any work – forming part of a thesis presented successfully for another degree. I also declare that the thesis represents my own work except where reference is made to others.

Abbreviations

AR Auto-Regressive

ASEAN Association of South-East Asian Nations

CAD Comparative Advantage – Defying

CE Central Europe

CAF Comparative Advantage – Following

CPIA Country, Policy and Institutional Assessment

DBA Deposit Banks Assets

DCBA Deposit and Central Banks Assets

DIV Diversification

DVA Domestic Value Added

EU European Union

FDI Foreign Direct Investment

FE Fixed Effects

FVA Foreign Value Added

GCs Global Corporations

GDP Gross Domestic Product

GNI Gross National Income

GMM Generalized Method of Moments

GOE Government Ownership of Enterprises

HICs High Income Countries

ICT Information and Communications Technology

ILO International Labour Organisation

IMF International Monetary Fund

ISIC International Standard Industrial Classification

LDCs Less Developed Countries

LIC Low Income Countries

LL Liquid Liabilities

LMICs Lower Middle-Income Countries

MICs Middle Income Countries

MNEs Multinational Enterprises

MRIO Multi-Region Input-Output

NR Natural Resources

NRRCs Natural Resource Rich Countries

NSE New Structural Economics

OEC Observatory of Economic Complexity

OECD Organisation for Economic Cooperation and Development

OLS Ordinary Least Squares

PSC Private Sector Credit

RCA Revealed Comparative Advantage

RRCs Resource Rich Countries

RRDCs Resource Rich Developing Countries

SVA Services Value Added

TCI Technology Choice Index

UNCTAD United Nations Conference on Trade and Development

UNDP United Nations Development Programme

UNIDO United Nations Industrial Development Organization

UN United Nations

WDI World Development Indicators

WTO World Trade Organization

1. Introduction

1.1. Motivation

1.1.1. Growth Strategies

Developing countries have suffered from the many characteristics of underdevelopment for years. These range from slow economic growth to high levels of unemployment and poverty, increased population explosion with little or no corresponding increase in skilled labour set and the increased inadequacy of capital to finance their way to economic development. For decades too, the economic literature has shown that several private and public sector-led strategies had proven not to be able to guarantee long term economic progress especially in developing countries. Whether mainstream or heterodox, what constitute appropriate growth strategies for developing countries is complex and highly debatable. Hence, it is the goal of this thesis to carefully explore some of the arguments and consider the prevailing conditions specific to developing countries.

From the Renaissance to the seminal work of Adam Smith on the sources of differences in wealth across nations, economists have continued to debate what poorer countries can do to get on a successful and sustainable development track. Reinert (2007) in his book "How Rich Countries Got Rich… and Why Poor Countries Stay Poor" identifies the key economic and technological forces which need to be harnessed by economic policy to generate economic development. Reinert argue that underdevelopment flourish where there is failure to promote and develop economic activities involving greater returns to scale and improved human capabilities and productive capacities. Many extremists' economists have argued for either completely self-regulating economy on the one hand or for totally state-run economy on the other. However, Reinert argues that important economic lessons can be learned from setting the historical records straight. Thus, he suggests that the history of the United States has the greatest economic relevance to today's poor countries and that it was the economic theory of the American Revolution led by Alexander Hamilton that is now recognised as the pioneer of industrial policy. The debate has increasingly become more useful than ever before because only a few countries for centuries have successfully grown from

low income to high income economies with most of the world's developing countries still languishing in underdevelopment.

More so, there has been debate on whether industrial policy in developing countries should conform to comparative advantage or defy it (Lin and Chang, 2009). In the first Development Policy Review debate, Lin and Chang though both protagonists that favour government intervention put up the argument for this in different ways and for different purposes. Lin argues that continuous industrial and technological upgrading are required for sustained economic growth and that they are best promoted by what he calls "a facilitating state" (a state that facilitates the private sector's ability to exploit the country's areas of comparative advantage) with "a dynamic private sector" as the ultimate driver. To Lin this makes a case for the use of a country's current comparative advantage and not in the factors of production that it may have someday but in the factors of production that it has now. Given that developing countries are ridden with market failures due to information externalities and co-ordination problem, such grounds provide a rationale for government intervention to kick-start development. Conversely, it is also true that there is risk of government failures too, but the fear of poor governance does not absolve us of responsibility for trying to design effective strategies for facilitating development. This means it behoves on policy makers and researchers to dig out the most effective ways of enhancing context-oriented development especially in developing countries. In his argument, Lin further posits that the key is recognising that the optimal industrial structure is endogenous to the country's endowment structure (particularly the availability of labour and skills, capital, and natural resources). This follows that the role of the government is to ensure that the endowment structure is first upgraded to facilitate upgrade in industry that will make appropriate use of the country's current comparative advantage. This means focusing on labour and resource-intensive types of production activities in most backward countries partly because even with increased capital flows to poor countries, low-cost capital remains relatively scarce. Taking a short cut by pursuing policies on an ideal industrial structure that is associated with modernisation which is often capital and skill intensive leads to developing countries defying their comparative advantage. This approach places priority on capital-intensive heavy industries and neglect the use of factors that are in great abundance in developing countries. Since it often

comes at high cost both financially and in terms of governance quality, Lin further argues implementing this approach requires that governments provide heavy protection and subsidies to firms that are not viable without government. Lin thus, concluded that defying comparative advantage would create long term governance problems while following comparative advantage could help provide the requirements for making developing countries more competitive in the world economy.

On the contrary, Chang disagrees with Lin on the recommendation that developing countries simply should follow their comparative advantage in industrial upgrading. Even though he admitted that government indeed has a role to play in upgrading industry, he argues that comparative advantage is simply a baseline and that a country needs to defy its comparative advantage to upgrade its industry. To Chang, the stringent assumptions of the theory of comparative advantage as used by Lin are only suitable for analysing short-term allocative efficiency and not medium-term adjustment and long-term development but Lin maintains that when an economy follows its comparative advantage in economic development, its endowment structure and comparative advantage changes dynamically.

Recently, Coniglio, Vurchio, Cantore, and Clara (2021) provide empirical evidence that shows how a country's specialisation evolves over time in a dynamic process, with shifts in comparative advantage resulting in new products being added to the country's export basket. It is important to note that understanding how comparative advantage evolves is crucial for identifying the determinants of economic diversification and to inform effective policy responses. Therefore, Coniglio and others explore whether the evolution of countries specialisation was guided by the notion of relatedness postulated by the product space framework of Hidalgo et al (2007), Hausmann and Klinger (2007) and O'Clery, Yıldırım, and Hausmann (2021). The product space framework is a dynamic process that is characterized by strong path dependence, as a country's current production capabilities in terms of technologies, production factors, and institutions determine what it produces today, and limits what it can produce tomorrow. Though they find some support evidence for path dependence, their analysis further show that a significant number of new products later added to countries' export baskets were unrelated to their initial specialization pattern. This shows

that the evolution of comparative advantage in the world economy has been characterized by significant jumps across the product space that is beyond the specialization pattern postulated by the framework. Coniglio and others reiterate that using such findings too narrowly as a guideline to identify latent comparative advantages might be undesirable partly because structural transformation has often taken different and unpredictable directions in most countries.

Thus, the reality that countries often depend on foreign conditions via their trade and financial relations with others has obviously made it more difficult for developing countries to judge what constitute appropriate strategies for transforming their economies. As argued by Oberholzer (2020), financial markets often punish profit-shrinking policies by capital flight thereby limiting the scope of action of an individual country. Developing countries have had to be mindful of the risk of increased capital flight when fashioning development policies. Thus, this also mean that the mobility of capital has made even countries with robust economic policies vulnerable to destabilising capital inflows and outflows. In this sense, growth strategies could create balance of payments problems, external debts and exchange rate fluctuations thereby increasing the discussion on what constitute appropriate growth strategies. While mainstream economists are tempted to conclude that growth and development should be left to the market, while government intervention should be reduced the mixed evidence of interventionist policies we have seen in China and other East Asian countries such as South Korea and Taiwan have further increased the debate on the appropriate growth strategies for developing countries (Chang, 2006). According to Oberholzer, though these countries may have had several advantages compared to today's developing countries in Africa, Latin America and Asia which range from institutional strength, historical legacy, and the state of the world economy global competition has since changed. Goods and financial markets have been liberalized, and advanced economies are no longer pushing for global growth. It can be argued that even if state-driven development has ever been successful it can no longer be so in the current age of economic and financial globalization. More so, the case for a self-regulating market driven approach has been tried by imposing market liberalization and fiscal discipline on Latin American countries after the debt crisis of the 1980s, and subsequently in the other world regions. Yet the results in terms of domestic investments and growth were disappointing.

Rodrik (2005) in (Aghion and Durlauf, 2005) argue that successful reformers are those who have creatively package market-oriented principles into institutional designs that are sensitive to local opportunities and constraints. More so, that igniting economic prosperity and sustaining it are somewhat different enterprises. Rodrik advance that while the former requires a limited range of unconventional reforms that need not to place too much tax burden on the institutional capacity of the economy, the latter is in many ways harder because it requires building longer term and sound institutional underpinning to endow the economy with the resilience to shocks. Thus, ignoring the distinction between these two tasks often leaves reformers saddled with impossibly ambitious, undifferentiated, and impractical policies.

The need for appropriate strategies in developing countries and the corresponding debates have therefore continued to take the centre stage in academic circles in the quest of seeking for ways of improving economic development especially in developing countries. This thesis is a step towards contributing to the debate on growth strategies and understanding some of the determinants in developing countries by providing some empirical evidence on the role of financial development. It further delves into attempts to provide evidence on the impact of interventionist and liberal policies on economic diversification (being an important goal) as well as analysing the place of global value chains in the structural transformation of developing countries. The concept of financial development is therefore reviewed in the next section as a way of introducing the need for the focus on its role in developing countries – based on related literature.

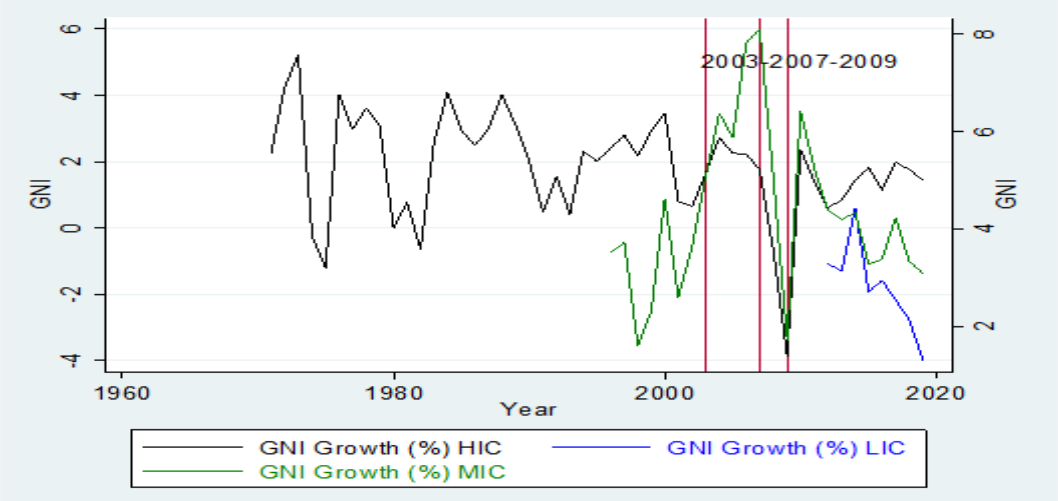
1.1.2. Financial Development

Levine (1997) posited that economists hold different opinions regarding the importance of financial development. While reviewing Goetzmann's "Money Changes Everything: How Finance made Civilization Possible", Shin (2018) makes two conclusions. First, that even ancient societies used sophisticated forms of finance, which are still in use today, after varying degrees of refinements and improvements over time and that both the positive outcomes (enabling profitable but risky ventures) and the negative ones (for example, debt crises) associated with finance are almost constant factors across times. The second conclusion is that finance evolves and adapts to the structure of the economy. While we cannot

fail to notice the common features in the financial tools used across time and space, it is evident that economies harnessed the power of finance in different ways and to different degrees of effectiveness. Economists, therefore, are now focused on posing very provocative questions on the debatable role of finance in economic development.

Shin (2018) argues that there is no bigger question in economics than why some countries are rich and others poor and that it is natural to ask whether finance can explain the wealth and poverty of nations. This is partly because of the evidence that the extent to which finance is used is positively correlated with income and wealth per capita. However, there are various ways of interpreting and formulating this important question of whether finance causes economic development.

For example, economists have considered whether finance is a sufficient or necessary condition for economic development (Goetzmann, 2017). In spite of the sophisticated use of finance, the living standards of the ancient civilizations were far below those of the nineteenth-century Western Europe, let alone ours today: implying finance cannot be a sufficient condition for economic prosperity. Also, a parallel argument can be made based on the diverse income levels across countries today – whether high-, middle- or low-income countries (see the figure below and appendix one for the description and list of countries as classified).



Source: Author Using Data from World Bank, 2021.

Figure 1. GNI Per Capita in Low-, Middle- and High-Income Countries.

Given the trend of Gross National Income (GNI) per capita annual growth (%) in the figure above, it shows that economies harnessed the power of finance in different ways and to different degrees across time and space. Before 2003, GNI per capita growth in High Income Countries (HIC) tend to be higher than the GNI per capita growth in Middle Income Countries (MIC) and Low-Income Countries (LIC). However, we noticed the opposite and a sharp difference after 2003 until 2007 when GNI per capita growth peaked in MIC. This surprisingly coincides with the beginning of the Global Financial Crises when incomes growth fell significantly across countries. The decline in GNI per capita growth during this period is however greater in HIC than in other regions as shown in the figure above. While the growth in income per capita in HIC fell by about -3.8% it fell only slightly in MIC by about 1.6% in 2009. Though there seems to be some recovery after the Global Financial Crises, the growth in income per capita across countries of the world is still below the pre-crises' levels. Thus, it is difficult to draw a sound conclusion on the role of finance in economic development since we notice sharp falls in per capita incomes across different income categories of countries during the global financial crisis and incomes are still yet to bounce back to pre-crisis level even after the crisis. This has not only further heightened the debate on the role finance can play in an economy, but it has also opened discussions on other economic determinants of a country's prosperity. On the relevance of other determinants for instance, Acemoglu, Johnson and Robinson (2005) in (Aghion and Durlauf, 2005) develops an empirical and theoretical case that differences in economic institutions, geography and culture are the fundamental causes of differences in economic development. They argue that economic institutions determine the incentives and constraints on economic actors and shape economic outcomes and that other institutions (whether political or social) and culture differ across societies which in turn affect economic outcomes in different ways.

There are banks in every country in the world, and all countries, save the very poorest, have stock exchanges. If finance were a sufficient condition for economic development, there should not be such a vast income per capita difference between the United States and, say, India, let alone sub–Saharan African countries. The converse that finance is necessary for economic development is a different matter. With so inclusive a definition of finance as contained in

Goetzmann (2017), one may agree with the view that it is impossible to imagine a well-functioning economy that does not use finance. Finance as described in Aghion, Howitt, and Levine (2018) is used to mean the use of money and debt to facilitate specialization; the use of market-traded securities to mobilise capital; the regular issuance and trading of derivatives to manage risks and foster international trade; the development of investment banks to underwrite securities; the formation and adaptation of venture capital firms to fuel high-tech innovations; or the invention of new institutions to identify and fund promising biotechnologies – all which have been integral part of economic growth. Also, a subtle point to the contrary is how finance became a less important feature when Rome transitioned from a republic to an empire – when the imperial bureaucracy supplanted many of the private financial arrangements that were necessary for governing the provinces and colonies. Related in the discussion of why finance was not as intensively used in China as in Western Europe, it is argued that the state played a much larger role in the economy through bureaucratic layers in China. The Roman Empire performed economically as well as the Roman Republic for a long stretch of time, and Imperial China was at least as well-off as Western Europe prior to the nineteenth century. It is then not too much of a stretch to think that government bureaucracy might be a substitute for finance, and that finance may not be a necessary condition for economic development. Of course, this is an exaggeration of the demise of finance in the two imperial regimes and does not provide a serious counterpoint to the necessity of finance for economic development. After all, at least since Adam Smith, economists agree that specialization and division of labour are key to economic development, and specialization cannot exist without finance.

Shin (2018) further argues that while this sufficiency versus necessity debate makes an interesting starting point, it is not useful for assessing the role of finance in economic development for two reasons. First, the uses of finance across economies are different especially in the extent and degree to which financial transactions take place. Second, as in the sufficiency discussion above, no one will try to make a serious argument that finance is the only factor that can explain economic development: the relevant question is how important finance is relative to other factors.

As is the case with most economic questions, since we cannot run experiments of randomizing access to and use of finance across economies, a clear-cut isolation of the relative contribution of finance to economic growth is infeasible. As a result, economists have resorted to empirical analyses of macro and micro-level relationships between finance and economic growth with an emphasis on ingenious statistical identification, and more recently to quantitative analysis of structural models (Shin 2018). Here, we specifically seek to contribute to the debate by asking whether finance could help explain specialisation or growth strategies in developing economies. Thus, in the first empirical chapter of the thesis we examine the effect of financial development on industrial growth strategy in developing countries to ascertain whether a country is likely to adopt a comparative advantage-following strategy or a comparative advantage-defying one. The most relevant and related literature are also reviewed in the introduction of the chapter. Thereafter, it takes us to consider in the subsequent chapters the effects of liberal and interventionist policies on economic diversification and whether GVCs could play any role in structurally transforming developing countries given their different resource endowments. It is important to note that our empirical analyses are limited because they do not aim at determining which strategy is superior, neither do they aim at recommending any liberal or interventionist policies to developing countries. However, our findings are important in igniting further studies and discussions on the appropriate growth strategies, and the means of achieving economic diversification and structural transformation that are necessary in developing countries.

1.1.3. Economic Diversification and Structural Transformation

Targeting economic diversification and structural transformation has attracted increasing interest by growth strategists in the economic literature. This is mainly because both economic diversification and structural transformation are relevant for poorer developing countries to create jobs and foster economic development. (Freire, 2019) argue that while the literature has identified several stylized facts about the pattern of diversification of economies, the development of explanations for those patterns has been loosely associated with an economic theory on growth, trade, technology change and structural transformation. Freire's study presents a model of structural economic dynamics and endogenous

technological change that can replicate empirical regularities related to economic diversification. Thus, it focuses on understanding the relationship between diversification and economic development and shows that diversification affects and is affected by structural economic dynamics. In addition, it reveals that diversification is path dependent implying that a country is more likely to produce a new product if it produces others that use some of the same capabilities and that the dynamics of diversification result in income disparities across countries over time.

Amongst other related literature, the United Nations Conference on trade and development (2016) discussed this subject in the context of changing development trajectories and trade patterns (UNCTAD, 2016). In terms of development trajectories, the UNCTAD report identifies three different trajectories of structural transformation over the past decades. Such stylized trajectories offer a framework for learning from successes and failures, and for designing appropriate policy responses. The first category is that of catch- up industrialization with robust production, investment, knowledge, and income linkages built over several decades based on a growing and increasingly diversified manufacturing sector. Other than in today's developed economies, this path can be observed only in a small number of East Asian newly industrialized economies, although its potential has been exhibited in some other countries for shorter periods of time. These experiences of catch-up industrialization confirm steadily rising per capita investment as a key factor for reaching a critical mass in certain manufacturing activities. They also demonstrate the crucial role played by the various linkages, which were fostered through strong government support for selected industries, including targeted credit allocation, public and publicly sponsored R&D, and promotion of access to export markets. The public sector facilitated long-term investment in plant and equipment, including through considerable public investment in both physical and relevant knowledge infrastructure. In addition, the creation or strengthening of income linkages was supported by policies to influence more equitable distribution of incomes, which in turn boosted domestic demand.

The next trajectory which is much more common among developing countries have been cases of stalled industrialization, in which shares of industrial income and

employment begin to stagnate after prolonged periods of growth of manufacturing output, but at lower levels of per capita income and overall productivity. This has been the case in India and Mexico, for example, and in several countries in South-East Asia. In other countries, the expansion of manufacturing slowed even before a solid base for sustained industrialization could be established, such as in many sub-Saharan African countries. In countries experiencing stalled industrialization, productivity growth has tended to fluctuate, and has rarely matched even the weakest periods in East Asia. Moreover, it has not been accompanied by a sustained expansion of employment in manufacturing. In many of these countries, there have been pockets of excellence, where there has been simultaneous growth of productivity and employment in subsectors of the economy, such as in some services in India, and in enclaves of manufacturing dynamism in Mexico that have a heavy FDI presence and have benefited from preferential access to the North American market. However, spill overs have been limited. A hybrid path has been followed in some countries in South-East Asia, such as Indonesia, Malaysia, and Thailand. They experienced positive structural transformation until the late 1990s, with continuous increases in employment and productivity across a broad range of industrial activities, including manufacturing, based on rising rates of investment. However, the 1997–1998 Asian financial crisis led to a significant reduction of investment rates and the stalling of earlier progress in employment and productivity in manufacturing.

In sub-Saharan Africa (excluding South Africa), the manufacturing sector has never managed to reach the scale needed to drive a cumulative process of linkage-building. In many countries, structural adjustment policies in the 1980s and 1990s had a negative impact on the expansion of manufacturing. The subsequent recovery of growth in manufacturing output was based on higher employment rather than improved productivity and has remained insufficient to create strong production and income-related demand linkages. Investment levels, even though increasing, have remained too low relative to requirements to drive broad-based productivity growth and knowledge generation and diffusion.

According to the UNCTAD Report, the third trajectory of structural transformation is one of premature deindustrialization, in which the shares of manufacturing value added, and employment started to decline at levels of per capita income

much lower than those at which developed economies and successful catch-up industrializers started to deindustrialize. This is accompanied by a sharp fall in relative productivity levels. This trajectory has been observed in a few countries in South America since the debt crisis of the 1980s. These economies have seen periods of productivity stagnation or decline, in some cases quite prolonged, and in most cases coinciding with sharp falls in investment growth. Indeed, the rate of capital accumulation in Latin America has been the lowest among developing regions in the post-1970 period. A similar trajectory is evident for countries in North Africa, as well as several transition economies that experienced the collapse of a centrally planned system.

Premature deindustrialization has been closely linked to drastic policy changes in the direction of more restrictive macroeconomic policies, lower public investment in infrastructure and knowledge, and, more generally, reduced state intervention to support structural transformation. Large, and sometimes unilateral, trade opening, coupled with periods of currency appreciation, strongly affected the profitability and viability of important segments of the manufacturing sector, while a trend towards more regressive income distribution weakened domestic demand.

In terms of trade pattern, the UNCTAD report further reveal that developing countries have greatly increased their share in global exports of manufactures, which grew from around 10 per cent in 1980 to nearly 45 per cent by 2014. About one quarter of that trade is South- South, reflecting in part how global value chains (GVCs) have extended the reach of international production networks in some key tradable sectors of the global economy. These developments, and the trade liberalization that facilitated them, are widely viewed as a promising indicator of the potential for globalization and trade to support industrialization and speed up development.

Part of the reason why export-led industrialization is such a favoured strategy is because of the successes of the first tier East Asian economies, where the expansion of exports of manufactures was supported by industrial policy and macroeconomic management resulting in the fastest and most sustained record of catch- up development in the modern era. Variants of this approach have spread to other countries in the region, though they have not been able to fully emulate

the success of the region's first movers. To a large extent, aggregate statistics on the rise of the South in manufacturing trade belie the singularity of Asia's achievements. In 2014, Asia alone accounted for nearly 90 per cent of developing-country exports of manufactures to the world, and for 94 per cent of South-South trade in manufactures. Nevertheless, a few developing countries outside the Asia region engage in significant trade in manufactures, with many more pursuing such trade in the hope of realizing the promise of export-led industrialization. Although deeper participation in international trade – both exporting and importing – can increase the pace and extent of industrialization, and raise productivity both within and across industries, these relationships are neither simple nor assured (Hausmann, Hwang, & Rodrik, 2007). Trade liberalization, if reciprocal, opens export markets and eases access to the import of capital goods and intermediate products, but it also introduces a few potential challenges for the industrialization process. Perhaps most formidable is the prospect of increasing competition from industrial imports, which has been linked to premature deindustrialization and informalization across several countries. Another challenge is that export markets have become much more crowded and competitive, increasing the globally accessible supply of less-skilled labour at a time of general wage compression and weak aggregate demand. Whether and to what extent the export of manufactures induces industrialization and productivity growth depends on both the composition of exports of manufactures (the more technologically intensive the better), and their share of domestic value added. Moreover, scale probably matters as much as the share of domestic value added and technological intensity, not least because of the need to absorb labour into manufacturing activities to achieve aggregate productivity growth. Enclaves of manufacturing excellence are encouraging, but they are insufficient to generate the linkages and the economy-wide productive transformation required to achieve significant industrialization.

Even where scale may be large enough to substantively shape domestic production, the problem of price is still a constraining factor. The fallacy of composition – as an ever more crowded field of exporters pursue the same export-led strategy – compresses price (and ultimately wage) growth, even for the most successful manufacturing exporters in Asia. As indicated by the Report, the terms of trade for developing-country exporters of manufactures declined at an average annual rate of 1.1 per cent between 1980 and 2014, and by 1.5 per cent for

exporters of manufactures in Asia. Moving to more technology-intensive exports seems a promising alternative, but the leap has to be large and sustained to outpace the many competitors vying for the same higher priced export markets. The flip side of the fallacy of composition is the concentration of market and pricing power. The rise of GVCs is both a cause and a consequence of this phenomenon. On the one hand, GVCs facilitate a wider participation of developing countries in global trade of manufactures, thereby opening new avenues for industrialization. On the other hand, this wider participation generates more competition, which further strengthens the bargaining and pricing power of lead multinational enterprises (MNEs) based predominantly in developed economies. This makes it difficult for developing-country producers – even the large emerging market suppliers – to raise and capture value added in economically consequential ways.

The Report also shows that big part of the problem is that export-led industrialization in the current era has been a generally disappointing generator of broadly shared, high-wage employment – an often overlooked but essential aspect of successfully linking exporting and industrialization. Even where productivity gains offer the potential for social upgrading, they may mostly increase profits, or be used to lower prices to solidify an existing competitive advantage, rather than raise wages. If most of the productivity gains are transferred abroad via lower prices, the virtuous circle of productivity supporting domestic demand and investment may be weakened. These competitive dynamics have been particularly problematic for countries in Africa and Latin America, where globalization has been associated with the movement of labour from high- to low-productivity production, but also to the informal economy. Conversely, a few Asian countries have been better able to exploit the opportunities created by exports of manufactures with a simultaneous increase in productivity and employment.

In addition, the Report reiterates that many of the weak links between trade in manufactures and industrialization can be traced to the problem of deficient global aggregate demand. Growth strategies, in both North and South, based on wage compression and fiscal austerity mean there is not enough demand in the traditional developed-country destinations for export-led industrializers. Turning

towards more regional, South-based markets offers a promising alternative – particularly for exports of manufactures – as is already partly reflected in the changing geography of international trade. But a successful shift requires that developing countries, especially large emerging economies, change their focus from export-oriented industrialization to domestic-demand driven industrialization. Developed-country markets still serve as important destinations for selling more sophisticated goods, and provide critical opportunities for enhancing production, design, and marketing capabilities. However, none of these strategies are capable of sustaining industrialization unless they are supported by growing global aggregate demand.

Sequel to the above, it is unfortunate that sparse data in developing countries make it difficult to understand how economic diversification and structural transformation changes and what conditions may be contributing to these processes. Structural transformation is particularly useful to developing countries that are emerging from low per-capita income levels to a different economic environment from that of the early-to-mid 20th century during which industrialisation was the major path to development. Nowadays, there has been increasing interest in additional conditions such as public-private sector policies, automation, interlinkages of global production which can change production processes and the dynamics much more rapidly. This is especially so because of almost-perfect cross-border information and knowledge sharing. More so, not only have we witnessed structural changes where services make up a large share of Gross Domestic Product (GDP) in all stages of development, but their growth is intrinsically linked to manufacturing – the so-called "servicification" of economies as highlighted by (Crozet, Crozet, & Milet, 2015).

A careful look however of the national and development strategies in developing countries indicates that only little has been achieved in economic diversification and structural transformation. This is mainly because economic cycles in these economies remained dependent on natural resources whose fragility is evident in the negative impact of fluctuations in the prices of commodities on export revenues and government income as well as on imports to meet domestic needs. The result on economic growth and development is negative hence the need for a

more effective strategy to transform these economies and help them mobilise their resources for improved development.

As cited above, there is large and growing literature on the relationship between economic diversification, structural transformation, and economic development with no consensus on what policies and determinants could help improve developing countries' targets to diversify and structurally transform their economies. Thus, in the second and third empirical chapters of this thesis attention is given instead to understanding the relationship between economic diversification and the policies aim at promoting it as well as the relationship between structural transformation and GVC-related trade respectively. This approach is a unique contribution to the scarce literature on the determinants of economic diversification and structural transformation in developing countries in more recent times and in a globalized world. This is particularly important because strategizing economic development in developing countries has been made more complex than ever before with increased mixed evidence on the role of liberal and interventionist policies in fostering economic prosperity around the world.

1.2. Objectives of the Study

Overall, this thesis delves into the debate on whether developing countries should adopt strategies for growth that conform with their comparative advantage or defy it by examining the role of financial development, the place of liberal and interventionist policies in economic diversification as well as the role of GVC-related trade in structural transformation. It seeks to highlight some of the means developing countries could improve their development success stories by going into the "black box" to first examine specifically whether financial development could lead to following or defying comparative advantage in developing countries. In this sense, it considers the relationship between financial sector development and strategies for growth crucial since whether developing countries follow or defy their comparative in the end it has grave consequences on their growth performance. To uncover whether financial development could lead developing countries to follow or defy their comparative advantage is an important and original contribution to the literature on finance and economic growth and development. As highlighted in greater details in the next chapter, related

literature on the subject focus on understanding the relationship between finance and economic development on one hand and between specialisation and economic development on the other. Though these relationships are important in explaining the state of economic prosperity in developing countries, they tend to ignore the relevance of factor endowments such as finance in determining strategies for growth and development. Our findings here are limited to understanding the role of finance in the specialization of countries and contributing to this debate, hence we do not seek to recommend any specialization strategies to developing countries.

The thesis also seeks to uncover the effects of liberal and interventionist policies on economic diversification in developing countries. This is to further buttress that in addition to the investigating the role of financial sector liberalisation in determining specialisation in developing countries, it is important to investigate the role of other liberal policies such as trade and more importantly state intervention measures in achieving economic diversification -which is considered a vital target for sustaining growth. Again, the related literature as discussed in second empirical chapter show that in addition to the paucity of data required to undertake empirical investigation on this subject there is growing mixed evidence on the role of liberal and interventionist policies in economic development. The evidence is particularly scarce on the impact of such policies on diversification in resource-rich developing countries which form the focus and context of this chapter. The findings of this chapter have serious implications for strategizing growth and strengthening institutions in developing countries.

The third objective of the thesis is to ascertain the impact of developing countries' integration into the global economy via Global Value Chains on structural transformation. Economists such as Kuznets (1979) and Monga & Lin (2019) agree that structural transformation is seen as the sure way to attain high rates of growth per capita or per worker and the mysterious process through which societies push into high-performing and dynamically growing sectors, industries, and branches. Recent related literature highlighted in detail in this empirical chapter reveal that participation in GVCs could also have negative consequences on developing countries. This is partly because understanding the changing dynamics of the global economy does not only require knowledge of how GVCs are

governed but what distributional effects arise from different governance forms. To Gereffi et al. (2005) GVCs are rarely coordinated spontaneously through market exchange but they are governed because of strategies and decision making by specific actors, large firms that manage access to final markets globally and at regional and national levels. From a broader perspective, GVCs are also shaped by actors that do not directly produce, transform, handle or trade products and services such as civil society organisations, trade unions, consumer groups, networks of experts, and policy makers, industry groups and multistakeholder initiatives including international organisations and states who may make active voices in the GVC world (Ponte et al., 2019). Thus, given the involvement of these diverse stakeholders in the operation of GVCs it casts doubts and hence makes it complex to understand their impact on an economy particularly on structural transformation in developing countries. Our analysis in this sense is therefore simple and limited to the key measures of GVC-related trade since data are not readily available in greater detail on their operations.

1.3. Structure of the Thesis

To achieve the above objectives, the rest of the thesis contains three empirical chapters in addition to a concluding chapter. The first empirical chapter (chapter two of the thesis) addresses the relationship between financial development and growth strategies. This is to help clarify whether financial development leads to developing countries specialising according to their comparative advantage or defying it. It is particularly important given the different factor endowments in these countries and the trajectory of their development over the years. The chapter is titled ‘financial development and strategies for growth in industrial sector” and divided into five sections. Section one covers the motivation for the chapter where the background to the relationship between finance and development is covered. Section two reviews key concepts and related literature. Concepts of financial development, growth strategy and comparative advantage are defined in this section as well as other relevant theoretical and empirical literature. In section three, we discuss the methodology. The variables and relevant controls are identified, the sources of data and sample are explained, the model and method of analysis are also presented in this section. Section four contains the results from the models and their interpretations. Results from some

alternative specifications of the models are also highlighted for robustness checks. The last section discusses the results and findings.

Chapter three of the thesis is titled "state intervention, liberalization and economic diversification in resource-rich countries". The analysis and evidence from the first empirical chapter forms the basis for the other two. While the first considers the link between financial development (a liberal policy perspective) and strategies for growth in the industrial sector, the second (chapter three of the thesis) specifically extends the investigation into analysing the role of state interventionist policies in economic diversification which could be vital in enhancing economic development in developing countries. Thus, this chapter is also divided into five sections. Section one is the introduction where the motivation for the chapter is considered. Section two reviews related theoretical and empirical literature. In section three, the empirical strategy is described – where the variables, data, sample, models, and methods of analysis are presented. The results and their discussion are covered in section four while section five highlights some of the lessons from the findings in the chapter.

On the other hand, the fourth chapter of the thesis examines the place of GVCs in achieving structural transformation – another yet important policy target for facilitating economic development in developing countries. This chapter is divided into seven sections. Section one is the introduction (motivation for the chapter) and section two explains the key concepts. In section three, related literature on how GVCs can affect structural transformation are reviewed. Section four highlights the challenges to GVC-oriented policies in developing countries. Section five covers the empirical strategy while sections six and seven contain the results and lessons, respectively.

The analyses in the chapters that follow overall, uncover the place of liberal and interventionist policies as well as the role of integration of developing countries into the global economy in facilitating their sustained economic growth and development. We now first turn to the effects of financial development on growth strategies in developing countries.

2. Financial Development and Strategies for Growth in Industrial Sector

2.1 Introduction

Dominant evidence on financial development and growth tend to ignore exploring whether finance could help explain the strategies for growth. The general idea that financial systems could play essential role in promoting economic development dates to Bagehot (1873) and Schumpeter (1911). Since then, empirical evidence on the relationship between finance and growth keep evolving over time with most developing countries still very unsuccessful in achieving convergence with their developed counterparts. Goldsmith (1959) was the first to show the presence of a positive correlation between the size of the financial system and economic growth- where he argued that this positive relationship was driven by increased financial allocation efficiency rather than increasing the volume of investment. Unfortunately, many other researchers such as Greenwood and Jovanovic, (1990) and Bencivenga and Smith (1991) also emphasized this channel without establishing whether there was a causal link between finance and growth.

Hence, economists in the early 1990s started working towards identifying the causal link between finance and growth. King and Levine (1993) were the first to show that financial depth predicts economic growth and Levine and Zervos (1998) showed that stock market liquidity predicts Gross Domestic Product (GDP) growth. More evidence in this direction came from Levine, Loayza, and Beck (2000) and Beck, Levine, and Loayza (2000) who used different types of instruments and econometric techniques to identify the causal relationship from finance to growth. In particular more recent literature in the field of economics and finance has found that industries that are more dependent on external finance are likely to grow faster in countries with a more developed financial system (Rajan and Zingales, 1998; Carlin and Mayer, 2003; Fisman and Love, 2004 and many others). In addition, Cecchetti and Kharroubi (2012), Law and Singh (2014), Aizenman, Jinjarak, and Park, (2015) and Arcand, Berkes, and Panizza (2015) used different approaches and different data sets to show that there is a threshold above which financial depth no longer has a positive effect on economic growth. This therefore means that the debates on the relationship between finance and growth have not

been fully resolved to be either positive or negative. Thus, attention has now shifted to examining the channels through which finance tend to affect growth including the economic sectors where finance could serve as a source of comparative advantage in developing countries.

Wang (2000) stressed that the question of which sector, financial or real leads in the process of economic growth and development remains ambiguous. This underscores the point that there is a small but growing literature that models the role of financial systems in determining patterns of production and hence comparative advantage (Ju and Wei, 2011). The concept of comparative advantage first appeared in Ricardo's 1817 book on the "Principles of Political Economy and Taxation". It was originally the economic reality describing the word gains from trade for individuals, firms, or nations which could arise from differences in their factor endowments or technological progress. Hence it was used to explain why countries engage in international trade even when one country's workers are more efficient at producing every single good than workers in other countries.

Baldwin (1989) and Kletzer and Bardhan (1987) are known for being the first authors to build theoretical models in which the comparative advantage of countries depends on the development of their financial institutions. Baldwin (1989) found that financial development may affect the output decisions of firms and thus trade patterns. Thus, in his paper domestic financial markets differ in extent to which they allow risk to be diversified. Kletzer and Bardhan (1987) considered a case where differences between countries in their domestic institutions of credit contract enforcement give rise to comparative advantage. Greater financial development which is assumed to result in lower price of external finance and lower degree of credit rationing generates comparative advantage in the sectors more intensive in the use of financial services- where technology and factor endowments are assumed to be identical across countries. In addition, Matsuyama (1992), Beck (2002) and Wynne (2005) found similar evidence thereby attributing the impact of financial development on the real economy to its causal impact on exports and trade balance.

Rajan and Zingales (1998) precisely examined whether financial development facilitate economic growth by scrutinizing the rationale that financial

development reduces the costs of external finance to firms. In explaining the theoretical mechanisms through which financial development affects economic growth, Rajan and Zingales specifically asked whether industrial sectors that are more in need of external finance develop disproportionately faster in countries with more developed financial markets. By focusing on the concept of industry growth, their estimates suggest that financial development has twice the economic effect on the growth of establishments as it has on the growth of the average size of the establishments. This further suggests an additional indirect channel through which financial development could affect growth- by disproportionately improving the prospects of young firms. This typically is in line with the Schumpeterian "waves of creative destruction" that would not start in countries with less-developed financial markets. Wurgler (2000) in a related study provided evidence on how the financial sector may help in industrial growth. Using a sample of 65 countries he finds that countries with developed financial sectors increased their investment more in growing industries and decreased their investment more in declining industries than did countries with underdeveloped financial sectors. The growth or decline in industry was measured by change in value added. Also, Rajan and Zingales (2001) tried to provide answer to how the development of the financial sector could affect industrial growth. Their work made a comparative analysis of the relationship-based banking systems and the arm's-length market-based systems where they found that a hybrid is probably best for the kinds of industries that are engines of world growth. However, they were quick to point out in their 2003 study that the state of financial development does not change monotonically over time. Using what they called interest group theory of financial development, Rajan and Zingales (2003) argued that politics tends to also affect financial development as incumbents oppose it because it breeds competition, while incumbents' opposition tend to be weaker under the prevalence of cross-border trade and capital flows. This accounts for cross-country and time-series variations of financial development.

Notably, Beck (2002) shows that countries with better developed financial sectors can exploit economies of scale and have a comparative advantage in manufacturing by allowing differences amongst countries' level of technology and endowment. Drawing from Rajan and Zingales (1998) Beck finds support for the theory that financial development lowers the cost of external finance and thus

countries with better developed financial sectors tend to have comparative advantage in manufactures, higher exports, and trade balances. However, this evidence is heavily criticized because such findings might not apply with better quality data. More so, the assumption that the same ranking of financial dependence that applies to the United States also applies to developing countries is not tenable. Thus, Beck (2013) argued that the government has distinct roles depending on the different views that relate financial development to policies and institutions (policy view), historic and cultural factors (historic view) and political conflicts and decisions (politics view). Thus, he emphasized that authorities are needed and limited to create the policy space and institutional framework for financial institutions and markets to develop but internalise the consequences of their decisions. It also means that governments cannot be trusted hence the call for the additional use of financial sector reforms where regulatory and government authorities are used to correct market failures and distributional repercussions of financial sector reforms.

For Kowalski (2011), it is capital-intensive activities which most benefit from financial development and become competitive. He explained that the source of comparative advantage changes with changes in policies and institutions including financial sector development. Becker (2013) and Manova (2008) argue differently how activities with high up-front fixed costs are the main beneficiaries of financial development and countries that are more financially developed tend to acquire comparative advantage in sectors where firms have more limited endowments of tangible assets. Therefore, this implies that financial development is likely to be a key factor in explaining specialisation in developing countries. It is however difficult to measure the degree of specialisation of countries whether at the firm, sector, or country levels as there are several considerations in determining relative factor-intensity in the production structure of firms. This informed why Kabango and Paloni (2010) point out that in developing countries, dependence on external finance is influenced by country-specific institutional and political considerations.

In contrast to the mainstream theory that banking sector development is essential to fund innovation and technology in developing countries- which is expected to in turn cause a shift in comparative advantage towards more sophisticated export

goods sectors, heterodox theories are more critical. Ebireri and Paloni (2016) provide indirect evidence on how financial development pushes countries to specialise according to their comparative advantage. They found that financial development is likely to prevent an improvement in the degree of sophistication of a country's export basket. Unlike Ebireri and Paloni (2016) who linked sophistication and concentration of exports to banking sector development, Manova (2008) reached similar conclusions using a different approach. Manova while emphasizing the role played by credit constraints in determining international trade flows instead linked export duration to equity liberalisations and found that liberalisations also increase exports disproportionately more in financially vulnerable sectors that require more outside finance.

Thus, the evidence on specialisation in production tends to ignore exploring the direct link between financial development and the strategy being used in specialisation. In the context of industrial policy, the argument is tense and ongoing on whether the strategies to encourage industrialization and industrial upgrading should conform to comparative advantage or defy it. Lin, Chang, and Maxwell (2009) maintained that focus on the current comparative advantage and the government's role in helping the private sector exploit a country's comparative advantage is essential in achieving what they called optimal industrial structure – where output is maximized. The optimal industrial structure is believed here to be endogenous to the endowment structure in terms of the relative abundance of labour, capital, and natural resources. Thus, it is the facilitating role of the state that encourages this endogenous process of upgrading. It does this by encouraging the emergence of firms and industries that will make effective use of the country's current comparative advantage. This will mean focusing on labour and resource-intensive types of production activities and services in most developing countries. Labour intensive industries tend to have more profit rates in the short and medium terms and are most-preferred by the private sector (Amsden, 1992). However, determining whether financial development could serve as a stimulus or impediment to this process of comparative advantage-following has not been given the due attention in the literature. The presence of huge developmental challenges in developing countries could also mean that they could also specialize in production by acquiring technologies already developed and existing in more advanced

countries. This would mean using capital intensive techniques in place of labour. In this sense, it could mean defying comparative advantage. Amsden (2001) argued that this could also mean pursuing infant industry protection and import substitution as well as changing the structure of exports where winners are picked using comparative advantage as a tool. Again, how much of this strategy of defying comparative advantage could be explained by financial development remains unclear. This informs why Chang (2002) attempts a theoretical exposition of how economic and intellectual histories of capitalism have been rewritten to justify neo-liberal policies and strategies that have been used in stimulating growth. Thus, this modification of the state of capitalism has not only further thrown developing countries into confusion regarding the appropriate protectionists or liberal strategies to implement (Evans, 1995) but it has made catching-up much more difficult than the earlier times.

Specifically, the works of Lin (2003; 2007;) and Lin and Li (2009) amongst others provided useful insight into how development strategy proxied by technology choice can impact per-capita income and argued differently on how the endowment structure of countries could help explain their growth in the sectors they enjoy comparative advantage. Lin (2003, 2007) argued that the failure of developing countries to converge with developed countries can be largely explained by their governments' inappropriate development strategies. In his study, per capita income is considered as a function of the prevailing technologies of industries in an economy. Thus, Lin argued that understanding how technology or industry gap could be narrowed among countries is crucial in achieving convergence. In his empirical testing of strategy choice and economic growth, Lin developed what he called technology choice index to measure strategy choice and the evidence shows that developing countries follow an inappropriate strategy as the temptation to close the industry gap impedes growth and development.

Lin and Li (2009) further used a three-sector model to show how institutional distortions occur in developing countries. They argued that post-World War II era propagated the belief in the development of state-of the art industries as means of growing economies. Hence, Lin and Li (2009) further argue that most developing economies attempted encouraging growth of capital-intensive industries at the expense of labor-intensive ones. Since developing countries are rich in labor and

natural endowments but not in capital, it implies that capital-intensive industries were not adapted to the endowment structure of these countries. Thus, the governments used distortionary policies to mobilize resources into the capital-intensive industries in the earlier stages of development. But their study showed that such trend tends to misallocate resources and makes the economy inefficient. A further evidence by Mau (2016) and Lectard and Rougier (2018) show that developing countries such as Ruwanda and Tanzania have only made little progress in growing their economics, oil rich countries such as Nigeria and Angola still face developmental changes while Vietnam and Malaysia have made substantial progress in diversifying their economies away from natural resource dependence.

While Lin's index of technology choice is a useful measure of growth strategy, this study uses it in a unique way. While Lin (2009) used the index as an explanatory variable to gauge its impact on economic development measured by income per capita, a more recent paper by Lectard and Rougier (2018) adopt the index too as an explanatory variable but extend the analysis to determining its impact on export diversification and sophistication. Specifically, Lectard and Rougier (2018) concentrate their analysis on the rise of manufacturing exports and their drivers across different countries under different level of economic development while incorporating the role of foreign direct investments in determining the extent of defying comparative advantage in developing counties as well as the resulting impact on export diversification and sophistication. Here, we hypothesize that financial development could exert impact on specialization strategy hence the use of technology choice as a dependent variable is a unique contribution to the debate on the determinants of specialization in developing countries and how developing countries attempt to catch-up with their developed counterparts. A more detailed explanation on the index follows in the methodology section.

This chapter, therefore, considers what determines the growth strategy in developing countries in their quest to catch up with developed countries via industrialisation as crucial especially the role of financial development. However, why then the emphasis on industry? While most studies as reviewed above on finance and growth focus on providing evidence that the industrial sector is more finance dependent than others, some studies have further shown that industrialisation could help promote economic growth where factor endowment

including financial resources and labour are combined to stimulate increased productivity. Haraguchi, Cheng, and Smeets (2019) analysed the drivers of successful industrialisation in developing countries and noted that the proponents of industrialisation rely heavily on these arguments: productivity advantage of manufacturing over other sectors and the higher externalities that can arise from manufacturing growth (Adam Szirmai, 2012); greater capacity to absorb labour force (Timmer, de Vries, and de Vries, 2015 in Weiss (2015) and McMillan, Rodrik, and Verduzco-Gallo (2014)); promotion of savings, higher capital accumulation and investment opportunities (Lewis, 1954; Szirmai and Verspagen, 2015); promotion of economies of scale by driving technological progress (Arrow, 1962; Thirlwall, 2002); providing spill over effects through linkages to other economic sectors (Hirschman, 1958); allows for greater economies of scope with countries that can produce larger varieties of goods (Hausmann, Hwang, and Rodrik, 2007; Hidalgo, Klinger, Barabasi, and Hausmann, 2007); greater possibility of achieving unconditional convergence in productivity (Rodrik, 2013); reducing technological gap while promoting the adoption of new technology and the development of high-productivity jobs (Rodrik, 2017); protection of jobs in low-wage, labour intensive and cost-efficient activities (Hallward-Driemeier and Nayyar, 2017; UNIDO, 2018); high inclusiveness (UNIDO, 2018); and increasing advent of global production networks and specialisation (Lin, 2012). Thus, examining the role of financial development in determining industrial growth strategy has useful policy implications in developing countries. Developing countries have over time tried to catch up with their developed counterparts in terms of growth and development but little or no success has been recorded. Thus, where the appropriate development strategies are pursued it is believed that tremendous results would be achieved and the overall quality of life enhanced.

While the studies reviewed provide important evidence for a microeconomic channel through which finance is supposed to work in particularly industrial growth, they still do not show how its development could exert any impact on growth strategy in industry. Hence, the overall aim of this chapter is to ignite the discussion on the determinants of growth strategy and or specialisation in developing countries. Specifically, this chapter seeks to contribute to knowledge in two main ways: 1) to provide evidence on the role financial development could play in determining growth strategy in developing countries. This is done by

pioneering the unique use of Lin's Index of technology choice as a dependent variable to explain growth strategy in relation to financial development. Thus, we assume that as a country's financial system develops, its growth strategy is expected to change either by following or defying comparative advantage. Therefore, the role of the government and financial authorities are also expected to change with changes in growth strategy leading to the overall desired economic performance. 2) to provide evidence on other important determinants in modelling growth strategies in developing countries and 3) to carve out the implications of the findings.

More concisely, the questions this chapter seeks to answer include:

(i) Does financial development lead developing countries to specialize according to their comparative advantage or defy it?

(ii) What other important determinants are significant in modelling growth strategies in developing countries?

(iii) What are the implications of the findings in (i) and (ii) above?

The rest of this chapter is organised as follows. Section two addresses concepts of financial development, comparative advantage and growth strategy, patterns of financial development and growth in developing countries. Methodology is covered in section three where the indicators, data, model, and analytical techniques of the study are described. Results are presented and discussed in section four while section five summarises the concluding remarks.

2.2 Related Literature

2.2.1. Concept of Financial Development

Gelbard and Leite (1999) considered a developed and well-functioning financial sector as a key component of an economy useful in aiding the exchange of goods and services, mobilising savings, allocating resources, and helping diversify risk. This seems to account for the growing body of literature on the importance of financial development across the world. Financial development is therefore used

to refer to a state when financial instruments, markets and intermediaries mitigate- though not necessarily eliminate effects of imperfect information, limited contract enforcement and transaction costs thereby improving the acquisition and dissemination of information about potential borrowers, enhancing the allocation of resources and diversification of portfolio (Cihak, Demirgüç-Kunt, Feyen, and Levine, 2012). This greater diversification can facilitate the flow of capital to higher return projects, boosting growth and enhancing living standards.

Cihak, Demirgüç-Kunt, Feyen, and Levine (2012) argued that defining financial development in terms of the degree to which financial system eases market imperfections is too narrow. Hence, it fails to provide much information on the actual functions of the financial system to the overall economy. A broader definition which fits well the larger finance literature is that financial development is viewed as improvements in the quality of five key financial functions:

(i) Producing and processing information about investments and allocating capital based on these assessments.

(ii) Monitoring individuals and firms and exerting corporate governance after allocating capital.

(iii) Facilitating trading, diversification, and management of risks.

(iv) Mobilising and pooling savings.

(v) Easing the exchange of goods, services, and financial instruments.

Financial institutions and markets around the world differ in how well they provide these key services. This poses some difficulty in measuring financial development across different economies. Thus, studies attempting to link financial development with growth, savings, investment, and trade amongst others have chosen several proxies – most of them have used monetary aggregates but with mixed results. Pill and Pradhan (1995) noted that conventional measures of financial deepening such as levels of real interest rates and ratio of broad money to GDP might give wrong signals about the efficacy of financial reforms and its implications for real activity. To them, these indicators overlook key factors such

as openness to capital flows, the extent of public borrowing from the domestic financial system, the development of nonbank financial intermediation and the competitiveness of the banking sector. The existence of the legal environment has also been overlooked but has been shown to protect the rights of creditors and enforces contracts. La Porta, Lopez-De-Silanes, Shleifer, and Vishny (1997) showed that such an environment tends to be associated with more developed and efficient capital markets. This means that the level of financial development of a country is partly explained by the institutional environment and the incentive structure in which bank managers, auditors and depositors operate.

Pill and Pradhan (1995) further showed that among broad money, base money, bank credit to the private sector and real interest rates, the credit to the private sector is the most appropriate financial development indicator, though this is in turn affected by financial innovation, emergence of nonbank credit and by commercial bank lending to other financial intermediaries. They also speculated that how well a financial development indicator performs depends on the stage of financial liberalisation in a country – whether it is financially repressed, domestically liberalized or internationally liberalized.

Other studies have used monetary aggregates as measures of financial development. King and Levine (1993) relate GDP per capita growth to nine different indices of financial development: narrow money to GDP, broad money to GDP, quasi money to GDP, central bank domestic credit to GDP, commercial bank domestic credit to GDP, gross claims on the private sector to GDP, commercial domestic credit to total domestic credit, claims on nonfinancial private sector to total domestic credit and claims on the private sector by non-deposit money banks to GDP. Baltagi, Demetriades, and Law (2009) used private sector credit and stock market capitalisation as indices of financial development to gauge the role of financial and trade openness. In a more recent work by Cihak et al. (2012) the development of a country's financial system is measured by a four by two matrix of financial system characteristics with the column classifying the financial system into banks and markets while the row is defined into indices including: the size of financial institutions and markets (financial depth), the extent to which financial institutions and markets are used (access), the efficiency of financial institutions and markets in providing financial services (efficiency),

and the stability of financial institutions and markets (stability). In addition to standardising the sum of some of the monetary aggregates used in the literature, Ebireri and Paloni (2016) adopted some of these monetary aggregates already used in the literature to link banking sector development with the degree of sophistication of a country's export basket.

Thus, as pointed out earlier this study seeks to pioneer linking financial development with growth strategy by providing empirical evidence using data from developing countries' industrial sector. Here, we first use the indicators used to measure the banking sector component of financial development to gauge their impact on industrial growth strategy. Given the dominance of the banking sector in financing industries in developing countries, this study focuses on the banking sector model- also partly due to the availability of data on the measures of banking sector development in developing countries.

2.2.2. Concept of Growth Strategy and Comparative Advantage

Rodrik (2005) viewed growth strategy as the economic policies and institutional arrangements aimed at achieving economic convergence with the living standards prevailing in advanced countries. Developing countries can achieve economic convergence with advanced countries first in terms of economic growth via structural transformation or industrialisation. However, the different methods of achieving this are what we refer to as growth strategy in this study.

Based on existing literature there is no single common measurement of structural transformation. Lopes, Hamdok and Elhiraika (2017) described structural transformation in a broader sense as a process of continuing rise in real per capita income, characterised by key economic and demographic changes including:

(i) A decline in the share of agriculture in GDP and total employment over time.

(ii) An increase in the share of the industrial sector and the manufacturing subsector in GDP and total employment.

(iii) An increase in the share of the services sector in GDP.

(iv) A rising ratio of average labour productivity outside agriculture to that in agriculture (with increasing agricultural productivity).

(v) Rapid urbanisation because of rural-urban migration and/or creation of production cities.

(vi) Changes in the composition of exports in favour of high value-added products and

(vii) A demographic transition from high to low rates of birth and death.

It therefore follows that we view the concepts of structural transformation and growth strategy as related. Hence, it is expected that financial deepening could affect the indicators of these concepts where the development of the financial system is constantly pursued mixed with appropriate government regulation or intervention. Related to the concept of structural transformation or growth strategy is the theory of comparative advantage. This is because we hypothesise that as a country's financial system develops, its capacity to support finance-dependent sectors improves and hence it affects its specialisation in production.

The principle of comparative advantage is no doubt one of the oldest and most important concepts in economics, there is some disagreement in the literature about its precise meaning, scope, and measurement. Notably, the concept is historically tied to the framework of the Ricardian trade model. Aggarwal and Agmon (1990) explain how Ricardo thought of the factors of production, primarily land and labour rather than capital or technology, as fixed among nations. Reflecting comparative advantage, trade was based on these permanent endowments. Thus, comparative advantage itself was considered permanent. For instance, many developing countries have high rate of growth of the domestic labour force. A simple application of the factor intensity model with static comparative advantage will indicate labour intensive productive activities for such countries. This may be expressed as exports of labour-intensive goods, contracting simple production and assembly work for firms from developed countries, or both. This traditional and static view of comparative advantage means that developing countries are permanently the exporters of raw materials and the importers of manufactured goods, as they supply cheap unskilled labour to developed countries.

Other writers, particularly in development economics for example Prebisch (2016) and Lewis (1962) have taken a different view. They have rejected this static concept of comparative advantage. The horizontal static approach was rejected as inappropriate both for its lack of realism and because it provided no choice in changing the low status of developing countries in world trade. The literature of economic development contends that comparative advantage need not necessarily arise only from natural endowments but can be fabricated and can be changed over time. This means that countries are often faced with both latent and current comparative advantages. Given the natural resources available at a point in time, while some could remain untapped giving rise to latent comparative advantage some could give rise to evolving attributes through fabricated activities or enhancements. Krugman (1987) presents a description of this dynamic model of comparative advantage as that which evolves over time through learning by doing. His model sheds light on three views that have been criticized by more conventional models. First it explains the view that temporary protection of selected sectors can permanently alter the pattern of comparative advantage in the protecting country's favour. The view that favourable developments such as the discovery of exportable natural resources may lead to a permanent loss of other sectors and reduce welfare overall was also explained. Third is the possibility that a temporary overvaluation of a currency due to tight money can lead to a permanent loss of competitiveness in some sectors. All these three views have the potential of altering a country's comparative advantage.

Findlay (1973) distinguishes between static and dynamic comparative advantage by explaining the role of government intervention in the dynamic model of comparative advantage. Using the classic assumptions, he contends that the long-term comparative advantage is a function on the technology (relative capital intensity) and savings rate and that the level of technology could be taken as a decision variable. In this way, the relative intensity of capital is determined or controlled by the government. Hence both static and dynamic comparative advantage require the same set of rules for welfare maximization where capital is perfectly movable and firms can be reorganized instantaneously at no cost,

thereby yielding the desired macro-outcomes. In contrast, in more realistic world where capital is not perfectly movable and reorganizing firms is time consuming and costly the traditional outcomes do not always obtain. This gives room for government intervention to adjust the behaviour of firms according to desired long-term comparative advantage. Thus, policies including financial sector development reforms are often pursued to change relative factors' prices to direct resources into certain sectors of the economy.

Comparative advantage in the Ricardian model involved only two products, hence it could be regarded as ambiguous. Its extension to n-products was first demonstrated by Dornbusch, Fischer, and Samuelson (1977). However, the necessity to use equilibrium prices in the measurement of costs is one crucial aspect that is not always emphasized in the measurement of comparative advantage in this context. This implies that the tradability of goods and services produced matters in measuring comparative advantage. Hence, it shows that costs comparisons based on market prices cannot be the basis of comparative advantage. It leads to the important distinction between the concepts of comparative advantage and competitive advantage. This means a country could be said to have comparative advantage over others in producing a particular good if it can produce that good at a lower relative opportunity cost or autarky price, that is at a lower relative marginal cost prior to trade. When costs are measured in terms of market prices we deal with competitive advantage, which is the same as cost competitiveness. The same measurement becomes one of comparative advantage when equilibrium prices are used (Siggel, 2006).

Balassa (1965) reported another empirical measurement for comparative advantage called "Revealed Comparative Advantage" (RCA). This measure reflects the success in exporting of countries relative to a world-wide norm. Exports can result from subsidies or other incentives provided, for instance exchange rate misalignment. In these cases, such incentives can explain competitiveness instead of comparative advantage. In this sense, it can be argued that the RCA index measures competitiveness rather than comparative advantage.

It is also clear from the above that the trade literature has assigned an unduly limited interpretation to comparative advantage. This is because its extension to more factors of production including intermediate inputs has been neglected. More so, a large body of literature has dealt with the determinant of trade using different trade models. Particularly, Siggel (2006) observed that there is the literature that confined comparative advantage to the Ricardian and Heckscher-Ohlin-trade type and does not apply to other forms of trade-such as intra-industry trade. Another argument suggests that a producer has comparative advantage where costs of production incurred in terms of equilibrium factor prices are lower than those of an international rival irrespective of the sources of the costs advantage. The source of advantage can be abundance of the primary or intermediate inputs (extended Heckscher-Ohlin), or the use of different technology (Ricardo), or the production at large scale (Krugman), or any combination of other sources such as in the product cycle model (Vernon). Thus, the movement from two-good to n-goods implies that the measurement of comparative advantage requires the use of monetary costs at equilibrium prices (ibid). This makes multiple real costs comparisons much easier in dealing with n-basket of goods. The principle of comparative advantage then remains valid for any number of goods and factors, as well as for any kind of trade.

The narrower interpretation of comparative advantage assumes that costs are always defined by production functions and factor prices- that is, as potential and not actual costs. While this is true because comparative advantage changes over time with changes in factor endowments, this approach reflects an ex-ante view which is useful for modelling and predicting. It is less useful for the analysis of past performance. Siggel (2006) further argued that comparative advantage should not be viewed exclusively as an ex-ante concept, as intra-industry trade can be explained by economies of scale combined with monopolistic competition based on product differentiation as in the Krugman model. It results from the fact that producers in different countries while using the same production functions, compete against the producers of related products at a level of costs that is lowered by large scale production. This in turn is the consequence of supplying a larger share than the domestic market. Since the attainment of large scale is essential, they maximise profits by concentrating production of certain products in one location and exporting to another.

Vernon (2009) gave a wider definition of comparative advantage in his product cycle theory. His model attributes comparative advantage in the production of new products to sources that may change over the life cycle of the products. In the initial stages, comparative advantage is based on first-come advantage of the country in which the product was first developed. The cost-advantage shifts to lower cost countries, where their advantage is likely to come from Heckscher-Ohlin type factor abundance. In later stages, scale economies and learning effects may become the source of comparative advantage. This model is associated with dynamic comparative advantage which is still debatable whether changes in its source and the development of comparative advantage over time could be truly dynamic. Notably, the source of comparative advantage here which is economies of scale is not too different from Ricardian comparative advantage. Ricardian comparative advantage leaves it open whether it results from greater skills, more capital or other factors. More often, large scale production usually requires a different technique than small scale production. Thus, it is not realistic to separate technology from scale of production.

Krugman and Obstfeld (2003) restrict comparative advantage to the factor proportions interpretation, and do not apply it to the general case in which it is based on costs. They made a case for intra-industry trade - that it does not follow the principle of comparative advantage. Siggel (2006) however, argue that any trade that results in welfare gains needs to be based on comparative advantage irrespective of the nature of its sources. While the arguments on the relevance or otherwise of the principle of comparative advantage are ongoing, we consider it here as a useful concept in explaining growth strategy in industries.

It is therefore clear from the above review that there are various sources of comparative advantage. The sources may be Ricardian productivity differences (or different technologies), or differences in factor endowments that are reflected by factor cost differentials. They may also include differences in the scale of production for firms that share the same cost function. The diverse sources of comparative advantage have made the concept difficult to measure but more widely used in understanding the growth of modern-day economies. Consequently, Lin (2003) championed the New Structural Economics (NSE) and developed the Technology Choice Index which measures whether technology choice is consistent

or not with comparative advantage. The index which measured the share of labour and capital in productivity as factor endowments was used to explain how developing countries could catch up with developed countries in terms of growth by following or defying their comparative advantage. Thus, he referred to using more labour than capital in production as comparative advantage following and pursuing capital-intensive methods as comparative advantage defying.

The two alternative growth strategies available to pursue in developing countries often result to different outcomes. In most developing countries there are abundant labour and scarce capital. Therefore, in a free, open, and competitive market, firms in these countries enter labour-intensive industries and adopt labour-intensive technologies in their production (Lin, 2003). On the contrary, in some cases the governments in developing countries often equate industrialization with modernization and push their countries to develop capital-intensive heavy industries and adopt the most advanced technologies in their production as quickly as possible. Evenson and Westphal (1995) submitted that developing countries cannot expect to achieve technology-driven economic growth without significant investment in technology infrastructure where there is a corresponding conducive environment for such investment and for having access to original foreign technology. This often results in losses. Hence in implementing this strategy usually called the Comparative Advantage Defying (CAD) growth strategy, the government often gives firms policy subsidy to compensate for losses incurred. Lin (2003) argued that such subsidy policy is often not sustainable as government financing gaps are glaring and rent seeking activities rampant. Although, Khan and Jomo (2000) have shown that rents are not always wasteful and inefficient. This further suggests that if some rents are essential for efficiency and growth while others are damaging then, the state may require a mix of policy reforms that are both capitalist and socialist in nature to stimulate the growth of the economy.

Since the 1990s, the governments of developing countries have increasingly used attracting FDIs to promote specialising according to their comparative advantage (Lectard and Rougier, 2018). However, this strategy often comes with unsustainable gains in terms of temporary rise in manufacturing exports. Findlay and Jones (2000) contend that the progress that results in finite changes in techniques such as labour-saving technical progress associated with FDIs in

developing countries could lead to lowered wages. In another evidence by Freund and Moran (2017) on cases in Malaysia, Costa Rica and Morocco, the host authorities were successful in using FDIs to alter the profile of their exports. This strategy therefore could mean transforming the production structure more with FDIs than by promoting domestic entrepreneurship. Hence, the argument that the gains that go with it are unsustainable suffices.

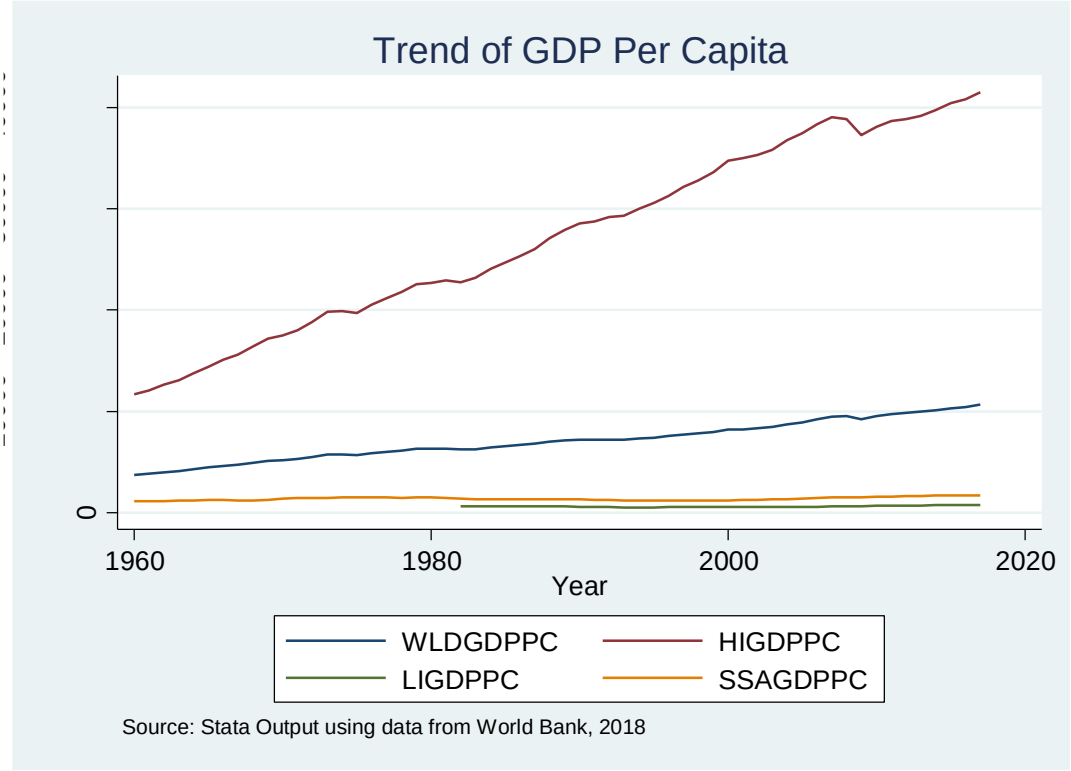
Alternatively, the government in an LDC could adopt Comparative Advantage Following (CAF) strategy to encourage firms to enter the industries for which the country has comparative advantages and to adopt the technology in production that will make these firms viable. The industries for which the economy has comparative advantages and the technologies that are appropriate for production are all determined by the country's relative factor endowments (Lin, 2003). However, the managers of firms, as micro agents, have no knowledge or concern of the actual endowments. Their only concerns are the prices of their outputs and the costs of their production. They will enter the industry and choose the technology of production appropriately only if the relative factor prices correctly reflect the relative factor abundances, which can be achieved only if the markets are competitive. Therefore, when the government in an LDC adopts a CAF strategy, its primary policy is to remove all obstacles to the functioning of free, open, and competitive product and factor markets. Structuralists such as Justman and Teubal (1991) further argued that to generate new comparative advantages, developing countries require a skill-specific infrastructure of new capabilities. Lin and Monga (2010) argued that governments in developing countries can be guided to equally identify industries that may hold latent comparative advantage. This further has policy implications in terms of what to be done to remove constraints that hinder the entry of firms into those industries. Thus, pursuing the CAF growth strategy entails implementing structural transformation policies that will facilitate investments in industries or sectors that developing countries tend to have latent comparative advantages. This process could in turn result in the emergence of new comparative advantages due to the dynamic nature of the endowment structure.

It is worth noting that there is a fundamental difference between the industrial policy of the CAF strategy and that of the CAD strategy. The promoted

industry/technology in the CAF strategy is consistent with the comparative advantage determined by changes in the economy's factor endowments, whereas the priority industry/technology that the CAD strategy attempts to promote is not consistent with comparative advantage. Therefore, it has been argued that the firms in the CAF strategy could be viable as only a small, limited-time subsidy is enough to compensate for the information externality. By contrast, firms following a CAD strategy are not viable, and their survival depends on large, continuous policy support from the government (Lin, 2003; Lin and Li, 2009). As pointed earlier, whether CAF and/or CAD enhancement policies are desirable in developing countries and in what proportion have been widely debated and further plague them into confusion regarding the appropriate policy mix to implement.

2.2.3. Patterns of Financial and Economic Development

This section attempts a descriptive analysis of the trend in financial development and economic development. It shows how divergence in economic development between developing countries and developed countries keep increasing over the years as seen in the trend of GDP per capita in the figure below.



***WLDGDPPC- World GDP Per Capita HIGPPC- Higher Income Countries GDP Per Capita LIGDPPC- Lower Income countries GDP Per Capita SSAGDPPC- Sub-Sahara Africa GDP Per Capita**

Figure 2. Trend of GDP Per Capita

The figure shows that the GDP per capita in the higher income countries and the world average have been consistently above those of the other sub-regions. This means that while development in developing countries tend to stagnate below their counterparts in developed countries. Per capita income in developing countries averaged below 1,000 USD for years implying that general economic and living conditions have been harsh in these countries since the 1960s as shown in the figure above. Thus, it has troubled many policy makers and researchers who have consistently raised a lot of questions about the increasing world inequality and stagnating development in developing countries for decades. This is suggestive of the need for an alternative growth strategy, and or financial and trade policies that would be able to stimulate the specialisation that would address such developmental challenges.

Figures three and four below show the trend of selected financial deepening indicators used mostly in the literature to capture banking sector and capital market development. The proxies used as bank and market indicators are the domestic credit to the private sector by banks and the market capitalisation of

domestic companies, respectively. Thus, while the bank indicator tends to increase fairly overtime the market indicators tend to be more volatile as shown in figures three and four.

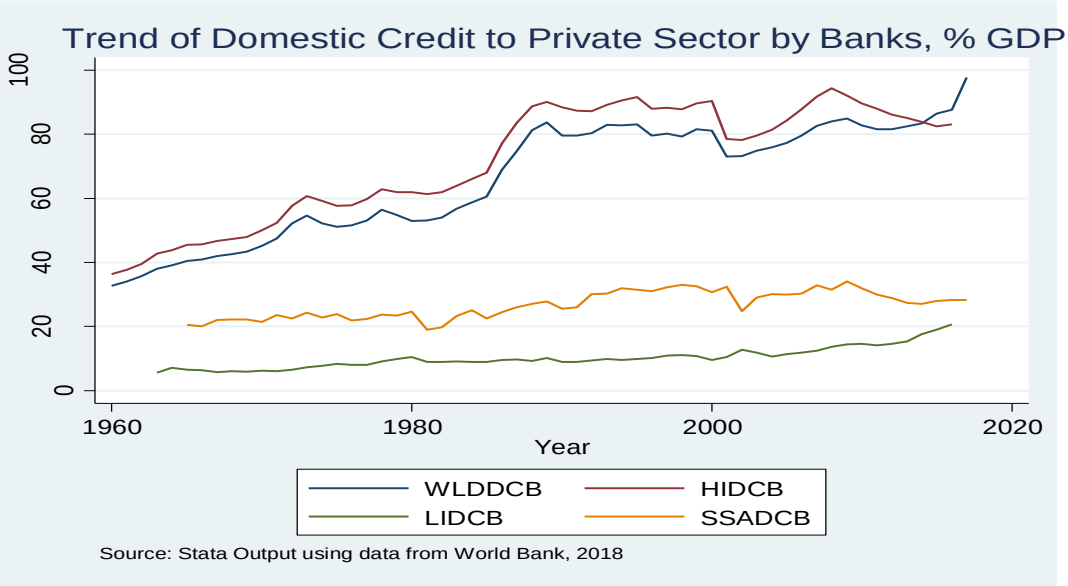


Figure 3. Trend of Selected Financial Deepening Indicator- Private Sector Credit (PSC)

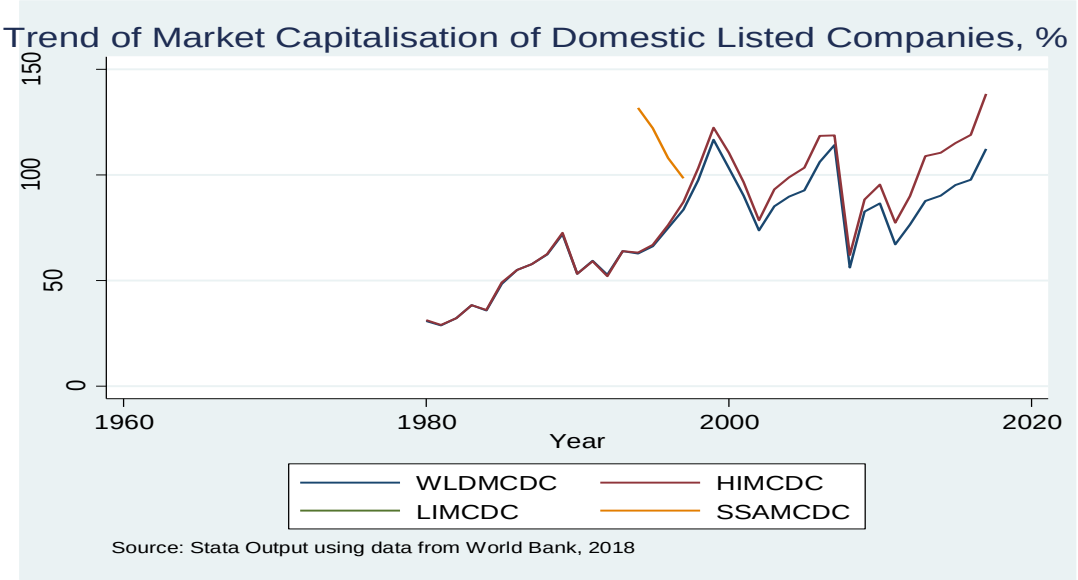


Figure 4. Trend of Selected Financial Deepening Indicators -Capital Market

Note: WLDDCB - World Domestic Credit by Banks, HIDCB - Higher Income Countries Domestic Credit by Banks, LIDCB Lower Income Countries Domestic Credit by Banks, SSADCB - Sub-Sahara Africa Countries Domestic Credit by Banks

*WLDMCDC- World Market Capitalisation of Domestic Companies, HIMCDC – Higer Income Countries Market Capitalisation of Domestic Companies, LIMCDC – Lower Income Countries Market Capitalisation of Domestic Companies, SSAMCDC – Sub-Sahara African Countries Market Capitalisation of Domestic Companies

It is glaring from the above trend that developing country's banking sector picked up much earlier than the capital market segment. This accounts for the limited availability of data on the development of the stock markets. Figure three exemplifies that the domestic credit to private sector by banks in the higher income countries and the world average have been consistently greater than those in the developing countries. While the market capitalisation of domestic listed companies in developed countries has also been steadily rising above the world's average, the trend in developing countries has remained in the downward trend.

Notably, the rising trend of financial development in some developing countries and the corresponding stagnating growth performance could raise important questions regarding the role of finance in these countries. For example, is increasing financial development useful in strategizing growth and what does the outcome imply for financial sector reforms and development policies in developing countries? These are some of the critical questions that need investigation amongst others. Providing answers to these questions is particularly pertinent in

paving the way for developing countries to make the most use of their financial systems and to help them design and pursue growth-enhancing financial sector and development policies. It is thus, particularly more important than ever before to investigate the role of financial development in developing countries especially its place in determining the strategies for economic growth and development. A more detail account of the indicators of growth strategy and more specifically banking sector development as used in this chapter follow in the next section.

2.3. Methodology

2.3.1. Introduction

This section of the chapter clarifies the empirical strategy employed to achieve the identified objectives and answer the research questions. The dependent and independent variables are explained as well as the controls. The data and sample are described as well as the model and methods of analysis. More importantly, here we clarify the justifications for the chosen variables and the use of dynamic panel data analysis and in particular, the Generalised Methods of Moments for the empirical investigation. Descriptive statistics involving the use of summary statistics and correlation are first employed to explore the trend in the data before the application of the system GMM as described in Roodman (2009) and in greater details in the latter part of this section below.

2.3.2. Identification and Definition of Variables

First is the dependent variable, a measure of industrial growth strategy and specialisation called the Technology Choice Index (TCI). The key motivation for using this indicator is its ability to show the direction of specialisation in an economy – that is whether a country is following or defying its comparative advantage. Lin (2003) first introduced and constructed the index based on the capital intensity in a sector (in this case the industrial sector) relative to the capital intensity in the whole economy. However, since the data for the capital used in a country's specific sector are only available for a small number of countries, this study adopts the modified TCI used by Lin (2007) to better measure growth strategy in a large pool of countries' industrial sector. It is expressed as:

$$TCI_{it} = \frac{{}^{AVS_{it}}/_{LS_{it}}}{{}^{GDP_{it}}/_{L_{it}}} - - - - - - (1)$$

Where AVS_{it} is the value added of a sector (in this case industry) of country i at time t; LS_{it} is the labour employed in an industry; GDP_{it} is the total value added in a country and L_{it} is the total labour force. Where the TCI is larger than otherwise, it means the government is adopting CAD growth strategy to promote capital-intensive industries otherwise it is adopting CAF. The numerator in equation (1) becomes larger as lesser labour units are used in production thereby leading to pursuing CAD strategy. In other words, this means that the marginal productivity of labour increases with less units of labour employed in production and falls where the units of labour used are increased. It assumes that developing countries are more endowed in labour and using less of labour would mean defying comparative advantage in labour intensive industries. While Lin's previous works used the TCI as a measure of growth strategy to gauge the impact of CAF or CAD on growth, this study investigates the role of financial development for CAF or CAD as an original contribution.

Next is the set of financial development indicators in the respective countries over time. It is proxied by several indicators as used in the literature. As pointed out earlier on, we adopt four monetary aggregates of banking size and activity to measure the banking sector component of financial development. The four are standard measures used in the mainstream empirical literature and they are used here because of their data are readily available. These indicators also capture the predominant banking sector development in developing countries. The four standard measures are ratio of domestic credit by deposit money banks to private sector relative to GDP - PSC (taken to be the most widely accepted indicator in the literature), liquid liabilities (LL) of the financial system relative to GDP, ratio of total claims of deposit money banks on domestic non-financial sector to GDP (deposit banks assets – DBA); and share of deposit money banks in the total claims of deposit money banks and central bank on domestic non-financial sector (deposit and central banks assets – DCBA). Liquid liabilities and claims of deposit money banks are indicators of the quality of financial services given that it in turn depends on whether the financial system finances mostly public or private sector-owned enterprises. The fourth indicator implies that deposit money banks are

likely to better allocate funds effectively and efficiently too than central banks. Higher values of these indicators overall thus reflect better financial services and banking sector development.

In addition to the standard measures of financial development, we also adopt the banking sector indicators in the 4x2 matric of Cihak et al. (2012) to carry out some robustness checks. These indicators are considered a comprehensive way of measuring financial development. The indicators are categorized based on four key characteristics of financial institutions and markets (financial depth, access, efficiency, and stability). In terms of financial depth, the banking sector is measured by private sector credit (which represents the domestic private credit to the real sector by deposit money banks to GDP), financial access is measured by number of depositors with commercial banks per thousand adults, financial efficiency is measured by net interest margin of banks (measured as the accounting value of bank's net interest revenue as a share of its average interest-bearing assets) and financial stability measured by z-score (this is the distance to default). There are also corresponding indicators for the capital market segment. First is stock market capitalisation to GDP which measures the depth of the market. Stock market capitalisation is the value of listed shares, and it is used to determine the size of a company which in turn is a basic determinant of various characteristics in which investors are interested including risk. The second indicator is the market capitalisation and without the top ten largest companies. This measures the accessibility of finance on the market. The third indicator is the stock market turnover ratio which measures financial efficiency on the market. It is defined as the value of total shares traded to average real market capitalisation. The fourth indicator is the stock price volatility– a measure of financial instability. It is the average of the 360-day volatility of the national stock market index. Consequently, a general increase in these indicators indicates increased financial development. However, the role of the capital market segment is not investigated here due to data limitations (this could form an important subject for further studies). Hence, emphasis is placed on the banking sector indicators due the availability of data and the dominance of the money market in the financial system of developing countries.

2.3.3. Data and Sample Description

Annual and cross-sectional time series data on the relevant variables between 1990 and 2018 are obtained from the World Bank: World Development Indicators, Global Financial Development Database and United Nation's Industrial Development Organization's International Yearbook of Industrial Statistics. The choice of the period covered in the study is built on the premise that the data for most of the variables used are available within the period in most developing countries. The period also coincides with when most developing countries have revisited the structural adjustment policies of the mid 1980s aim at industrialising their economies.

Based on data availability, the sample is made up of 132 developing countries selected out of the countries listed in the United Nations 2018 classification of developing countries (United Nations, 2018). These include: Afghanistan, Albania, Algeria, Angola, Argentina, Azerbaijan, Bahamas, Bahrain, Barbados, Belarus, Belize, Benin, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Brunei Darussalam, Burkina Faso, Burundi, Cape Verde, Cambodia, Cameroon, Central African Republic, Chad, Chile, China, Columbia, Comoros, Congo Democratic Republic, Congo, Costa Rica, Cote d'Ivoire, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eswatini, Ethiopia, Fiji, Gabon, Gambia, Georgia, Ghana, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, India, Indonesia, Iran, Iraq, Jamaica, Jordan, Kazakhstan, Kenya, Korea, Kuwait, Kyrgyz, Lao PDR, Lebanon, Lesotho, Liberia, Libya, Madagascar, Malawi, Malaysia, Maldives, Mali, Mauritania, Mauritius, Mexico, Moldova, Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Nepal, Nicaragua, Niger, Nigeria, North Macedonia, Oman, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Qatar, Russian Federation and Rwanda. Others are Samoa, São Tomé and Príncipe, Saudi Arabia, Senegal, Serbia, Sierra Leone, Singapore, South Africa, Sri Lanka, Saint Lucia, Saint Vincent and Grenadines, Sudan, Suriname, Tajikistan, Tanzania, Thailand, Timor-Leste, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Uganda, Ukraine, United Arab Emirates, Uruguay, Vanuatu, Venezuela, Vietnam, West Bank and Gaza, Yemen, Zambia, and Zimbabwe.

2.3.4. Model Description

Using the variables identified above the indicators of banking sector development are used as explanatory variables while the Lin's index is used as dependent variable in our benchmark model. The financial development and growth strategy proxies here are assumed to be endogenous and dynamic. This means that we assume present growth strategy to be influenced by its past values as well as those of financial development. This is in line with the view of Gujarati (2004) who argued that in view of the nature of economic behavior, any realistic formulation of economic models should involve some lagged variables among the set of explanatory variables. Lagged variables are one way of accounting for the length of time in the adjustment process of economic behavior, and the most efficient way of rendering them dynamic. Bond (2002) argued that dynamic models allow for recovering consistent estimates of parameters. In addition, assuming fixed regressors in panel data models imposes often unrealistic restrictions on dynamic economic behaviour (Wooldridge, 2010).

To empirically determine whether financial development would affect the growth strategies of countries the following dynamic panel model is used:

$$TCI_{it} = \alpha_i + \sum_{it=1}^{NT} \beta\, TCI_{it-1} + \sum_{it=1}^{NT} \gamma FD_{it} + \sum_{it=1}^{NT} \sigma CV_{it} + L_c + L_t + \varepsilon_{it} ------(2)$$

Where TCI is the technology choice index that represents a measure of growth strategy and specialisation. FD_{it} is the vector of financial development indicators in the respective countries over time. Notably, these are the banking sector development variables as used in this chapter and they are used in separate models to reduce the problem of multicollinearity; L_c and L_t are the country and time fixed effects, and ε_{it} is the disturbance term. i denotes cross section units with i = 1, 2, 3, …N, N is the number of countries. t denotes the time periods, t = 1, 2, 3, …. T, T is the total number of time periods. The relevant proxies for the

variables are as described in the section for the identification of key variables above.

CV_{it} is a vector of control variables drawn from the empirical literature on the

the determinants of growth such as Pickett, Forsyth, and McBain (1974), De and Lootty (2012), Li, Shao, Shi, Sun, and Zhang (2019), Mawejje (2019) and based on theoretical and political economy considerations. The control variables include gross fixed capital formation to GDP, labour force with basic education (% of total working-age population with basic education), government expenditure to GDP, fuel exports, foreign direct investment net inflows and inflation. These are important controls partly because of the attention given to their relevance by policy makers in developing countries.

The growth strategy in developing countries is likely to be explained by the mentioned control variables. Gross fixed capital formation serves as a measure of investment. It explains how much of the new value added in an economy is invested rather than consumed which could in turn affect specialisation in production. Labour force with basic education indicates the skill level or productivity of the workforce. A high index is likely to attract less use of labour as labour-intensive production is often characterised by unskilled population. Further role of government is measured by government spending to GDP. This indicates the use of fiscal policy to direct production by the government. Its increase might encourage or discourage CAD specialisation. This depends on whether the fiscal spending is expansionary or contractionary. In addition, the degree of dependence on natural resources is measured by fuel or mineral exports. Heavy dependence on mineral and natural resources is likely to affect a country's specialisation in production.

The next control – foreign direct investment net inflows is a measure of degree of openness of an economy in terms of international financial market development. Inflation is further used to capture general price distortions which are important in resource allocations. All these controls are considered to affect the choice of countries to use more or less of labour or other factors in production amongst others.

2.3.5. Analytical Technique

The study adopts the panel data approach. Panel data is now widely used to estimate dynamic econometric models whose advantages cannot be overemphasized (Bond, 2002; Wooldridge, 2010). Econometric approaches suitable for estimating the dynamic models such as for specialisation-financial development nexus specified above are the difference and system Generalised Method of Moments - GMM (Arellano and Bond, 1991; Arellano and Bover, 1995; Blundell and Bond, 1998). Roodman (2009) pointed that these estimators are designed for situations embodying the following assumptions about the data generating process:

(i) The process may be dynamic, with current realisations of the dependent variable influenced by past ones.

(ii) There may be arbitrarily distributed fixed individual effects. This argues against cross-section regressions, which must assume fixed effects away and in favour of a panel setup, where variation over time can be used to identify parameters.

(iii) Some regressors may be endogenous.

(iv) The idiosyncratic disturbances (those apart from the fixed effects) may have individual-specific patterns of heteroskedasticity and serial correlation.

(v) The idiosyncratic disturbances are uncorrelated across individuals.

(vi) Some regressors can be predetermined but not strictly exogenous; that is independent of current disturbances, some regressors can be influenced by past ones. The lagged dependent variable is a good example of such endogenous regressors.

(vii) The number of time periods of available data, T, may be small but with large individuals, N.

(viii) Finally, because estimators are designed for widespread use, they do not assume that good instruments are available outside the immediate dataset. It is thus often assumed that the only instruments are internal – based on lags of the instrumented variables. However, the estimators do allow inclusion of external instruments.

Arellano-Bond (1991) estimation starts by transforming all regressors, usually by differencing which is known in econometric literature as difference GMM (Hansen, 1982; Roodman, 2009). The Arellano-Bover (1995) and Blundell-Bond (1998) estimator augments Arellano-Bond by making an additional assumption that first differences of instrument variables are uncorrelated with the fixed effects. This allows for the introduction of more instruments and can thus improve efficiency. It builds a system of two equations, the original equation and the transformed one – and is called system GMM. This particular method is used mainly because it is useful to control for the different sources of endogeneity (Wintoki, Linck and Netter, 2012). Endogeneity explains how an explanatory variable correlate with error term, and it could be found in a dynamic model where current values of explanatory variables are affected by past values of the dependent variable. Thus, the use of system GMM here doe not only allow for robust estimates but makes controlling for endogeneity that could be due to unobserved heterogeneity, simultaneity, and dynamic endogeneity possible (Wintoki, Linck and Netter, 2012).

Though Roodman (2009) highlight that the GMM has the capacity to invalid results due to its complexity, the xtabond2 command implements these estimators and makes the Windmeijer (2005) finite sample correction to the reported standard errors in two step estimation possible. This is often regarded as potent over the cluster-robust-one-step in addition to its ability to reduce downward-bias of the standard errors. Now, it equally offers automatic difference-in-Sargan/Hasen testing for the validity of instrument subsets, support for observation weights and the forward orthogonal deviations transformation, an alternative to differencing proposed by Arellano and Bover (1995) that preserves sample size even in panels with gaps (Roodman, 2009). However, we apply the two step robust system GMM with Windmeijer (2005) correction as noted by Roodman (2009) that the co-efficient of the lagged dependent variable in the GMM estimation should therefore

lie between the Ordinary Least Squares (OLS) and the Fixed Effects (FE) estimates where the OLS is biased upwards while the FE is biased downwards. In addition, the estimated model is diagnosed for autocorrelation of the second order and validity of instruments using the Auto-Regressive (AR) and Hansen statistics.

2.4. Results

2.4.1. Preliminary Data Analysis: Descriptive Statistics

First, this section covers the descriptive statistics for the measures of growth strategy and banking sector development. Tables one to two report the statistics of technology choice index. Table one below shows the descriptive statistics.

Table 1. Technology Choice Index Descriptive statistics

Item	1995	2000	2005	2010	2015
Minimum	0.2432	0.1826	0.2871	0.4740	0.4644
1st Quartile	1.2313	1.2247	1.1750	1.1942	1.1499
Median	1.6998	1.7053	1.7021	1.5472	1.5232
Mean	2.2317	2.2679	2.2091	2.1275	1.9693
3rd Quartile	2.4737	2.9156	2.5859	2.4295	2.3225
Maximum	10.3873	9.5782	8.4321	8.7583	6.8457
Standard Deviation	1.6813	1.6606	1.6187	1.5451	1.2948

Source: Author's Computation using Stata 14, 2019

The difference between the minimum and maximum values in Table one is though high across the time periods, the distribution of the index in terms of the mean, median, first and third quartiles tend to be steady. For instance, the minimum TCI in 1995 was 0.24 while the maximum was about 10.39 and by 2015 the minimum increased marginally to 0.46 with the maximum at 6.85. The mean remained at about 2 across time and only reduced marginally to about 1.95 in 2015. The

standard deviation also reflects this trend with the values across the period - stagnating slightly above one. Hence, this suggests that there is no widening distance among the growth strategies of most of the countries in the sample as shown in the Table. However, it suggests some difference between the pool of countries with the lowest and highest average measures of growth.

Table two below depicts the top 10 countries with the lowest and highest TCI. This is shown below.

Table 2. Top 10 Countries with Highest and Lowest Technology Choice Index

Rank	Country	Lowest TCI	Country	Highest TCI
1	Maldives	0.43	Tanzania	5.18
2	Liberia	0.47	Bhutan	5.29
3	Togo	0.56	Guinea	6.12
4	Tonga	0.56	Angola	7.05
5	Hong Kong	0.62	Papua NG	7.34
6	Lebanon	0.65	Burundi	7.43
7	St. Lucia	0.67	Timor-Leste	7.50
8	Bahamas	0.68	Gabon	8.10
9	Mauritius	0.77	Libya	.
10	West Bank/Gaza	0.82	Qatar	.

Source: Author's Computation using Stata 14, 2019

Table two further confirms that the top 10 countries with the lowest technology choice index have their mean values ranging from 0.43 to 0.82 while the mean values for the top 10 countries with the highest range from 5.18 to 8.10. The countries and their respective average technology choice indices for the period are as listed in Table two. The bottom 10 countries all have their TCI below 1 and it's visible in countries such as Maldives, Liberia, Togo, Tonga, and Hong Kong

amongst others. On the other hand, the top 10 countries have their TCII above 5 as seen in countries such as Tanzania, Bhutan, Guinea, Angola, and Papua New Guinea amongst others.

Tables three to 10 contain the descriptive statistics of the indicators for banking sector development with the scatter plots shown in the corresponding figures. First, table three indicating the descriptive statistics for private sector credit is shown.

Table 3. Private Sector Credit Descriptive Statistics

Item	1995	2000	2005	2010	2015
Minimum	0.19	0.33	0.92	2.67	3.59
1st Quartile	6.42	7.62	8.97	14.75	20.4
Median	14.65	18.51	20.97	26.74	32.97
Mean	22.94	26.82	30.04	35.09	42.92
3rd Quartile	30.76	36.35	37.57	46.62	57.97
Maximum	147.9	148.1	260.2	163.85	212.08
Standard Deviation	26.31	27.42	32.98	28.01	32.24

Source: Author's Computation using Stata 14, 2019

Table two tends to exhibit remarkably similar trend to table one as the difference between the maximum and minimum private sector credit across time periods are large. The minimum in 1995 was just 0.19 and the maximum was 147.9 but by 2015 the minimum had increased to about 3.59 while the maximum stood at 212.08. Unlike the distribution of the technology choice index, the distribution of the private sector credit as an indicator of banking sector development in terms of the mean, median, first and third quartiles and standard deviation suggest that there is some difference across time. For instance, the mean PSC in 1995 was about 22.94 and this increased to 42.92 by 2015. The quartiles and standard deviations also increased between 1995 and 2015.While the first quartile

increased from 6.42 in 1995 to 20.4 in 2005, the standard deviation increased marginally from 36.31 in 1995 to 32.98 in 2005 but declined to 32.24 by 2015.

Table four shows the corresponding average statistics for the top ten countries with the highest and lowest PSC as below.

Table 4. Top 10 Countries with Highest and Lowest Private Sector Credit

Rank	Country	Lowest PSC	Country	Highest PSC
1	Congo DR	2.59	St. Lucia	72.34
2	Sierra Leone	3.66	Lebanon	73.66
3	Chad	4.13	Panama	74.75
4	Guinea	4.17	Korea Rep.	83.39
5	Guinea-Bissau	4.67	Singapore	95.99
6	Timor-Leste	4.88	Thailand	105.74
7	Yemen	5.14	Malaysia	107.31
8	Equatorial Guinea	5.69	China	108.49
9	Malawi	6.28	Hong Kong	161.19
10	Sudan	6.40	Liberia	173.62

Source: Author's Computation using Stata 14, 2019

Table four above confirms that the top 10 countries with the lowest PSC have their mean values ranging from 2.59 to 6.40 while the mean values for the top 10 countries with the highest range from 72.34 to 173.62. The countries and their average PSC indices for the period are as listed in Table four. The bottom 10 countries all have their PSC below 6.5 as seen in countries like Congo Democratic Republic, Sierra Leone, Chad, Guinea, and Guinea Bissau amongst others. On the other hand, the top 10 countries have their PSC above 70 as seen in countries such

St. Lucia, Lebanon, Panama, Korea Republic, Singapore amongst others. Notably, Liberia, Hong Kong, China, Malaysia and Thailand are the countries with the highest PSC with each above 100 (expressed as percentage of GDP) indicating that these countries are more financially developed than others in the sample.

Figure five below shows the scatter plot for the mean TCI and PSC for the countries in the sample.

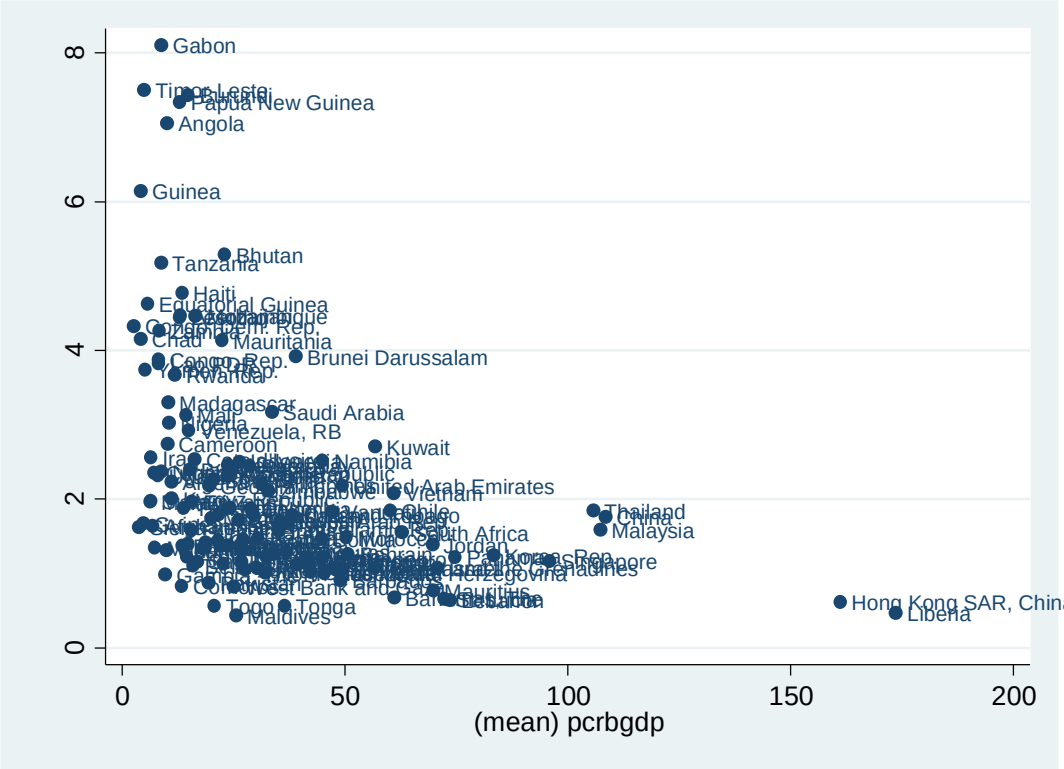


Figure 5. Scatter Plot showing the Correlation between Private Sector Credit and Industrial Growth Strategy in Developing Countries

The scatter plot in figure five depicts those countries with high financial development in terms of PSC tend to have low technology choice index and vice versa. However, the scatter plots further show that there is a large pool of countries with the technology choice index below 2 and with their PSC variable not exceeding 50. This suggests that too high or too low banking sector development might be associated with too low or too high technology choice index as shown in the diagram. We can thus infer that though it is difficult to predict the relationship between financial development and strategies for growth, a negative pattern could be noticed in the figure. The correlation coefficient table

in the next section clearly shows the sign and magnitude of correlation between TCI and PSC.

The next descriptive statistics is for liquid liabilities as one of the indicators of financial development. Table five below contains the summary statistics.

Table 5. Liquid Liabilities Descriptive Statistics

Item	1995	2000	2005	2010	2015
Minimum	0.35	0.89	4.14	7.06	11.59
1st Quartile	15.24	16.79	19.81	25.16	31.57
Median	25.4	29.07	32.81	37.59	45.34
Mean	32.28	40.52	44.19	47.92	57.85
3rd Quartile	40.13	50.41	49.21	58.98	72.18
Maximum	159.9	428.8	450.4	311.7	348.58
Standard Deviation	25.89	47.42	50.59	38.71	48.41

Source: Author's Computation using Stata 14, 2019

Table five also shows a similar trend to table four as the difference between the maximum and minimum liquid liabilities (LL) across time periods are also large. The minimum in 1995 was just 0.35 and the maximum was 159.9 but by 2015 the minimum had increased to about 11.59 while the maximum stood at 348.58. The distribution of this indicator of banking sector development in terms of the mean, median, first and third quartiles and standard deviation also suggest that there is some difference across time. For instance, the mean LL in 1995 was about 32.28 and this increased to 57.85 by 2015. The quartiles and standard deviations also increased from 15.24 in 1995 to 31.57 in 2005, and from 25.89 in1995 to 48.41 in 2005 respectively.

Table six below shows the corresponding average statistics for the top ten countries with the highest and lowest LL.

Table 6. Top 10 Countries with Highest and Lowest Liquid Liabilities

Rank	Country	Lowest LL	Country	Highest LL
1	Congo DR	6.41	Thailand	96.14
2	Tajikistan	9.92	Zimbabwe	99.59
3	Timor-Leste	10.45	Singapore	106.18
4	Chad	10.56	Libya	109.18
5	Equatorial Guinea	10.73	Malaysia	115.11
6	Malawi	13.96	Jordan	116.65
7	Guinea	14.10	China	140.96
8	Sierra Leone	14.85	Lebanon	197.99
9	Uganda	14.91	Liberia	230.27
10	Nigeria	14.95	Hong Kong	256.25

Source: Author's Computation using Stata 14, 2019

Table six reveals that the top 10 countries with the lowest LL have their mean values ranging from 6.41 to 14.95 while the mean values for the top 10 countries with the highest range from 96.14 to 256.25. The bottom 10 countries all have their LL below 15 as seen in countries such as Congo Democratic Republic, Tajikistan, Timor-Leste, Chad, and Equatorial Guinea amongst others. Sierra Leone again appears on the list of countries with the lowest LL as the eighth lowest in the ranking. On the other hand, the top 10 countries have their LL above 90 – which tends to be higher than the values for PSC as seen in countries such Thailand, Zimbabwe, Singapore, Libya, and Malaysia amongst others. Notably, countries such Liberia, Hong Kong, China, Malaysia, and Thailand are again amongst the countries with the highest LL including countries such as Lebanon and

Jordan, with each having its LL above 100 (expressed as percentage of GDP) indicating that these countries are more financially developed than others not only in terms of PSC but also in terms of LL.

Figure six below shows the scatter plot for the mean TICI and LL for the countries in the sample.

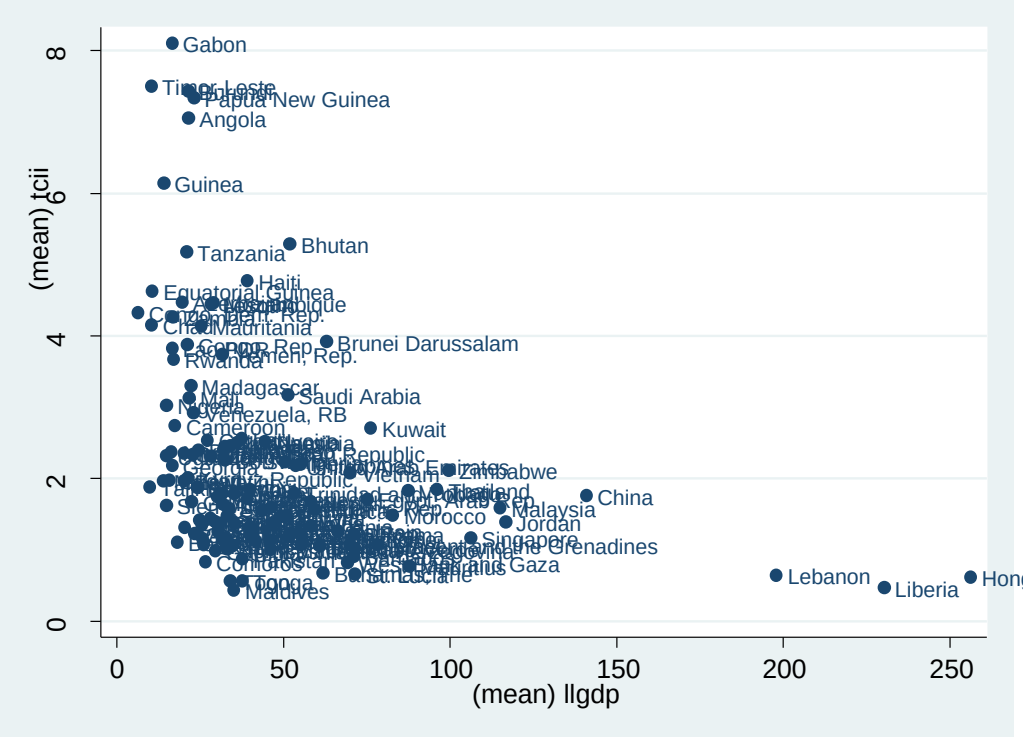


Figure 6. Scatter Plot showing the Correlation between Liquid Liabilities and Industrial Growth Strategy in Developing Countries.

The scatter plot in figure six shows a similar trend to figure five. It indicates that those countries with high financial development in terms of LL tend to also have low technology choice index and vice versa. However, there is a large pool of countries with the technology choice index below 2.50 and with their LL not exceeding about 60. This suggests a similar trend as highlighted under figure five that too high or too low banking sector development might be associated with too low or too high technology choice index as seen in countries such as China, Jordan and Malaysia (bottom right of the scatter plot) and in Guinea, Gabon and Timor-Leste (upper left of the scatter plot). The correlation coefficient table is also presented in the next section to clearly show the sign and magnitude of correlation between TCII and LL.

The next descriptive statistics is for deposit banks' assets as one of the indicators of financial development. Table seven below presents the summary statistics.

Table 7. Deposit Banks Assets- Descriptive Statistics

Item	1995	2000	2005	2010	2015
Minimum	0.25	0.38	1.25	2.67	3.6
1st Quartile	10.35	10.6	14.54	18.68	26.84
Median	19.85	26.77	27.21	34.06	44.25
Mean	29.37	34.21	37.04	43.4	54.16
3rd Quartile	38.72	42.15	43.97	60.59	68.76
Maximum	182.98	191.78	283.45	203.49	249.13
Standard Deviation	30.22	34.18	36.66	33.41	38.28

Source: Author's Computation using Stata 14, 2019

Table seven reveals a similar trend to the previous descriptive tables as the difference between the maximum and minimum deposit banks assets (DBA) across time are also large. The minimum in 1995 was just 0.25 and the maximum was 182.98 but by 2015 the minimum had increased to about 3.6 while the maximum stood at 249.13. The distribution of this indicator of banking sector development in terms of the mean, median, first and third quartiles and standard deviation also suggest that there is some difference across time. For instance, the mean DBA in 1995 was about 29.37 and this increased to 54.16 by 2015. The first and third quartiles also increased from 10.35 in 1995 to 26.84 in 2005, and from 30.72 in1995 to 68.76 in 2005 respectively. The standard deviation increased slightly from 30.22 in 1995 to 38.28 in 2015.

Table eight below shows the corresponding average statistics for the top ten countries with the highest and lowest DBA.

Table 8. Top 10 Countries with Highest and Lowest Deposit Banks Assets

Rank	Country	Lowest DBA	Country	Highest DBA
1	Congo DR	2.98	Korea Republic	88.95
2	Timor-Leste	4.88	Mauritius	90.22
3	Chad	6.02	Jordan	93.56
4	Equat. Guinea	6.12	China	116.68
5	Guinea	6.19	Singapore	117.03
6	Guinea-Bissau	6.57	Malaysia	117.31
7	Afghanistan	6.84	Thailand	117.62
8	Sierra Leone	8.33	Liberia	129.69
9	Sudan	8.41	Lebanon	145.11
10	Malawi	8.89	Hong Kong	184.49

Source: Author's Computation using Stata 14, 2019

Table eight reveals that the top 10 countries with the lowest DBA have their mean values ranging from 2.98 to 8.89 while the mean values for the top 10 countries with the highest range from 88.95 to 184.49. The bottom 10 countries all have their DBA below 9.00 as seen in countries such as Congo Democratic Republic (with the least DBA of 2.98), follow by Timor-Leste, Chad, and Equatorial Guinea amongst others. Sierra Leone again appears on the list of countries with the lowest indicator of financial development in terms of DBA as the eighth lowest in the ranking. On the other hand, the top 10 countries have their DBA above 80 – which tends to be higher than the values for PSC. Notably, countries such Hong Kong, Lebanon, Liberia, Thailand, and Malaysia are the countries in the top five with the highest indicator – DBA of banking sector development follow by countries such as Singapore, China, Jordan, Mauritius and Korea Republic. This again indicates that

these countries are more financially developed than others not only in terms of PSC and LL but also in terms of DBA.

Figure seven below shows the scatter plot for the mean TCII and DBA for the countries in the sample.

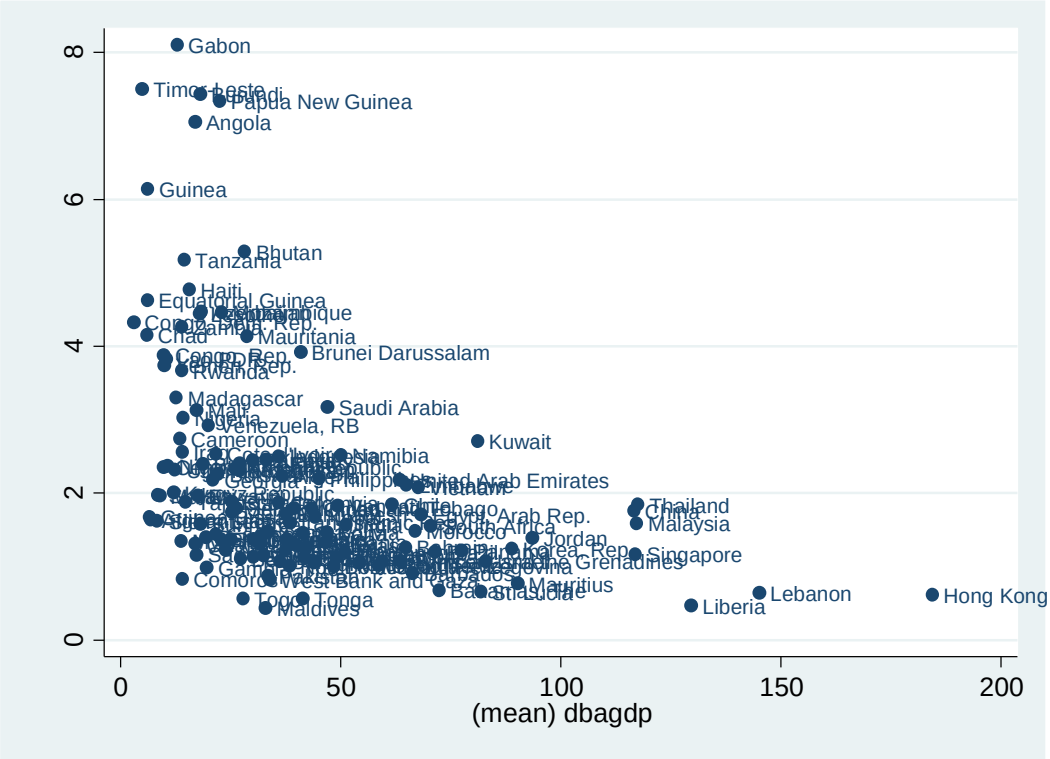


Figure 7. Scatter Plot showing the Correlation between Deposit Banks Assets and Industrial Growth Strategy in Developing Countries.

The scatter plot in figure seven shows a similar trend to figure six. It indicates that those countries with high financial development in terms of DBA tend to also have low technology choice index and vice versa. More so, there is a large pool of countries with the technology choice index below 2.50 and with their DBA not exceeding about 100. This suggests a similar trend as highlighted under figures five and six that too high or too low banking sector development might be associated with too low or too high technology choice index as seen in countries such as China, Thailand, Hong Kong, Liberia, Lebanon, and Malaysia (bottom right of the scatter plot) and in Papua New Guinea, Angola, Guinea Gabon, and Timor-Leste (upper left of the scatter plot). The corresponding correlation coefficient table is also presented in the next section to clearly show the sign and magnitude of correlation between TCII and DBA.

The next descriptive statistics is for deposit banks' assets and central bank assets as one of the indicators of financial development. The table below presents the summary statistics.

Table 9. Deposit Banks Assets and Central Banks Assets- Descriptive Statistics

Item	1995	2000	2005	2010	2015
Minimum	6.09	2.98	4.75	21.94	47.76
1st Quartile	57.18	58.13	72.5	82.29	82.51
Median	74.77	79.67	88.02	91.86	94.67
Mean	70.2	73.55	81.05	86.82	89.01
3rd Quartile	91.52	94.63	96.74	97.65	98.62
Maximum	99.99	99.99	99.99	100	99.99
Standard Deviation	24.63	24.35	20.2	15.21	12.42

Source: Author's Computation using Stata 14, 2019

The descriptive statistics shown in table nine reveal a similar trend to the previous descriptive tables as the difference between the maximum and minimum deposit banks and central bank assets (DCBA) are also large within the study period. The minimum in 1995 was just 6.09 and the maximum was 99.99 but by 2015 the minimum had increased to a staggering 47.76 while the maximum remained at 99.99. This reflects in greater differences in the distribution in the first quartile and little or no difference in the third quartile. The distribution of this indicator in terms of the mean, median, and standard deviation also suggest that there is some difference across time. For instance, the mean DCBA in 1995 was about 70.2 and this increased to 89.01 by 2015. The standard deviation decreased from 24.63 in 1995 to 12.42 in 2015 which differs from the trend in the earlier standard deviations.

Table 10 below shows the corresponding average statistics for the top ten countries with the highest and lowest DCBA.

Table 10. Top 10 Countries with Highest and Lowest Deposit and Central Banks Assets

Rank	Country	Lowest DCBA	Country	Highest DCBA
1	Liberia	14.62	Bhutan	99.31
2	Guinea	33.3	Botswana	99.33
3	Nicaragua	40.81	Tunisia	99.44
4	Sierra Leone	40.99	West Bank/Gaza	99.49
5	Myanmar	41.63	Brunei D.	99.54
6	Haiti	47.37	Qatar	99.56
7	CA Republic	48.58	Kuwait	99.76
8	Zambia	49.26	Bosnia H.	99.98
9	Chad	51.42	Hong Kong	.
10	Congo DR	52.01	Saudi Arabia	.

Source: Author's Computation using Stata 14, 2019

Table 10 reveals that the top 10 countries with the lowest DCBA have their mean values ranging from 14.62 to 52.01 while the mean values for the top 10 countries with the highest DCBA are all slightly above 99. The bottom 10 countries all have their DCBA above 14 as seen in countries such as Liberia with the least DCBA of 14.62, follow by Guinea, Nicaragua, Sierra Leone, Myanmar amongst others. On the other hand, the top 10 countries with the highest DCBA include Bhutan, Botswana, Tunusia, West Bank/Gaza, Brunei, Qatar Kuwait, and Bosnia with no large differences between them. This again indicates that these countries are more financially developed than others in terms of DCBA.

Figure eight below shows the scatter plot for the mean TCII and DCBA for the countries in the sample.

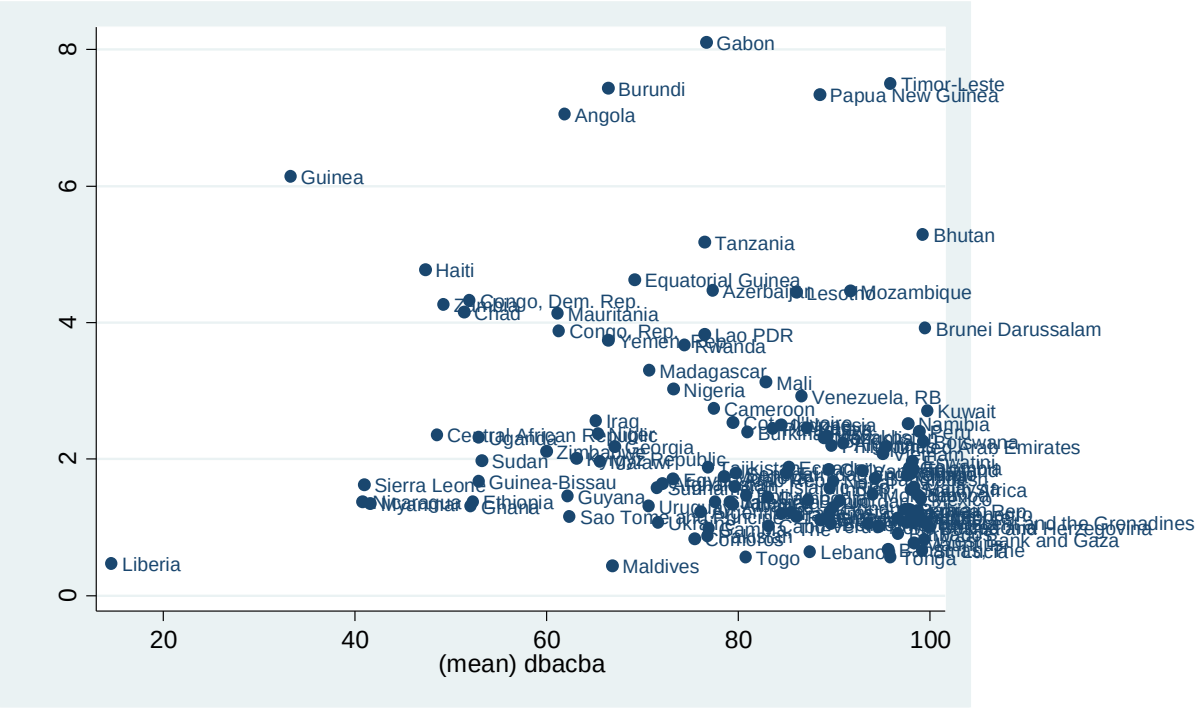


Figure 8. Scatter Plot showing the Correlation between Deposit/Central Banks Assets, and Industrial Growth Strategy in Developing Countries.

The scatter plot in figure eight shows somewhat different trend to the previous figures. It indicates that those some countries such as West Bank and Gaza with high financial development in terms of DCBA tend to also have low technology choice index, others such as Bhutan and Brunei tend to both high DCBA and TCII. Though there is a large pool of countries with the technology choice index below 2.50 and but with their DCBA very high with most exceeding 80. Thus, while there are more countries with high DCBA and low TCII, there are still some in the sample that tend to have both high DCBA and TCII indicating the complexity of the relationship between this indicator of financial development and growth strategies in developing countries. The corresponding correlation coefficient table is shown in the next section to clearly show the sign and magnitude of the correlation between TCII and DCBA.

2.4.2. Correlation Coefficients

While the scatter plots above show the association between the measure of growth strategy (the dependent variable) and the key explanatory variables – measures of financial development, correlation coefficients are important way of indicating the degree of association not only between dependent and explanatory variables, but they tend to clarify the degree of association or correlation between the independent variables (Senthilnathan, 2019). Tables 11-14 depict the correlation coefficients for the models involving the key indicators of banking sector development and other explanatory variables.

Table 11. Correlation Coefficients for PSC Model
Dependent variable: TCII

Variable	TCII	PSC	GFCF	LFBE	GGDP	Fuel export	Net FDI	Inflation
TCII	1	-	-	-	-	-	-	-
PSC	-0.299	1	-	-	-	-	-	-
GFCF	0.430	0.096	1	-	-	-	-	-
LFBE	0.210	-0.094	0.021	1	-	-	-	-
GGDP	-0.082	0.008	0.037	-0.326	1	-	-	-
Fuel export	0.170	-0.175	-0.062	0.028	-0.046	1	-	-
Net FDI	-0.164	0.617	0.074	-0.065	-0.125	-0.177	1	-
Inflation	0.051	-0.134	-0.102	-0.022	-0.047	0.199	-0.102	1

Source: Author's Computation using Stata 17, 2022

Table 11 reveals that increases in TCII is associated with decreases in PSC which is in line with the negative and low correlation coefficient of -0.299, and the scatter plot in figure five. The degree of correlation between TCII and the control variables indicates low correlation too except for the correlation between TCII and gross fixed capital formation, which is positive, and moderate at about 0.43. With respect to the correlation between the explanatory variables, all the respective coefficients show low degree of correlation with correlation coefficients below 0.5. However, PSC and net FDI inflows report high and positive correlation with a coefficient of 0.617. This means that increase in net FDI inflows is associated with increase in PSC though magnitude of correlation is not severe (over 0.7). More so, the presence of high correlation between these variables does not matter since the measures of financial development are not included all in the same model to reduce the problem of multicollinearity.

Next is the correlation matrix for liquid liabilities. Table 12 below summarize the correlation coefficients with respect to TCI and the relevant explanatory variables.

Table 12. Correlation Coefficients for Liquid Liabilities Model
Dependent variable: TCII

Variable	TCII	LL	GFCF	LFBE	GGDP	Fuel export	Net FDI	Inflation
TCII	1	-	-	-	-	-	-	-
LL	-0.250	1	-	-	-	-	-	-
GFCF	0.434	0.113	1	-	-	-	-	-
LFBE	0.210	-0.078	0.031	1	-	-	-	-
GGDP	-0.082	-0.022	0.037	-0.328	1	-	-	-
Fuel export	0.170	-0.170	-0.059	0.024	-0.046	1	-	-
Net FDI	-0.165	0.799	0.080	-0.071	-0.125	-0.179	1	-
Inflation	0.050	-0.150	-0.098	-0.027	-0.047	0.198	-0.104	1

Source: Author's Computation using Stata 17, 2022

Table 12 shows that increases in TCII is associated with decreases in LL which is in line with the negative and low correlation coefficient of -0.25, and the scatter plot in figure six. Also, the degree of correlation between TCII and the control variables here exhibits low correlation. However, the correlation between net FDI inflows and LL is high and positive with a correlation coefficient of 0.799. Again, this does not matter much since the key variables of interest that measure financial development are not included in the same model to reduce the problems of multicollinearity. With respect to the other correlation between the explanatory variables, all the respective coefficients show low degree of correlation with correlation coefficients below 0.5 which further reduces the problem of multicollinearity.

Next is the correlation matrix for deposit banks assets. Table 13 below summarize the correlation coefficients with respect to TCI and the relevant explanatory variables.

Table 13. Correlation Coefficients for Deposit Banks Assets Model
Dependent variable: TCII

Variable	TCII	DBA	GFCF	LFBE	GGDP	Fuel export	Net FDI	Inflation
TCII	1	-	-	-	-	-	-	-
DBA	-0.337	1	-	-	-	-	-	-
GFCF	0.430	0.066	1	-	-	-	-	-
LFBE	0.210	-0.110	0.021	1	-	-	-	-
GGDP	-0.082	-0.005	0.037	-0.326	1	-	-	-
Fuel export	0.170	-0.190	-0.062	0.028	-0.046	1	-	-
Net FDI	-0.164	0.625	0.074	-0.065	-0.125	-0.177	1	-
Inflation	0.051	-0.127	-0.102	-0.022	-0.047	0.199	-0.102	1

Source: Author's Computation using Stata 17, 2022

The correlation coefficient reported in Table 13 reveals that increases in TCII is associated with decreases in DBA which is in line with the negative and low correlation coefficient of -0.337, and the scatter plot in figure seven. The degree of correlation between TCII and the control variables again indicates low correlation too except for the correlation between net FDI inflows and DBA, which is positive, and HIGH at about 0.625. As explained above, this did not also pose any serious or severe problems. The correlation between the other explanatory variables all shows low degree of correlation with correlation coefficients below 0.5. Thus, this reduces the problem of multicollinearity.

The correlation matrix for DCBA as shown in Table 14 below summarize the correlation coefficients with respect to TCI, DCBA and the relevant explanatory variables.

Table 14. Correlation Coefficients for Deposit and Central Banks Assets
Dependent variable: TCII

Variable	TCII	DCBA	GFCF	LFBE	GGDP	Fuel export	Net FDI	Inflation
TCII	1	-	-	-	-	-	-	-
DCBA	-0.160	1	-	-	-	-	-	-
GFCF	0.434	0.277	1	-	-	-	-	-
LFBE	0.205	-0.203	0.021	1	-	-	-	-
GGDP	-0.106	0.245	0.034	-0.334	1	-	-	-
Fuel export	0.160	-0.052	-0.063	0.024	-0.055	1	-	-
Net FDI	-0.041	0.060	0.191	-0.019	-0.090	-0.267	1	-
Inflation	0.042	-0.288	-0.104	-0.024	-0.055	0.196	-0.153	1

Source: Author's Computation using Stata 17, 2022

Table 14 reveals a negative correlation between TCII and DCBA with a low correlation coefficient of -0.160 – as shown in the scatter plot in figure eight. The degree of correlation between TCII and the control variables indicates low correlation too with correlation coefficients below 0.5. Notably, the measure of financial development here (DCBA) and net FDI inflows report low and positive correlation with a coefficient unlike the high correlation reported in the earlier results. This further confirms that there's no evidence of serious multicollinearity.

The correlation coefficients for the models in terms of Cihak, et'al (2012) measures of financial development are summarized in Appendix II. The results also do not show evidence of serious multicollinearity.

2.4.3. Econometric Results

Though it is difficult to depict the effect of banking sector development on the growth strategy in industry from the descriptive statistics above, the statistics have however shown the association between the variables to be more negative than positive. Using the dynamic panel data method described in the methodology section the econometric results in tables 15 to 18 are reported depicting the effects of banking sector development on industrial growth strategy in developing countries. Specifically, the two step system GMM robust estimator with Windmeijer (2005) correction (column IV) is considered appropriate in the models because all the diagnostics are satisfactory for the results in tables 15 to 18 and hence more robust. The Sargan tests do not reject the over-identification restrictions, the absence of second order serial correlation is also not rejected. More so, the coefficients of the lagged dependent variables are all positive and significant at one percent level of significance and they lie between the OLS and FE estimates. Though some of the controls turned out not be significant, this could be due to the impact of other factors since constant terms are included in the models.

For clarity, the full meaning of the acronyms used in the regressions are outlined as follows: TCII (Technology Choice Index), PSCRBGDP (Private Sector Credit by deposit banks to GDP), LLGDP (Liquid Liabilities to GDP), and DBAGDP (Deposit Banks Assets to GDP), DBACBA (Deposit Banks to Central Banks Assets). These variables are as described in the methodology section.

Table 15 below shows the result for banking sector development in terms of private sector credit. This is the key variable emphasized in the literature.

Table 15. Result for Private Sector Credit
Dependent Variable: TCII

Variable	OLS	FE	Syst. GMM (One Step Rob)	Syst. GMM (Two Step Rob)
Lagged TCII	1.002*	0.0931	0.5323*	0.5623*
	(0.086)	(0.1468)	(0.0836)	(0.1277)
pscrbgdp	-0.0005	-0.0091**	-0.00526**	-0.00648**
	(0.0008)	(0.0035)	(0.0022)	(0.00325)
gfcfgdp	0.0156	-0.0209**	0.0132**	0.01128***
	(0.0117)	(0.0094)	(0.0055)	(0.0062)
lfbe	0.0006	-0.0146**	-0.00305	-0.0037
	(0.0015)	(0.0057)	(0.00341)	(0.0023)
ggdp	0.0065***	-0.0159	-0.0131	-0.013
	(0.0035)	(0.0252)	(0.0096)	(0.0124)
fex	-0.0016	0.017**	0.0039**	0.00317
	(0.0017)	(0.0074)	(0.0017)	(0.0022)
nfdiigdp	0.0036	0.0016	0.0102	0.0142***
	(0.0026)	(0.0112)	(0.00704)	(0.0081)
inf	-0.0013	-0.005***	-0.0143	-0.0153
	(0.0016)	(0.0023)	(0.0136)	(0.012)
Wald Test	49.43	6.09	1126.7	10098.55
	[0.00]	[0.00]	[0.00]	[0.00]
AR (2)			-1.02	-0.87
			[0.306]	[0.383]
Sargan-test			8.27	8.27
			[0.826]	[0.826]
Hansen-test			15.35	15.35
			[0.286]	[0.286]
Observations	101	101	46	46
Groups		50	31	31
Instruments			27	27

Source: Author's Computation using Stata 14, 2019; *-1%, **-5%, and ***-10% significance level
Note: Robust standard errors are in () brackets and probabilities in [] brackets

Table 15 indicates that private credit is negative and significant at five percent level of significance. This suggests that banking sector development in terms of private credit is negatively related to the growth strategy in industry. An increase in private sector credit tends to decrease the measure of growth strategy implying

that developing countries are likely to specialise according to their comparative advantage given that they have abundant cheap labour. However, amongst the set of controls, gross fixed capital formation and net foreign direct investment inflows are both positive and significant at 10% level of significance implying that increases in these controls would increase the technology choice index (the measure of growth strategies) in developing countries. This means developing countries tend to defer their comparative advantage as investment and foreign direct investment inflows increase. It could also mean that more capital is used at the expense of labour with increased investments and FDI inflows thereby making production more capital intensive than labour intensive in developing countries. The result further shows that though the labour force with basic education, government expenditure relative to GDP, and inflation are negative they are not significant implying that increases in these controls tend to lead to insignificant decrease in TCII. Fuel exports as a measure of resource dependence reveal a positive impact on growth strategy but it is also not significant which means that as fuel exports increases TCII tends to increase by insignificant magnitude. Strikingly, the lagged measure of growth strategy indicates that previous strategy in developing countries tends to lead to CAD since it is positive and significant.

Table 16 below contains the result for liquid liabilities. It also shows that the estimates for liquid liabilities are also robust as shown thus:

Table 16. Regression Result for Liquid Liabilities
Dependent Variable: TCII

Variable	OLS	FE	Syst. GMM (One Step Rob)	Syst. GMM (Two Step Rob)
Lagged TCII	1.0097*	0.0967	0.5185*	0.5198*
	(0.0907)	(0.1472)	(0.0856)	(0.1557)
llgdp	0.00018	-0.0083**	-0.00536***	-0.00625
	(0.00087)	(0.0033)	(0.0031)	(0.0053)
gfcfgdp	0.0153	-0.0207**	0.0137**	0.0146***
	(0.0116)	(0.0094)	(0.0059)	(0.0077)
lfbe	0.0005	-0.0144**	-0.0025	-0.0057
	(0.0015)	(0.0058)	(0.0045)	(0.0049)
ggdp	0.0064***	-0.0125	-0.0113	-0.015
	(0.0064)	(0.0252)	(0.0110)	(0.014)
fex	-0.0017	0.0135***	0.00364***	0.0049*
	(0.0017)	(0.0071)	(0.0019)	(0.0018)
nfdiigdp	0.0014	0.00052	0.0228	0.0266
	(0.0044)	(0.0111)	(0.0156)	(0.0252)
inf	-0.0012	-0.006*	-0.0113	-0.0203
	(0.0017)	(0.0023)	(0.0159)	(0.0162)
Wald Test	52.18	6.02	7317.08	8295.54
	[0.00]	[0.00]	[0.00]	[0.00]
AR (2)			-0.83	-1.11
			[0.408]	[0.268]
Sargan-test			14.09	14.09
			[0.368]	[0.368]
Hansen-test			16.33	16.33
			[0.232]	[0.232]
Observations	100	100	46	46
Groups		49	31	31
Instruments			27	27

Source: Author's Computation using Stata 14, 2019; *-1%, **-5%, and ***-10% significance
Note: Robust standard errors are in () brackets and probabilities in [] brackets

The result in table 16 indicates that liquid liabilities are negative and not significant suggesting that they are though negatively related to industrial growth strategy, the relationship is insignificant (column IV – two step specification). This means that the increase in liquid liabilities tend to decrease TCII. The lagged dependent variable here also reveals a positive and significant estimate meaning that it is comparative advantage - defying. In addition to gross fixed capital formation as a control which is positive and significant at 10%, fuel export is

negative and significant at one percent level of significance. These mean that while increase in investment tends to increase TCII the increase in fuel exports here tend to decrease TCII. Thus, investment in this specification also tend to be comparative advantage – defying in developing countries. Fuel exports as a measure of resource dependence is not only positive here but significant which means that increase in fuel exports tends to increase TCII. The positive and significant impact of fuel exports means that increased dependence on natural resources could lead to developing countries defying their comparative advantage especially in labour intensive industries as production is likely to become more capital intensive.

The result in table 17 below highlights the estimate for banking sector development measured in terms of deposit banks' assets (claims of deposit money banks on domestic non-financial sector). Here, deposit banks' assets report to have a negative significant impact on industrial growth strategy at five percent level of significance implying that increase in deposit banks' assets tend to decrease TCII. Thus, this measure of financial development also confirms the tendency of finance to lead to CAF in developing countries. Lagged growth strategy indicates a positive significant effect as found earlier. Gross fixed capital formation and net foreign direct investment inflow as controls are again positive and significant at five percent level which mean that increases in investment and net FDI inflows tend to increase TCII.

Table 17. Regression Result for Deposit Banks Assets
Dependent Variable: TCII

Variable	OLS	FE	Syst. GMM (One Step Rob)	Syst. GMM (Two Step Rob)
Lagged TCII	1.0038*	0.0929	0.5201*	0.5356*
	(0.0873)	(0.1512)	(0.0872)	(0.1195)
dbagdp	-0.00026	-0.0079**	-0.0051**	-0.00571**
	(0.00075)	(0.0035)	(0.0021)	(0.00248)
gfcfgdp	0.0155	-0.0239**	0.0119**	0.0134**
	(0.0117)	(0.0099)	(0.0052)	(0.00636)
lfbe	0.00059	-0.0139**	-0.0041	-0.0028
	(0.0015)	(0.0058)	(0.0035)	(0.0033)
ggdp	0.0064***	-0.0204	-0.0167***	-0.0146
	(0.0034)	(0.0257)	(0.0093)	(0.0104)
fex	-0.0016	0.0152**	0.0034**	0.0034
	(0.0017)	(0.0074)	(0.0017)	(0.0022)
nfdiigdp	0.0031	0.0023	0.0109	0.0145**
	(0.0027)	(0.0108)	(0.00703)	(0.0069)
inf	-0.0013	-0.0049**	-0.0136	-0.010
	(0.0016)	(0.0024)	(0.0126)	(0.011)
Wald Test	49.78	4.00	1653.00	11244.34
	[0.00]	[0.00]	[0.00]	[0.00]
AR (2)			-0.95	-0.91
			[0.340]	[0.361]
Sargan-test			7.85	7.85
			[0.853]	[0.853]
Hansen-test			17.03	17.03
			[0.198]	[0.198]
Observations	101	101	46	46
Groups		50	31	31
Instruments			27	27

Source: Author's Computation using Stata 14, 2019; *-1%, **-5%, and ***-10% significance
Note: Robust standard errors are in () brackets and probabilities in [] brackets

The estimates in table 17 indicate that increases in deposit banks assets have the effect of reducing the technology choice index, while increases in gross fixed capital formation and net foreign direct investment inflow have the effect of increasing the index in the sample of countries for the study period.

The regression result in table 18 contains the results for the share of deposit money banks and central banks on domestic non-financial sector. This also reports to be negative though insignificant as shown below:

Table 18. Regression Result for Deposit and Central Banks Assets
Dependent Variable: TCII

Variable	OLS	FE	Syst. GMM (One Step Rob)	Syst. GMM (Two Step Rob)
Lagged TCII	1.001*	0.1336	0.6039*	0.6401*
	(0.0856)	(0.1410)	(0.0691)	(0.0899)
dbacba	-0.0045**	-0.0177**	-0.00438	-0.0057
	(0.0017)	(0.0069)	(0.0060)	(0.0075)
gfcfgdp	0.0177	-0.0054	0.0365	0.0058
	(0.0118)	(0.0094)	(0.0067)	(0.0075)
lfbe	0.00008	-0.0127**	-0.0025	-0.0025
	(0.0016)	(0.0059)	(0.0022)	(0.0024)
ggdp	0.0069***	-0.0139	-0.0986	-0.0082
	(0.0037)	(0.0247)	(0.0081)	(0.093)
fex	-0.0018	0.015	0.00418***	0.0031
	(0.0019)	(0.0073)	(0.0022)	(0.0039)
nfdiigdp	-0.0061	0.0452**	0.0050	0.0113
	(0.0070)	(0.0201)	(0.0137)	(0.0162)
inf	-0.0022	-0.0061**	-0.0056	-0.0070
	(0.0016)	(0.0023)	(0.0097)	(0.0087)
Wald Test	48.07	4.68	677.07	772.74
	[0.00]	[0.00]	[0.00]	[0.00]
AR (2)			-0.84	-0.85
			[0.402]	[0.393]
Sargan-Test			11.13	11.13
			[0.600]	[0.600]
Hansen-Test			14.96	14.96
			[0.310]	[0.310]
Observations	96	96	43	43
Groups		48	29	29
Instruments			27	27

Source: Author's Computation using Stata 14, 2019; *-1%, **-5%, and ***-10% significance
Note: Robust standard errors are in () brackets and probabilities in [] brackets

Worthy of note from table 18 is the insignificance of the key variable - deposit banks' assets and the corresponding larger value of the lagged dependent variable which is 64% - about nine percent higher than that of the key variable – private sector credit. It is also clear that none of the controls are significant. This means that in terms of deposit banks' assets the lagged dependent variable and other factors as indicated by the constant in the regression are responsible for changes in industrial growth strategy in developing countries.

Some robustness checks are also performed using the comprehensive measures of banking sector development developed in Cihak et al. (2012) in terms of financial depth, access, and stability (measured by private sector credit, bank accounts per thousand population and z-score respectively) and some new control variables to control for openness and country size characteristics. In addition, the natural logarithms (ln) of variables are used in the estimation to account for skewness in the data due to large values (as seen in population and land area statistics) thereby making them normally distributed (Benoit, 2011). The results from the system GMM estimation are presented in tables 15-18 and explained thereafter as below.

Table 19. Result for Financial Depth - Private Sector Credit
Dependent Variable: lngrowth strategy

VARIABLES	(1) OLS	(2) Fixed Effects	(3) One Step Rob Syst GMM	(4) Two Step Rob Syst GMM
L.lngrowthstrategy	0.886***	0.457***	0.847***	0.836***
	(0.0196)	(0.114)	(0.0391)	(0.0368)
lnprivatecredit	-0.0340***	-0.0380	-0.0596	-0.0787*
	(0.0126)	(0.0373)	(0.0431)	(0.0408)
lngrossfixedcap	-0.0125	-0.0399	0.257	0.351**
	(0.0306)	(0.0399)	(0.197)	(0.138)
lnfuelexport	0.00762**	0.00517	0.00797*	0.00858**
	(0.00297)	(0.00939)	(0.00431)	(0.00395)
lnopenness	0.0117	-0.0455	-0.0942	-0.134
	(0.0145)	(0.0417)	(0.0828)	(0.0820)
lnpopd	-0.00369	-0.112	-0.0121	-0.0121
	(0.00779)	(0.141)	(0.0105)	(0.0101)
lnlandarea	-0.00540	5.653***	-0.0165	-0.0240*
	(0.00582)	(1.430)	(0.0119)	(0.0131)
Wald Test	469.84***	12.75**	4646.64***	4743.79***
	[0.00]	[0.00]	[0.00]	[0.00]
AR (1)			-2.55**	-2.48**
			[0.011]	[0.013]
AR (2)			-0.26	-0.06
			[0.796]	[0.954]
Hansen Test			9.2	9.2
			[0.686]	[0.686]
Instruments			24	24
Observations	327	327	327	327
R-squared	0.912	0.412		
Country FE	No	Yes	Yes	Yes

Year FE	No	Yes	Yes	Yes
Number of countries		106	106	106

Source: Author's Computation using Stata 14, 2019; *-1%, **-5%, and ***-10%
significance level
Note: Robust standard errors are in () brackets and probabilities in [] brackets

Table 19 further confirms that financial development tends to lead to comparative advantage – following, CAF growth strategy in developing countries in terms of financial depth (measured in terms of private sector credit). This is because the coefficient of private sector credit remains negative implying that increases in this indicator leads to decrease in TCII. Lagged TCII turns a positive and significant estimate implying that increases in lagged growth strategy tends to increase present strategy thereby leading to comparative advantage defying strategy in developing countries. Also, gross fixed capital formation and fuel exports as measures of investment and natural resource dependence report to be positive and significant which mean that their increase tend to increase TCII and consequently CAD in developing countries. Land area, however, turns negative and significant impact on TCII implying that increases in land area tends to decrease TCII thereby leading to CAF in developing countries.

Table 20 shows the result when financial efficiency is used as an indicator of financial development.

Table 20. Result for Financial Efficiency – Net Interest Margin
Dependent Variable: lngrowth strategy

VARIABLES	(1) OLS	(2) Fixed Effects	(3) One Step Rob Syst GMM	(4) Two Step Rob Syst GMM
L.lngrowthstrategy	0.895***	0.472***	0.826***	0.838***
	(0.0183)	(0.119)	(0.0304)	(0.0334)
lninterestmargin	0.0483**	0.0324	0.255***	0.205**
	(0.0197)	(0.0285)	(0.0654)	(0.0795)
lngrossfixedcap	0.0143	-0.00345	0.322**	0.356**
	(0.0326)	(0.0483)	(0.148)	(0.159)
lnfuelexport	0.00704**	0.000494	0.0132***	0.0125**
	(0.00293)	(0.00953)	(0.00484)	(0.00509)
lnopenness	0.0114	-0.0509	-0.0968	-0.152
	(0.0159)	(0.0444)	(0.113)	(0.129)
lnpopd	0.000545	-0.0937	0.00937	-0.00291
	(0.00810)	(0.151)	(0.0168)	(0.0176)

lnlandarea	-0.000270	5.186***	-0.00976	-0.0190
	(0.00588)	(1.562)	(0.0158)	(0.0187)
Wald Test	469.43***	11.25***	2039.12***	2374.5**8
	[0.00]	[0.00]	[0.00]	[0.00]
AR (1)			-2.96***	-2.93***
			[0.003]	[0.003]
AR (2)			-0.08	0.03
			[0.938]	[0.972]
Hansen Test			9.91	9.91
			[0.539]	[0.539]
Instruments			23	23
Observations	322	322	322	322
R-squared	0.913	0.420		
Country FE	No	Yes	Yes	Yes
Year FE	No	Yes	Yes	Yes
Number of country dummy		104	104	104

Source: Author's Computation using Stata 14, 2019; *-1%, **-5%, and ***-10%
significance level
Note: Robust standard errors are in () brackets and probabilities in [] brackets

The result in table 20 shows that financial efficiency (measured by net interest margin) is positive and significant at 5% level of significance indicating that an increase in net interest margin tends to increase TCII. This tends to lead to comparative advantage defying, CAD in developing countries. Gross fixed capital formation and fuel exports are again positive and significant; hence their increases tend to lead to increases in TCII thereby leading to CAD. Though population density, openness and land area are negative implying that they tend to lead to CAF as their increases tend to decrease TCII they are not statistically significant. Again, lagged growth strategy is positive and statistically significant indicating that lagged strategy tends to be CAD as found earlier.

Tables 21 and 22 show the results for financial development in terms of financial access and stability. These two tables are analysed together – simultaneously because their two step robust result seem not to matter much since they are not statistically significant.

Table 21. Result for Financial Access – Bank Accounts Per Thousand
Dependent Variable: lngrowth strategy

VARIABLES	(1) OLS	(2) Fixed Effects	(3) One Step Rob Syst GMM	(4) Two Step Rob Syst GMM
L.lngrowthstrategy	0.887***	0.215	0.873***	0.871***
	(0.0271)	(0.148)	(0.0421)	(0.0635)

lnbankaccounts	-0.043***	-0.0431	-0.0738*	-0.0260
	(0.0133)	(0.0290)	(0.0426)	(0.0459)
lngrossfixedcap	-0.0877**	-0.00665	-0.136	-0.0154
	(0.0437)	(0.0530)	(0.172)	(0.208)
lnfuelexport	0.0189***	0.00430	0.0173	0.0152
	(0.00541)	(0.0151)	(0.0111)	(0.0102)
lnopenness	0.0549	-0.0771	0.213	-0.0558
	(0.0354)	(0.0677)	(0.234)	(0.158)
lnpopd	0.00476	-0.151	0.0234	-0.0116
	(0.0126)	(0.296)	(0.0301)	(0.0207)
lnlandarea	-0.00206	11.84***	0.0235	-0.0199
	(0.0116)	(2.595)	(0.0428)	(0.0288)
Wald Test			1622.23***	1784.34***
			[0.00]	[0.00]
AR (1)			-1.99**	-2.4**
			[0.047]	[0.023]
AR (2)			-0.56	
			[0.672]	
Hansen Test			12.62	12.61
			[0.181]	[0.216]
Instrument			21	21
Observations	160	160	160	160
R-squared	0.912	0.425		
Country FE	No	Yes	Yes	Yes
Year FE	No	Yes	Yes	Yes
Number of country dummy		72	72	72

Source: Author's Computation using Stata 14, 2019; *-1%, **-5%, and ***-10%
significance level
Note: Robust standard errors are in () brackets and probabilities in [] brackets

Table 22. Result for Financial Stability – Z-Score
Dependent Variable: lngrowth strategy

VARIABLES	(1) OLS	(2) Fixed Effects	(3) One Step Rob Syst GMM	(4) Two Step Rob Syst GMM
L.lngrowthstrategy	0.908***	0.471***	0.880***	0.897***
	(0.0182)	(0.111)	(0.0244)	(0.0416)
lnzscore	-0.00273	0.0457	-0.0245	-0.0158
	(0.0140)	(0.0336)	(0.0695)	(0.180)
lngrossfixedcap	-0.0204	-0.0306	0.237	0.0796
	(0.0314)	(0.0402)	(0.257)	(0.187)
lnfuelexport	0.00508*	0.00443	0.00564	0.00688*
	(0.00294)	(0.00929)	(0.00407)	(0.00413)
lnopenness	0.00892	-0.0591	-0.137	-0.155
	(0.0162)	(0.0448)	(0.116)	(0.138)
lnpopd	-0.00509	-0.0616	-0.0175	-0.0144
	(0.00807)	(0.142)	(0.0133)	(0.0122)
lnlandarea	-0.00150	5.134***	-0.0192	-0.0234
	(0.00601)	(1.640)	(0.0154)	(0.0210)
Wald Test			4062.55***	4095.56***
			[0.00]	[0.00]
AR (1)			-2.5**	-2.7**
			[0.013]	[0.011]
AR (2)			-0.42	-0.75
			[0.677]	[0.455]

Hansen Test			[0.578]	12.48
			12.48	[0.329]
Instrument			[0.421]	23
			23	
Observations	325	325	325	325
R-squared	0.907	0.410		
Country FE	No	Yes	Yes	Yes
Year FE	No	Yes	Yes	Yes
Number of country dummy		105	105	105

Source: Author's Computation using Stata 14, 2019; *-1%, **-5%, and ***-10%
significance level
Note: Robust standard errors are in () brackets and probabilities in [] brackets

The results for financial access and stability show the two step robust estimates are not significant though they are negative indicating that increase in financial access and stability in developing countries tend to reduce TCII - notably, the one step estimate for financial access is significant at one percent level of significance. These suggest that financial access and stability tend to lead to CAF growth strategy in developing countries. More so, fuel export reports to be positive and significant in table 22 indicating that increase in resource dependence could lead to CAD in this specification as found earlier as it tends to lead to increase in TCII. The lagged TCII in both tables are positive and significant implying that increase in the index of lagged growth strategy could lead to increase in present index which implies that previous strategy indeed matters in determining current strategy for growth.

Overall, Investment, fuel exports and land area prove to be relevant determinants of growth strategy in this specification. Thus, in addition to financial development the private sector, natural resources – fuel exports and land tend to have serious implications in strategizing growth in developing countries.

2.5. Discussion

The findings from the econometric analysis deserves some further discussion. This study has specifically found four major unique findings. First, banking sector development in terms of credit to private sector is found to have a significant negative impact on growth strategy (measured by technology choice index) in

industry. This means as the credit to private sector increases, the technology choice index in industry of the sampled countries decreases. In developing countries, where cheap labour is assumed to be abundant this decrease in technology choice implies that they are pursuing Comparative Advantage - Following (CAF) growth strategy as more labour is used in industry. It is important to note that this finding does not imply that CAF is in any way superior to CAD, but it is nonetheless an important empirical finding on the relationship between financial development and strategies for growth as it implies that a well-funded private sector could help in exploiting the comparative advantages in developing countries.

Related to the first important finding is the finding that claims of deposit money banks on domestic non – financial sector also called deposit banks assets are found to also have the same negative and significant impact on technology choice index. This means that deposit banks' claims in developing countries enhances CAF growth strategy in the industrial sector. In this sense therefore, banks are seen as vital institutions for harnessing comparative advantage in developing countries. Thus, strengthening banks could serve developing countries well in following their comparative advantage in industrialisation. However, the robustness check results in terms of financial efficiency indicates that as banks become more efficient, they tend to lead to comparative advantage – defying growth strategy though the evidence in terms of financial depth, access and stability supports the claim that banks could be useful in promoting CAF-strategy.

Next is the finding that gross fixed capital formation, net foreign direct investment inflows and fuel exports are significant variables in explaining changes in technology choice index in developing countries within the sample period. While the first two tend to increase technology choice which means enhancing Comparative Advantage – Defying (CAD) growth strategy in developing countries, the third tends to promote CAF by decreasing technology choice index. The robustness checks also confirms the relevance of these controls in addition to the role of country size variables such as population density and land area as well as the degree of openness. It follows that though financial development tends to affect strategies for growth in developing countries, other economic and non-economic factors are also vital in properly gauging the magnitude of such effects.

With respect to FDI inflows, OECD (2020) reported that during the COVID-19 pandemic FDI inflows were at the second level recorded since 2010 in the wake of the global financial crisis. The OECD projections further show that even under the most optimistic scenario, FDI flows were to likely fall by at least 30 percent in 2020 compared to 2019. This trend tends to corroborate our finding that while increases in FDI inflows could be CAD- enhancing, a continuous fall in FDI inflows into developing countries could lead them to follow their comparative advantage as they devise other means of financing development. Therefore, this opens a window for further research on the determinants of growth strategy in developing countries.

Lastly, it is also not in doubt that previous industrial growth strategy is found to be useful in explaining changes in technology choice of developing countries. Although, the literature on financial development and growth strategy is scarce, the works of Lin (2003, 2007), Rajan and Zingales (2003) and Baltagi et al. (2009) provide some useful comparable results and implications. Lin's work provides the useful index of technology choice based on factor endowments and finds it to be useful in explaining changes in per capita income and growth. Baltagi's work also provides some evidence on the relationship between GDP per capita and banking sector development which was found to be though positive and hence growth-stimulating. Rajan and Zingalese (2003) on the other hand report that financial openness may allow firms to tap foreign finance which they may not need. Therefore, they further conclude that cross border capital flows are unlikely to convince interests groups in developing countries to push for financial development. This is in line with our finding that increases in net foreign direct investment inflows tend to promote CAD in developing countries.

The findings have also shown that past technology choice index in industry could be an important determinant of current industrial strategy in developing countries. Overall, the findings are unique and provide some evidence on the role financial development in the banking sector plays in determining the industrial growth strategy of developing countries.

Thus, these findings tend to have implications on the role of financial sector development in serving as a source of comparative advantage in economic sub-sectors that are finance dependent (industrial sub-sectors). Though our analysis is

for the industrial sector, further analysis into the industrial sub-sectors as well as other major sectors could reveal insightful findings and implications for strategizing industrialisation (in particular) and development (in general) in developing countries. Consequently, in the next chapter we turn to the analysis of policies that could affect economic diversification in developing countries that are particularly dependent on natural resources and whose industrialisation have stagnated for years.

3. State Intervention, Liberalisation and Economic Diversification in Resource-Rich Developing Countries

3.1 Introduction

The topic of industrial policy has been controversial within academic and policy circles, and mostly relates to which between the state or the market should take the lead in diversification[1]. The debates have evolved around the dichotomy between the state and market forces, with special attention to whether industrial policy should be limited to correcting market failures or should govern the market by shaping the accumulation of productive capabilities (Lebdioui, 2019; Wade, 2012). Moreover, the growing divergence in competitive performance in the developing world has ignited increasing debates on the role of industrial policy. Lall (2013) contrasts the neoliberal with the structuralists' approach to industrial policy by making a case for selective interventions in tackling market and institutional failures and in building the required capabilities for industrial development as well as describing how the Asian Tigers managed to build industrial competitiveness in their economies. The neoliberal approach canvasses that the best strategy for countries in all situations is to liberalize – and not do much else. The proponents of this approach believe that integration into the international economy with resource allocation driven by free markets, will let countries realise their natural comparative advantage. As a consequence, dynamic advantage will in turn be optimized and the highest rate of growth attained. The approach further provides that the only legitimate role for the state is to provide a stable macro-economy with clear rules of the game, open the economy fully to international trade, give a lead role to private enterprise and furnish essential

[1]Mazzucato (2018) explained how contentious the debate on government's productivity is – that is whether government can be productive and add value or whether it holds back the economy because it is unproductive or even destroys value. In addition, John Maynard Keynes' ideas in the late 1930s and the 1940s redefined government as a contributor to national product – in stark contrast to Kuznets's omission of many government services from the national income. National accountants then came to view government spending as directly increasing output. Mazzucato pointed out that this debate is more tainted by political views and ideological positions than informed by deep scientific proofs.

public goods like basic human capital and infrastructure. This approach has the backing of the industrialized countries and the Bretton Wood institutions – which has become enshrined in the new rules of the game being formulated and implemented by the World Trade Organisation (WTO).

Lall (2013) further argues that the neoliberal approach has some strong theoretical premises that markets are efficient, the institutions needed to make markets work exist and are effective, and if there are deviations from optimality they cannot be remedied by governments. These premises are based on theoretical, empirical, and political assumptions that tend to rely heavily on restrictive view of technological competitiveness, experience of most successful industrialising economies, and the view that governments are necessarily and universally less efficient than markets, respectively.

On the other hand, the structuralists' view puts less faith in free markets as the driver of dynamic competitiveness and more in the ability of government to mount interventions effectively. The theoretical and empirical bases for the argument that untrammelled market forces account for the industrial success of the East Asian Tigers or the earlier industrialization of the rich countries have been heavily criticized by this approach. While accepting the mistakes of the past industrialisation strategies and the need for greater openness, it argues that greater reliance on markets does not pre-empt a proactive role for government. This underscores the fact that markets are powerful forces, but they are not perfect; the institutions needed to make them work efficiently are often weak or absent. Government interventions are therefore needed to improve market outcomes. This means that as developing economies change and pass-through distinct stages of industrialisation the kinds of industrial policy needed along the continuum differ. However, such changes do not eliminate the need for intervention but aggravate it. Industrial policy in this sense is constrained and thus requires utmost reconsideration and redesigning of the appropriate strategies for achieving growth convergence.

The structuralists also accept the fact that some industrialisation policies have not worked well in the past. To the neoliberals, this could account for the denial of any role for proactive policy both in the past success and in future strategy citing that the costs associated with market failures are lesser than those linked

to government failures. On the other hand, the structuralists see a vital role for policy in industrial success. They argue that past policy failure is not a reason for passive reliance on deficient markets but for improving government capabilities. In addition, they noted that poor countries who have implemented neoliberal policies recently have not experienced the industrial growth or export success that characterized more interventionist economies. To them, continuing with passive liberalization in the present-day world will worsen rather than reverse divergence.

Both neoliberals and structuralists underscore the need for industrial policy not only in developing countries but also in developed countries (Rodrik, 2004 and Wade, 2012). Rodrik (2004) for instance, links such need to two key market failures that weaken the entrepreneurial drive to restructure and diversify especially developing countries. One has to do with information spill overs that are involved in discovering the cost structure of an economy. The other has to do with the coordination of investment activities with scale economies. Rodrik (2004) also emphasizes that the public sector is not omniscient and industrial policy is open to corruption and rent seeking. Thus, policy setting that seeks to promote convergence must be embedded within the network of linkages between the private and public sectors with equally reasonable amount of autonomy for private and public sector interests. However, there is a critical challenge of finding the intermediate position between full autonomy and full embeddedness. Where there is too much autonomy for bureaucrats, it generates a system that minimizes corruption but fails to provide the incentives that the private sector really needs. Similarly, too much embeddedness for the bureaucrats makes them end up in bed with business interests. Hence getting this balance right is important in reducing the need to worry about the appropriate policy choice.

On the other hand Chang and Andreoni (2016) expand the theory of industrial policy by underscoring the relevance of recent changes in economic reality such as the rise of global value chain, financialization and the new imperialism. First, while they recognise the fact that for most countries the globalisation of production has not resulted in greater capital accumulation, domestic value creation and international value capture, among neoliberal scholars, under such a mantra, ‘you need to import if you want to export’, Global Value Chains (GVCs) have been used to re-emphasise the benefits of international trade and, thus, the

need for more trade liberalisation. Surprisingly, the majority of the Developmentalist scholars have also highlighted the opportunity offered to developing countries by the GVC-based industrialisation model to overcome the highly uncertain and capital-demanding task of developing entirely new sectors. GVCs open the opportunities for accessing regional and global markets, while diversifying and upgrading in specific tasks and new products. Notably, Chang and Andreoni maintain that countries can benefit from GVCs-industrialisation model where they meet certain capabilities such as the institutional monopoly requirements (creation of entry barriers, squeezing supply chains), and reliable backward and forward linkages in the industrial systems as well as the creation or deployment of underlying technologies. To Chang and Andreoni meeting all the mentioned conditions or capabilities requires some sort of intervention just as increasing financialization and imperialists tendencies had necessitated interventionist policies in developing countries and even in the developed countries where or when they themselves are faced with similar problems or challenges to those of developing countries.

While mainstream economists, structuralists and policy makers tend to agree on the increasing relevance of industrial policy, what constitutes an appropriate state's role and even that of the market in industrial diversification and upgrading is not clear and this could mean there still exists opportunities for mischief on the policy front regarding whether to maximize or minimise government interventions in the economy. Stiglitz, Lin, and Monga (2013) argue that industrial policy has raised so much controversy and confusion and is now the compelling new rationale that seems to have brought mainstream economists to acknowledge the crucial importance of industrial policy and revisited some of the fundamental assumptions of economic theory and development.

More precisely, the capacity of governments to accelerate development by raising investment and promoting some economic activities ahead of others become a variable and not a constant. Reinhart and Rogoff (2010) study economic growth and inflation at distinct levels of government and external debt. They thus used government debt as a variable to capture government capacity to accelerate growth and then claimed that when the size of government debt (as a proportion of GDP) is over 90% (much higher than the 60% of the European integration's

Maasticht Treaty and still lower than that of many countries), economic growth falls. The results showed that rich countries whose public debt exceeded that percentage experienced a sharp decline in growth rate for the period 1946-2009. Though the findings added some strength to the advocates of the smaller state the authors were quick to point that their work was based purely on empirical data and had no underlying theory of government[2]. The World Bank (2013) in its report emphasizes that the state has a crucial role in the financial sector in terms of providing strong prudential supervision, ensure healthy competition and enhance financial infrastructure. In terms of direct state intervention via ownership of banks the World Bank presents new evidence that state involvement can help mitigate the adverse effects of crises. However, it cautioned that over longer periods direct state intervention can have important negative effects on the financial sector and the economy. Mazzucato (2018) further clarifies how government spending could also be used as a variable and explain how the IMF and EU magic number or cap have been used to urge member countries to downsize the state by cutting government spending. In the EU, if government spending goes above three percent, then bailouts are jeopardized. Evidence, however, have shown that austerity did not work as expected. For instance, though Greece received huge sums in bailout aid in exchange for cutting state expenditure, its economic problems worsened as growth went into deep depression. Germany and Italy both have maintained lower budget deficits but the debt to GDP ratios in these countries have been far above the 60% ceiling. Hence, it can be deduced here that inadequate investments in areas to raise GDP and prolonged squeeze on government spending could be responsible for the weakened demand in the Italian economy as well as the reduced incentive to invest (Mazzucato, 2018)[3].

[2] Herndon, Ash, and Pollin (2010) uncover a few computational and data consistency errors in Reinhart and Roggoff (2010).

[3] Mazzucato further explained that recent research into the impact of government size on economic growth has found unanimously that small government is “bad” if for example it cannot even maintain basic infrastructure, rule of law such as funding of the police and the educational needs of the population. Conversely, the same research concludes that bigger government might be “bad” if it is a result of activity that “crowds out” the private sector or interferes too much in people’s lives. Thus, the ideal size of government is hard to quantify which might depend heavily on what you want the government to do and how you value its activity.

It further implies that the consensus amongst mainstream economists which has become the standard recipe of the multilateral lending agencies, notably the International Monetary Fund (IMF) and the World Bank would need rethinking particularly in the context of resource-dependent economies. Thus, this study generally seeks to try to minimise the debate by attempting to provide empirical evidence on the role of state and liberal interventions in economic diversification. Particularly, the chapter sets out to achieve these specific objectives:

(i) To ascertain the impact of state and liberal interventions in resource-rich developing economies on economic diversification.

(ii) To estimate the interaction effects between regulation and other interventionist tools on economic diversification in resource-rich developing countries.

(iii) To draw some lessons from the findings in (i) and (ii) above.

It thus suffices to ask these specific questions in the context of resource-rich developing countries:

(i) How does state intervention and liberalisation affect economic diversification in resource-rich developing countries (RRDCs)?

(ii) Does government regulation improve the impact of fiscal and liberal tools on economic diversification in resource-rich developing countries (RRDCs)?

(iii) What lesson (s) can we infer from the findings above?

We would seek to provide answers by using sample of resource-rich developing countries. Emphasis would be on these economies to aid the analysis of state intervention and liberalisation in the context of resource-abundance of countries and the strategies being used to achieve economic diversification (in terms of increased value-added in the non-resource sector). Hence, focusing on them would help draw useful policy implications for the convergence of resource-rich developing countries with their developed counterparts. Moreover, it has also been argued that the most successfully industrialised countries at one time or the

other adopted significant state interventions in driving diversification in their initial stages of development and that some still do in a variety of ways that some today's developing economies do[4].

Section two undertakes a careful review of the literature by giving the theoretical and empirical perspectives follow by the empirical strategy in section three. Section four presents and discusses the results while section five concludes by highlighting the salient takeaways and implications of the findings.

3.2. Related Literature

3.2.1. Concepts of State intervention, Liberalisation and Economic Diversification

The concept of state intervention is broad and thus there is no specific theory that explains it and its effect on the economy but there exist various propositions and evidence. Carlos Bresser-Pereira (1993) hypothesize that state intervention expands and contracts cyclically, and that, in each new cycle the mode of state intervention changes. For a while, state intervention increases, the state assumes an increasing role in the coordination of the economic system, in the micro-allocation of resources, in the macro- definition of the level of savings and investments (or of the equilibrium between aggregate demand and supply), and in the micro-macro determination of income distribution among social classes and among sectors of the economy. It increases because it is being successful, because the state is performing a role that the market is unable or inefficient in performing. It is increasing because it responds in an effective way to the demands of society. Carlos Bresser-Pereira further argue that as state intervention increases, however, be it in terms of its share in GDP, or in terms of the degree

[4] Reinert (2005) in (Paula and Dymski, 2005) provides explanations why growth and development are uneven among nations of the world using an approach to economic theory called "the other canon"- which is a critique of the standard economic theory. Amsden (2001) in her book "the rise of the rest: challenges to the west from late-industrialising economies" shows how a dozen non-western countries with pre-World War II manufacturing experience succeeded in entering the orbit of modern industry. The late-industrialising nations follow paths that served to reduce government failure and firm mismanagement and promoted "getting the control mechanisms right" recommendations which differed from Adam Smith's "invisible hands".

of regulation the economy is submitted to, intervention starts to become dysfunctional. The two basic symptoms indicating that the expansion of the state went too far are excess regulation, which hinders rather than stimulates economic activity, huge public deficits that crowd out private investments, and negative public savings that reduce total savings. This is the moment when the cycle reverts or is supposed to revert, when state control contracts and market control expands. It is the time for some de-regulation and denationalization.

The hypothesis of the cyclical nature of state intervention conflicts both with the static theories, which assume a given level of state intervention as ideal, and with the historical theories that claim a long-term tendency toward the state-oriented economy. For the neoliberals, the ideal level of state intervention is exceptionally low, for the statists, extremely high, and for the pragmatists, intermediary. However, Carlos Bresser-Pereira maintains that all these three positions are unacceptable if they assume a given relation between market and state control as ideal or optimum. Instead, the hypothesis is that this ideal relation will necessarily vary historically and according to a cyclical pattern of state intervention. Thus, rather than falling into an endless discussion about a doubtful optimum, we can propose that there is a cyclical and ever-changing pattern of state intervention. This assumption reduces the ideological content of the debate on the economic intervention of the state and thereby emphasize the resultant impact of such changes on the economy.

State intervention assumes many forms. It is possible to distinguish four of them: (1) macroeconomic regulation, (2) normative microeconomic regulation, (3) administrative or case by case microeconomic intervention, and (4) nationalizations or direct investment in state-owned enterprises. The intensity of these interventions will vary according to the moment and the situation. It is possible to define the theoretical limit for each type of intervention. The limit of macro regulation is centralized planning; normative micro regulation may limit itself to some health and safety regulations for the production and distribution or to extend itself to all types of economic activities. Administrative micro regulation - specific, case by case state intervention, whose application depends on the decision of a given public official or of a government committee - may also be very extensive or extremely limited. In the first case, it will happen at the

expenses of normative micro regulation that is based on stable rules or regulations instead of being achieved in a case-by-case basis. Finally, the limit of nationalizations and direct investment by the state is the abolition of the private ownership of the means of production (Carlos Bresser-Pereira, 1993).

State intervention will also vary according to the type of relation that the state establishes with business and the economy. This can be restraining, supportive, or neutral. Taxation and the regulation of health, safety and the environment are typically restraining. Subsidies and tax exemptions are the classical examples of supportive state intervention. Macroeconomic policy can eventually be neutral, although we know very well that distributive neutrality in state intervention is almost impossible. The intensity of state intervention is thus exceedingly difficult to measure. The simplest way is to measure the share of state expenditures in the GDP, but this does not take the state-owned enterprises into account. An entirely different and relevant form of measuring state intervention is by the degree of regulation, but there is no established quantitative technique for measuring the intensity of state regulation. This paper uses a loose combination of both criteria based on the empirical literature.

Farooki and Kaplinsky (2014) examines the scope of economic diversification available to resource-rich developing countries using Hirschman's theory on linkages[5]. In this sense, the state could intervene using policies to promote fiscal, consumption and production linkages between the commodities and industrial sectors. Hirschman was sceptical of the capacity of governments to generate industrial development using fiscal linkages. He argued that the problem with fiscal linkages is that they did not provide any guidance on which sectors the commodity rents should be used to develop the "ability to tax the enclave which

[5]Hirschman (1958) proposed three major types of linkages from the commodities sector to the industrial sector while analysing industrial growth in Canada and the United States. The first is fiscal linkages, the resource rents which the government can harvest from the commodities sectors in the form of corporate taxes, royalties and taxes on the incomes of employees. These rents can be used to promote industrial development in sectors unrelated to commodities. The second major category is consumption linkages, that is, the demand for the output of other sectors arising from the incomes earned in the commodities sector. The third form is production linkages, both forward (processing commodities) and backward (producing inputs into the commodities sector) from the resource sector.

is hardly a sufficient condition for vigorous economic growth." On the other hand, Hirschman was a little less sceptical of the impact of consumption linkages in promoting industrial development. He recognised that the demand generated by employees in the commodities sector had the potential to provide a major spur to industrial production as workers and capitalists spent their incomes earned in the resource sector. But since most resource-rich developing economies had poorly developed manufacturing sectors, he recognised that consumption linkages would occur abroad as the needs of domestic consumers would be met through imports especially where average tariff levels continue to decline. In addition, Hirschman believed that the most viable link between the commodities and industrial sectors would be via production linkages, particularly backward linkages. He argued that unlike fiscal linkages where no guidance was provided for sectoral development, production linkages laid out a path for industrial diversification. Hirschman saw production linkages as providing exciting potential for industrial development in previously enclave commodity-dependent economies and believed that the degree of these linkages would be affected by two factors. The first was scale, reflecting the size of demand from the commodities sector in relation to the minimum effective scale of production in backward linkages supplier firms and of output for forward linkage user firms. The second was "technological strangeness," that is how similar the technology and processes were between the core resource sector and those in supplier and user firms. Here he argued that production linkages were generally "less strange" to the commodity sector than the transfer of resources via fiscal linkages to unrelated sectors. Thus, through its policies on tariff and technology the state could promote linkages and industrialisation in the domestic economy.

As noted earlier the state's direct intervention in the form of government investment is key. The state could appropriate resource revenues to stimulate capital accumulation and consequently economic diversification. This is sometimes referred to as public investment. Toigo and Woods (2006) argue that though public investment is not the only form of government intervention it is important in determining growth, clear and tractable. State intervention through this means often shapes decisions about the right infrastructure, where people live and work, and the location and nature of private investments thereby affecting the growth of different economic sectors. In general, the state could

intervene in an economy as a promoter, regulator, owner, or an overseer (World Bank, 2013). Hence, the purpose of this study is to test the proposition that state interventionist policies (through investment and regulation) could induce economic diversification in RRDCs.

Liberalisation on the other hand explains how the government can choose to temper minimally with the economy by allowing market forces to direct investment and consequently output expansion. The Bretton Wood institutions have been the champions of liberal policies for decades whereby economies are encouraged to open their economies by liberalising their financial systems and trade. The literature recognises a few indicators of liberal policies such as trade openness and financial development amongst others (Agosin, Alvarez, and Bravo-Ortega, 2012; Giri; Greenaway, Morgan, and Wright, 2002; Singh, 1997; Winters, 2004).

With respect to economic diversification to Lashitew, Ross, and Werker (2020) there are three approaches to define economic diversification: variety-based, quality based and output-based. The variety-based approach measures the diversity of economic activities regardless of their quality which is closer to the literal meaning of diversification (Bahar and Santos, 2018). Quality-based measures of diversification are related to the concept of structural transformation and consider the shift of production toward economic activities that offer greater value addition and or competitive advantage (McMillan, Rodrik, and Verduzco-Gallo, 2014). Output-based measures consider the changes in non-resource economic production regardless of its composition. Variety-based and quality-based measures of diversification have some theoretical appeal but require large and disaggregated datasets that are often not available or of inadequate quality (Ahmadov, 2014). In addition, variety-based measures have the additional limitation of being influenced by exogenous changes. For example, export concentration could appear to improve when resource exports decline either due to resource depletion or price fall.

Lashitew, Ross and Werker (2020) further argued that despite its simplicity, output-based measure of non-resource economic activity has not been utilized to measure economic diversification in resource-rich countries. This is an important

omission given the measurement challenge and data quality limitations of the other diversification measures as well as some further advantages of output-based measures. This study attempts to fill in this gap by using the growth of manufacturing and services sectors, measured according to their domestic performance. This is in line with a large body of research that expounds the importance of these sectors for employment creation, structural change, and technological convergence (Rodrik, 2013 and Eichengreen and Gupta, 2011). Notably, measurement problems are not absent with output-based measures of diversification either. These sectors include activities that are highly resource intensive. For example, manufacturing includes ISIC division 23, which includes the manufacture of coke and refined petroleum products, and division 24, which consists of the manufacture of chemicals and chemical products. Services include the public sector, which may be financed with resource revenues. Our reliance on these sectors is due to the need to assess diversification performance across countries. Cross-country data on domestic value added in the non-resource sector is not available at a finer level of detail. Nonetheless, the use of value added rather than gross output provides a measure of diversification that is consistent with its theoretical meaning since it only captures the economic value added through refining and other processing activities (Lashitew, Ross and Werker, 2020).

3.2.2. Contextualizing Industrial Policy: Role of the State and Factor Endowments

Lin (2012) push the idea of New Structural Economics (NSE) by drawing on his knowledge of East Asian industrialization and theories about stages of growth. Lin's idea on the appropriate industrial policy is built on the premise that 'development' is not only about higher levels of income and consumption as viewed by the World Bank but also about changes in production structure. Thus, Lin's argument posits that governments can usefully push firms to diversify and upgrade their production – with the caveat that government efforts should remain within the economy's existing comparative advantage (Lin & Chang, 2009). In Lin's NSE, the starting point is an economy's endowments which constitute capital, labour, and natural resources – assumed to be given at any point in time but changeable over time. Factor endowments for countries at preliminary stages of development are typically characterized by a relative scarcity of capital and

relative abundance of labour and/or natural resources. Being given, endowments do not arise as the result of historical trajectories and do not need situating within a broader context of international and domestic political, financial, and commercial realities. The analysis suggests that these given endowments imply a particular comparative advantage for diverse types of production activities. Developing industry following this comparative advantage provides the optimal path for a country. It produces the largest economic surplus and fastest capital accumulation. Capital accumulation implies the upgrading of the factor endowment structure and leads to changes in industrial structure, in line with a new or 'latent' comparative advantage (Fine and Waeyenberge, 2013).

Lin's framework further implies that for a country's comparative advantage to be revealed to the private sector, the main agent in industrial upgrading requires that relative factor prices must fully reflect scarcities. This necessitates 'effective' competition in factor markets. The role of government is to play an active, 'facilitating' role in assisting the private sector in structuring productive activity according to comparative advantage by coordinating investments for industrial upgrading and diversification and by compensating for externalities generated by first movers in the growth process. This is in addition to the government's more traditional infrastructure-improving role. The framework proposed by Lin is then three-pronged: it is centrally organized around the concept of comparative advantage; it relies on the market as optimal resource allocation mechanism; and it charts a role for a 'facilitating' state in the process of industrial upgrading (Lin, 2012).

Lin's explanation for the strategic government intervention process in the economy's existing comparative advantage has been criticized. Fine and Waeyenberge (2013) were quick to argue that a closer scrutiny of the NSE would reveal the flawed nature of its core theoretical notion of comparative advantage and expose its strong and unfortunately conservative commitment to a flawed and incoherently applied neoclassical economics, accompanied by a persistently narrow policy scope. This was partly due to the weak assumptions based on factor endowments with diminishing returns and a limited role for government intervention (facilitating in nature). Nonetheless, Lin's framework was greeted with some enthusiasm by the critics of the World Bank Washington Consensus.

Reinert in (Paula and Dymski, 2005) however, argues that a broader understanding of growth requires an understanding of the phenomenon in ways suggested by the Other Canon approach to economic theory. This approach to theory emphasized amongst others diversity rather than equality. Emphasis here is also on the structural understanding of development by stressing synergies or linkages between economic activities. Here, we attempt to isolate the effects of state interventionist and liberal policies with a view to determining their right synergy or policy mix required for the convergence of resource-rich developing countries.

Development experts now agree that development strategies need to be contextualised according to the specific conditions of the countries facing such developmental challenges as economic diversification. For instance Perez (2015) analyses the factors changing the context and conditions around natural resources (NR) endowments to include price trends, the new nature of markets, technological dynamism (and the potential for innovation brought about by information and communication technology (ICT) and market segmentation) and the new globalized economy[6]. First, price trends of natural resources have the tendency to favour resource-rich countries as the consumer behaviour of the previous age and the push towards full global development have led to a fast-growing demand for materials, energy, and food in the emerging countries, which has increased the overall demand for natural resources. This has been leading to the exhaustion of the most easily accessible sources and pushing marginal costs up. Thus, the impact of climate change will intensify that effect. This means that, without losing their customary volatility, raw materials prices are likely to oscillate at much higher average levels (Farooki and Kaplinsky, 2013). This makes them both valuable advantage and an obstacle. Thus, while they can be used as a source of funding for the 'technologization' of natural resources (that is improving or modernizing exploitation and processing) and consequently economic diversification they can also be lost in corruption (Perez, 2015).

Second, the new hyper-segmented nature of all markets has also changed in terms of its volume and impact on supply and prices. There is now a market hyper-segmentation of all products and activities into a wide and varying range, spanning

[6] Perez (2015) analysed the specificity of the factors in relation to Latin America's ability to respond to them.

from high-volume, low-price, and commodities to an array of low-volume, high-price, and niche products. This fracturing of the market applies as much to manufactures as to services and primary sector products and it also affects each activity along the value chain. So, starting from the raw materials, it is possible, with innovation, to move up to higher value products or move along to more adaptable products that can be custom-made for specific clients, increasing both the value and stability of prices. The natural resource markets, although still primarily based on commodities, are thus seeing an increasing proportion of specialized materials and premium produce for the high-end niche markets. From organic to gourmet, through various dietary products, the food market is segmenting into many specialized niches. The same is happening in the materials sector, where customized alloys, green chemistry, nanomaterials, and other products adapted to demand requirements and specifications are proliferating and reaping high rewards. Meanwhile, the realm of tangible products has also experienced a hyper-segmentation. On the one hand there are the high-end niche products (which often require special materials) but on the other, we have witnessed the commoditization of most standard assembled products with very narrow profit margins. This means there still exists some opportunities in natural resource-related production (Perez, 2015).

In addition, Perez further emphasizes that ample pathways to information and global markets through information and communication technology (ICT) means innovation is now much more accessible to newcomers. ICT makes information more easily available, facilitates design, and enables entry into the hyper-segmented product and service markets. Hence, techno- logical dynamism in all sectors, including NR, is higher than ever before, spurred by differentiation in demand and increasingly shaped by environmental and health concerns. In the NR sector, the focus used to be on processes to lower the cost of homogenous products and to overcome local limits, whereas today we see innovation to be increasingly geared to special materials and food products. ICT has also enabled the new transport and distribution systems that make it easier for small and medium companies to access markets independently. This new context has led to the development of a much greater variety of distribution outlets (from the narrowly specialized to the hyper-markets), and the concomitant transport systems,

allowing producers of different quantities and qualities to trade globally and on affordable terms.

A shift in behaviour from the old multinational corporation (MNC) to the global corporation (GC) is another area in which the context has changed in the use of natural resources (Perez, 2015). Since the 1980s, the behaviour of MNCs (multinational corporation) has been changing, as they morph from isolated affiliates acting as foreign enclaves in each country into fully globalized, strongly interacting value networks. Such global corporations (GCs) are not only concerned with finding competent and reliable suppliers and partners, but they now have a financial interest in engaging in training and the proper transfer of technology to ensure quality across the whole structure[7].

Given how the context has changed for natural resource producers, it is imperative to revisit the potential for "getting the control mechanisms right" via intervention policies and how these policies could enhance diversification in RRDCs. This is particularly interesting as the "getting the prices right" - market control recipe of the West is being dislodged by East-West competition for access to resources. This creates conditions for stronger negotiating positions for the producer nations, reinforced by the much greater access to information through ICT. Hence, this has further raised the interest from policy makers in making commodities work for overall development in resource-rich countries.

3.2.3. Related Empirical Evidence on the Role of the State in Economic Diversification

Several empirical studies have attempted to quantify the effect of government intervention on economic growth, with most of these studies using government spending as a proxy for intervention. Some of these studies focus only on government consumption. Most of the studies use either cross-country or panel data, although a small number do use time-series data (Knowles and Garces (2000).

[7]Ernst and Kim (2002) and Urzua (2012) capture these propositions while (Gereffi, Humphrey, and Sturgeon, 2005) presents the problems and benefits associated with GCs that were not available in import substitution industrialisation model.

Studies relying solely on government consumption as a proxy for the size of government include Ram (1986) and Alexander (1994) (which find a positive correlation between government consumption and growth), Alexander (1990) (which finds a negative correlation) and Kormendi and Meguire (1985) and Evans (1997) (which find no significant correlation). The two papers by Alexander use panel data for a sample of OECD countries, Evans uses time-series data for 92 countries, whereas the other studies use cross-country data.

There are other studies that go beyond the use of the traditional measure of government consumption. Some disaggregate government spending into different components, the others include taxation in the analysis. As argued by Kneller, Bleaney, and Gemmell (1999), to exclude taxation means ignoring the potential distortions caused by financing government spending. Easterly and Rebelo (1993) include a variety of different measures of government spending and taxation in Barro-style regressions, using cross-country data, and find that only government investment in transport and communications is (positively) correlated with growth.

Kneller, Bleaney and Gemmell (1999) examine the effect of both government expenditure and taxation on economic growth using panel data for 22 OECD countries. They disaggregate expenditure into 'productive' expenditure (expenditure with a substantial physical or human capital component) and 'unproductive' expenditure (the main item of which is social security spending). Productive expenditure is significant and positively correlated with growth (although it is insignificant when estimated using instrumental variables), whereas non-productive expenditures are insignificant. Distortionary taxation, defined as taxation which affects investment decisions, is significant and negatively correlated with growth. Fölster and Henrekson (2001) examine the effect of government expenditure and taxation (but do not include both in the same estimating equation) on economic growth using panel data for a group of high-income countries and find both variables to be significantly negatively correlated with growth. Their measure of government expenditure includes government consumption, government investment and transfer payments.

Barro (1991) argues that expenditures on education and defence are more like public investment than public consumption; in particular, these expenditures are

likely to affect private sector productivity or property rights, which matter for private investment. It is a common finding in Barro's work that there is a negative partial correlation between government consumption and economic growth across countries. Barro (1991) also includes public investment as a proportion of GDP as an explanatory variable but finds it to be insignificant. However, studies such as Aschauer (1994) Toigo and Woods (2006) and Bivens (2012) found that state intervention via public investment could serve as a vehicle for economic growth.

The existing literature relies heavily on various measures of government spending and taxation as proxies for intervention. However, there is little work focusing on the effect of other types of intervention on especially economic diversification. Moreso, Knowles and Garces further show that government spending is a poor proxy for government intervention more generally as in many economies around the world, government intervention is high (as found in the East Asian economies), even though government spending is low. Given the difficulty of quantifying other aspects of government intervention they used data from Economic Freedom of the World which attempts to capture the degree of government ownership of industry (GOE) and the extent of price controls (PRICE) to provide evidence on the role of state intervention on output per worker. Their result on government consumption confirms the earlier findings by Barro that there is negative correlation between government consumption and economic performance, but it further shows that such finding does not apply to the East Asian economies implying that other aspects of government intervention need to be captured. Though GOE and PRICE in their study correlated with lower level of output they maintained that such findings should not be used to infer anything about the effect of other forms of government intervention – such as regulation.

There are variety of evidence on the impact of regulation on the economy as there are different regulatory policies and contents (Parker and Kirkpatrick, 2012). Focus here is on regulatory policy and governance in general and the effects on the economy. Summarily, several studies of regulatory policy and governance have been published (OECD, 2011). The studies use various proxies for regulatory governance and cover a range of regulatory policies and economic effects. In general, the studies suggest that there is evidence of a statistically significant and positive relationship between regulatory policy and governance and economic

growth while regulatory governance and the institutional framework in a country can mitigate the damaging impacts of regulatory policies (for example, product and labour market regulation) on economic growth.

In the context of Natural Resources (NR) the literature's focus has been on the relationship between NR and economic development which dates to at least the 14th century. Indeed, long before the 'modern' resource curse thesis[8], cognitive explanations for the resource curse, based on the idea that resource booms or 'easy wealth' produce a type of short-sighted euphoria among policy makers were well known. Particularly, theoretical debates on the role of natural resource abundance and development have been marked by both resource optimism and pessimism, with one or the other being in the ascendant at any time, but neither being dominant across time (Lahn and Stevens, 2018). Moreso in the past decades, a plethora of econometric and statistical studies aimed to contribute to this debate by attempting to find a correlation between natural resource abundance and economic development. Some have found a positive correlation, some have found a negative one, while others did not find any clear-cut statistical correlation[9].

Considering the mixed evidence, and the inability of econometric studies to determine a clear correlation between resource abundance and growth, there has been a growing awareness that natural resources are neither a curse nor blessing, but that their contribution to development depends on what states make of them. If there is nothing inherently inevitable that predetermine natural resources as a curse for development, we must move beyond resource determinism and instead attempt to understand the ways in which natural resources can be harnessed for development by the state. While the recent literature has moved towards a recognition of state policy action in making the most of commodities and other endowments[10], there are still important disagreements regarding the scope of

[8] Refer to works of Ross (1999); Sachs and Warner (1995, 1997, 2001).
[9] Refer to Bravo-Ortega and De Gregorio (2007); Brunnschweiler and Bulte, 2008); Davis (1995); Findlay and Lundahl (1999); Pineda and Rodríguez (2010); Gylfason (2001); Neumayer (2004); Sachs and Warner (1995, 1997); Bond and Fajgenbaum (2014); James (2015).
[10] See Addison and Roe (2018); Chang (2007); Collier, ed, Francois, Jacquet, and Pleskovic (2004); Humphreys, Sachs, and Stiglitz (2007); Lederman et al. (2010).

state interventions via its ownership of natural resources and the resulting impact on the economy. This research contributes to this debate by also analysing the mechanisms of state policies in natural-resources-dependent countries and how they but could facilitate diversification towards the non-resource sector to achieving structural transformation.

Focusing on diversification is justified for some reasons. Diversification enables a resource-dependent country to reduce its exposure to commodity price volatility and other economic shocks such as the recent global coronavirus pandemic. Beyond such concern, diversification may have an even more significant role to play as a part of economic development. Diversification can be understood not as a goal, but a means to leap into the frontline of the development race (Benavente, 2016). Some scholars have indeed argued that countries get richer not by producing more of the same goods but by learning how to produce a more diverse range of technologically dynamic and sophisticated goods and services (Chang, 2007).

However, the empirical evidence on isolating the effects of state intervention and liberal policies on economic diversification is missing in the literature. This study seeks to fill this gap and consequently contribute to the debate on whether the government as a major agent in an economy is unproductive or it is otherwise – especially in the context of liberalised resource-rich developing countries.

3.3. Empirical Strategy

3.3.1. Introduction

In this section, the variables used are identified and explained, the data and sampled are described and the model as well as method of estimation are specified and justified. With respect to the methods of analysis, descriptive statistics are first used to explain the patterns among the variables. This is followed by panel fixed effects estimation to ascertain the impact of state and liberal interventions on economic diversification.

3.3.2. Variables, Data and Sample

The definitions of the variables in our models and their sources of data are highlighted here. Economic diversification in the context of RRDCs is defined by the set of measures of non-resource sector performance – the ratio of services value added to manufacturing value added as defined by Amiri, Samadian, Yahoo, and Jamali (2019) and Lashitew, Ross, and Werker (2020). This is in line with the literature that highlights the relevance of manufacturing and services as highlighted in the literature (Eichengreen and Gupta, 2011; Rodrik, 2013). The data for these measures of diversification are sourced from the World Bank's World Development Indicator (WDI) database. The value added in the non-resource sectors are measured as a ratio of GDP thereby yielding the index for diversification expressed as below:

$$DIV_{it} = \frac{SVA_{it}}{MVA_{it}} \quad (3),$$

where DIV is economic diversification, SVA is services value-added and MVA is manufacturing value-added – all in country, i at time, t.

Notably, an increase in SVA to MVA ratio would denote an increase in services (non-tradable goods value added) relative to manufacturing (tradable goods value added) and vice versa.

The data for the measures of state intervention are sourced from World Bank's WDI database. Tax potential is measured by tax revenue to GDP. Government expenditures on education and health are measured as a percentage of total government expenditure. Thus, tax potential, government expenditures on health and education are considered here as important fiscal intervention tools often used by governments to stimulate the economy. Next to fiscal measures are governments' measures regulation of the economy. The regulation measure of state intervention is a total index of selected Country Policy and Institutional Assessment (growth-enhancing) indicators also sourced from the World Bank WDI (Agosin et al., 2012; Mosley, 2018). These CPIA indicators include business regulatory environment rating, debt policy rating, and efficiency of revenue mobilisation, equity of public resource use, fiscal policy rating and macroeconomic management. Other CPIA indicators used include policy and

institutions for environmental sustainability, property rights and rule-based governance, public sector management, quality of budgetary and fiscal management, quality of public administration as well as transparency, accountability, and corruption in the public sector rating. This index is yet another important measure of state intervention used in the literature (Agosin et al., 2012; Mosley, 2018).

Liberalisation which could be financial (measured by private credit by deposit money banks and interest rate) or trade (measured by openness and tariff) as defined by Hauner et al., (2008). These measures indicate the degree of liberalisation in the financial and trade systems. While the data for private credit is sourced from the World Bank's Global Financial Development database and is measured as a percentage of GDP, data on lending interest rates, openness and tariff are from WDI. Lending interest rate (%) is the bank rate that usually meets the short-term and medium-term financing needs of the private sector. The tariff rate (%) used is the most favoured nation weighted mean for all products as defined by the World Bank. Trade openness on the other hand is measured as merchandise trade in terms of share of GDP that is the sum of merchandise exports and imports divided by the value of GDP (% of GDP).

Amongst the set of controls, GDP per capita (constant 2010 USD), agricultural exports, resources exports (measured as % of merchandise exports) in which resources exports constitute of fuel, ore and metal exports, and net foreign investment inflow which is the total investments inflows less dis-investments by foreign investors divided by GDP have their data sourced from WDI. While GDP per capita is used to control for level of income, agricultural and resource exports are used to account for the dependence on the traditional sector and natural resources. FDI inflows are a good way of controlling for openness of an economy and the role of international financial market development. The measure of institutional quality used is the executive constraint concept of the Polity IV latest database (measured by a seven-category scale) as used in Can and Gozgor (2018) and Henn, Papageorgiou and Spatafora (2015) – this indicator is used because of its relevance is gauging the overall decision-making processes and the constraints on the powers of executives in making decisions. Other controls whose data are from the WDI include investment proxied by gross fixed capital formation

(measured as % of GDP) and used to account for the level of economic activities, real exchange rate (with 2010 as the base year) which is used to account for changes in exchange rates that are vital determinants of manufactures, country size (measured by population, population density, aged dependency ratio and land area) and external balances on goods and services (% of GDP) as a control for trade openness.

Data on the relevant variables are for the period which data is available for most of the RRDCs sampled (1995-2019). These are countries which derive at least 20% of exports or 20% of fiscal revenue from non-renewable natural resources. The classification of resource-rich countries is based on IMF classification (Tiwari et al., 2012). These are as described thus:

Resource-rich developing countries (29) include: Angola, Bolivia, Cameroon, Chad, Democratic Republic of Congo, Rep. of Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Guinea, Guyana, Indonesia, Iraq, Lao PDR, Liberia, Mali, Mauritania, Mongolia, Niger, Nigeria, Papua New Guinea, Sudan, Syrian Arab Republic, Timor-Leste, Turkmenistan, Uzbekistan, Vietnam, Yemen, and Zambia. Common characteristics of these countries include extreme dependence on resource wealth for fiscal revenues, export sales, or both; low saving rates; poor growth performance; and highly volatile resource revenues. Iran is excluded from the list because of the crisis that rocked the country within the period, thus its data might be spurious.

Prospective natural resource - exporting LICs/LMICs (11) in the sample are: Afghanistan, Central African Republic, Ghana, Guatemala, Kyrgyz Republic, Madagascar, Mozambique, São Tomé and Príncipe, Sierra Leone, Tanzania, and Togo.

Upper-middle-income resource-rich economies (14) constitute: Albania, Algeria, Azerbaijan, Botswana, Chile, Ecuador, Iran, Kazakhstan, Libya, Mexico, Peru, Russia, Suriname, and Venezuela.

High-income resource rich countries (8): Bahrain, Brunei Darusalam, Trinidad and Tobago, Saudi Arabia, Oman, United Arab Emirates, Qatar, and Norway.

UN (2019) gives a detailed classification of countries and treats a few upper-middle-income and high-income resource-rich countries as developing economies and economies in transition. In the classification only Norway is treated as a developed economy hence we exclude it and Russia (for the industrial progress made in the country) from the sample of countries for this study and treat the rest as RRDCs. Timor Leste is also excluded from the sample due to data anomalies or inconsistencies.

3.3.3. Model and Estimation Technique

Following model estimations of Can and Gozgor (2018) and Henn, Papageorgiou and Spatafora (2015)[11] we develop benchmark regressions (this time however, strikingly different with diversification as a policy target) that would facilitate answering the above research questions. This is in addition to using the competitive capabilities identified in Lashitew, Ross, and Werker (2020) as controls that are considered vital determinants of economic diversification in RRDCs. The empirical models are summarized thus:

$$\mathrm{DIV_{it}} = \alpha_i + \sum_{it=1}^{NT} \beta\, \mathrm{ST_{it}} + \sum_{it=1}^{NT} \gamma \mathrm{LIB_{it}} + \sum_{it=1}^{NT} \sigma \mathrm{CV_{it}} + \mathrm{C_c} + \mathrm{T_t} + \varepsilon_{it} \quad (4)$$

$$\mathrm{DIV_{it}} = \alpha_i' + \sum_{it=1}^{NT} \beta'\, \mathrm{ST_{it}} + \sum_{it=1}^{NT} \gamma' \mathrm{LIB_{it}} + \sum_{it=1}^{NT} \gamma'' \mathrm{FMxREG_{it}} + \sum_{it=1}^{NT} \gamma''' \mathrm{LIBxREG_{it}} + \sum_{it=1}^{NT} \sigma' \mathrm{CV_{it}} + \mathrm{C_c} + \mathrm{T_t} + \varepsilon_{it} \quad (5)$$

Where DIV_{it} is the measure of economic diversification in country i at time t, while ST_{it} represents state intervention (taxation, public investment, and regulation), LIB_{it} is liberalisation (private sector credit by banks, interest rate, openness, and

[11] Can and Gozgor (2018) examined the effects of export product diversification on export quality for a panel of 115 countries while controlling for income, human capital and institutional quality as used by Henn, Papageorgiou and Spatafora (2015). Lashitew, Ross and Werker (2020), on the other hand, identified economic diversification as an important policy target and further highlighted several competitive capabilities as vital determinants of economic diversification. In this empirical strategy, some of the competitive capabilities are used as vital controls based on data availability in the sample of RRDCs. More so, additional controls are used for robust checks as carried out by Can and Gozgor (2018).

tariff) and CV_{it} is the set of control variables. C_c and T_t are the country and time fixed effects terms, and ε_{it} is the disturbance term. i denotes cross section units with i = 1, 2, 3, …N, N is the number of countries and t denotes the time periods, t = 1, 2, 3, …, 25. T is the total number of time periods which is 25 years (1995-2019). $\alpha_i, \alpha_i', \beta, \beta', \gamma, \gamma', \gamma'', \gamma''', \sigma, and\ \sigma'$ are parameters to be estimated.

Notably, the models are based on the econometric assumptions of fixed effects well documented in the econometric literature (Wooldridge, 2010). Bai (2009) maintain that fixed effect estimation is the basic approach to control for unobserved heterogeneity and for all time invariant omitted variables. This is particularly useful under the large N and large T data structure. More so, standard errors were adjusted for clustering to account for heteroskedasticity (Abadie et al., 2017) and the variance inflation factor test was carried out to check for multicollinearity.

Estimating equation (4) would yield the estimates depicting the effects of state intervention and liberalisation on economic diversification ($\beta\ and\ \gamma\ respectively$). In equation (5), we add the interaction term showing the interaction of fiscal measures, FM (tax potentials, government expenditures on health and education) with regulation, REG, and the interaction of liberalisation with regulation thereby yielding the parameter estimates, $\gamma''\ and\ \gamma'''$.

3.4. Results and Discussion

3.4.1. Descriptive Statistics

Table 23 shows the descriptive statistics for the variables used in the study. It depicts the observations, mean, standard deviation, minimum and maximum values in columns 1, 2, 3, 4 and 5 respectively.

Table 23. Descriptive statistics

Variables	(1) Obs	(2) Mean	(3) SD	(4) Min	(5) Max
SVA to MVA ratio	1,231	5.388	6.154	0	150.8
Tax revenue to GDP	531	13.02	5.478	0.0435	30.26
Govt health expend	1,029	7.453	3.691	1.038	31.91
Govt edu expenditure	644	15.50	5.090	4.673	41.40
Regulation	471	32.41	12.33	3.200	47.40
Private credit by banks	1,195	20.00	17.77	0.328	120.8
Interest rate	899	17.11	10.67	3.422	65.42
Openness	1,411	63.34	30.37	7.806	225.4
Tariff	846	9.856	6.263	0.150	87.19
GDP per capita	1,389	6,552	11,396	215.2	69,679
Executive constraint	1,270	3.838	2.008	1	7
Resource exports	1,021	46.84	34.32	0.115	99.67
Resource rent pc	1,186	5.016	12.60	0.111	99.11
Agricultural exports	1,049	4.734	8.468	0.113	98.95
Population	1,341	747,783	3.921e+06	0.126	3.804e+07
Land area	1,367	703,452	694,230	710	2.700e+06
Population density	1,367	75.33	187.2	1.479	2,017
Age dependency ratio	1,449	70.88	21.19	15.74	114.5
GFCF	1,214	23.34	8.057	0.293	59.72
Real exchange rate	547	106.8	46.73	42.90	740.6
Net FDI inflows	1,375	4.766	9.516	-37.15	161.8
Ext balances on G/S	1,249	-1.373	19.43	-161.4	50.68
New Firms	429	1.548	2.384	0.00679	20.09

Source: Author, 2021 – using data from various sources.

Given the minimum and maximum values of the variables in Table 23 there seems to be some variation amongst the observations. For instance, the minimum value of SVA to MVA ratio is zero and the corresponding maximum is 150.8. Services correspond to the International Standard Industrial Classification (ISIC) of all Economic activities divisions 50-99 and manufacturing refers to industries belonging to ISIC divisions 15-37. The ranking of the first ten countries with the highest and lowest SVA to MVA ratio is shown in Appendix III. A common feature of countries in the sample is that they tend to have high distribution of SVA and lower distribution of MVA. Tax revenue to GDP, government expenditure on health, government education expenditure, and regulation have the minimum values of 0.04, 1.03, 4.67 and 3.20 with the corresponding maximum values of

30.26, 31.91, 41.40 and 47.40 respectively. On the other hand, we observe a similar trend for the measures of liberalisation.

However, the mean and standard deviations in columns 2 and 3 show that most of the observations are not far from their respective sample means. The sample mean of SVA to MVA ratio is 5.39 and its standard deviation is 6.15. Other key variables with single digit standard deviations are tax revenue to GDP, government health and education expenditures and tariff. Conversely, regulation, private credit by banks, interest rate and openness all have double digit standard deviations. Similar variations are also observed for the control variables.

Details on the correlations of the key explanatory variables with SVA to MVA ratio are shown in the scatter plots. Figure 9 shows the correlation of fiscal interventions with the index of economic diversification, while figures 10 and 11 show the correlation of liberal tools and resources measures with economic diversification. Figure 12 indicates the country and time heterogeneity of economic diversification in the overall sample.

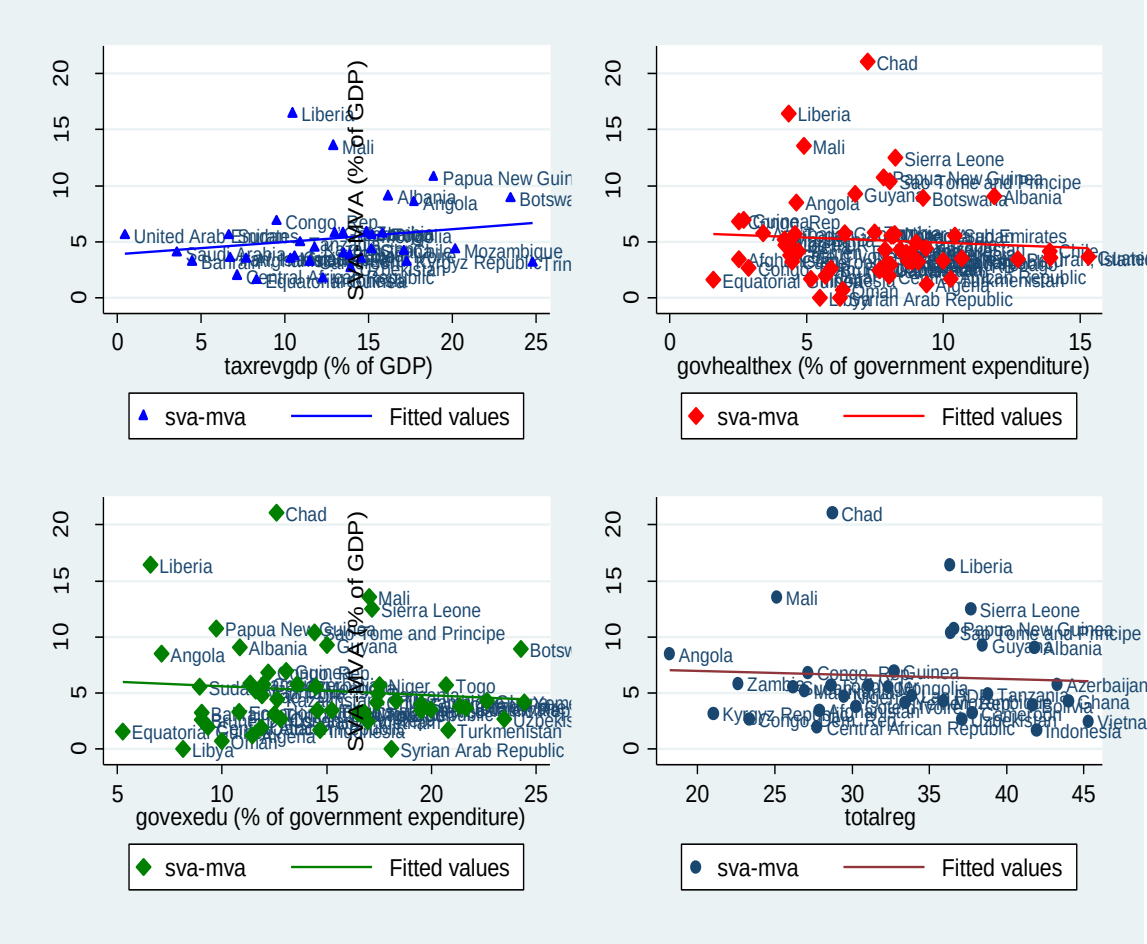


Figure 9. Correlation of state intervention measures with SVA to MVA ratio.

Figure 9 shows the scatter plots in terms of fiscal intervention measures. The scatter plots indicate that only tax revenue to GDP seems to suggest a positive correlation with SVA to MVA ratio, as shown in the first panel by blue triangle hollows and the blue fitted line, while the other fiscal measures suggest a negative correlation. The second panel with red diamonds shows the scatter plot for government health expenditure while the green hollows represent government expenditure on education and the dark circles (with a red fitted line) shows the plot for government regulation. However, it is difficult to infer the direction of correlation since the scatter plots show that most countries in the sample seem to be below the fitted lines with an intercept SVA to MVA ratio of 5% or below. This further confirms the variations observed amongst the observations. The correlation analysis in the next section would thus reveal the degree of correlation between the dependent variable and the independent variables.

Next is the scatter plot in terms of the measures of liberalisation. Figure 10 shows the scatter plot which is also divided into four panels as shown below.

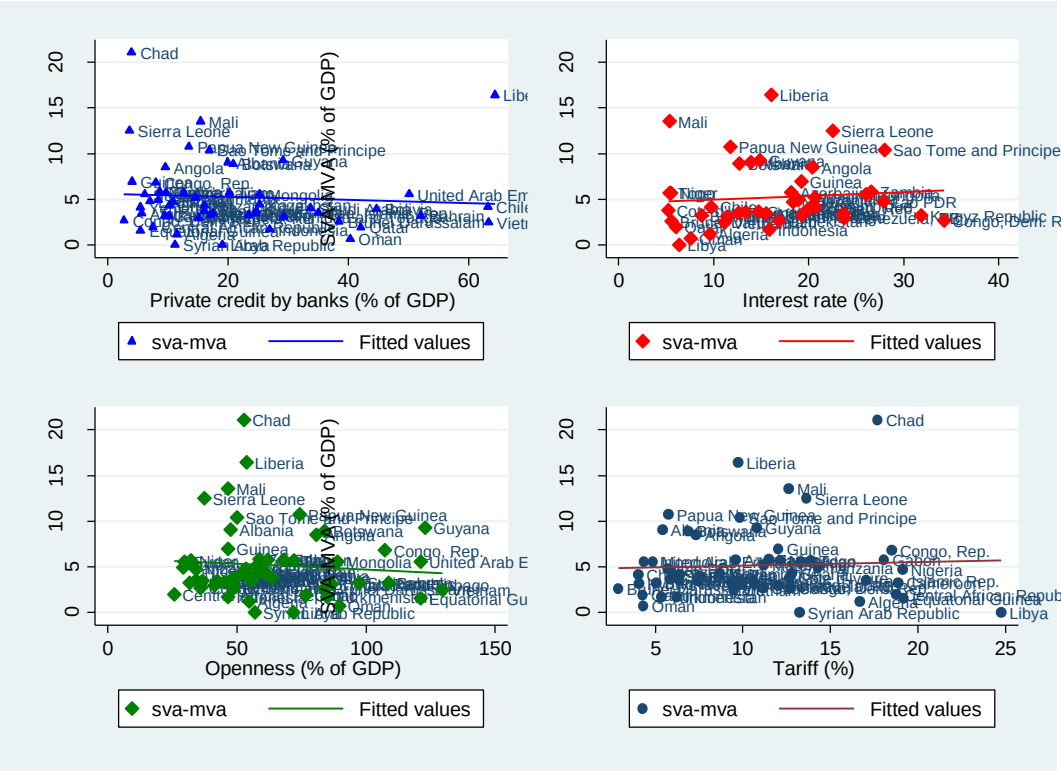


Figure 10. Correlation of liberalisation measures with SVA to MVA ratio.

Private sector credit by banks and openness in figure 10 indicate a positive correlation with SVA to MVA ratio. The correaltion between PSC and SVA to MVA ratio is shown in first panel with blue triangle hollows and fitted line while the second panel with red diamond ones and a fitted line represents the scatter plot showing the correlation between interest rate and SVA to MVA - which suggests a negative correlation. In the third panel, the scatter plot with green diamond hollows and fitted line represents the correlation betwwen opennes and SVA to MVA ratio which indicates a negative correlation too. The last panel however tends to show a positive correlation between tariff and SVA to MVA ratio. The fitted lines are like those in figure 9 implying similar variations and difficulty in infering the direction of correlation with an intercept of about 5%.

In terms of natural resource measures, figure 11 below shows the scatter plot. The first panel represents the correlation in terms of resource exports while the second panel shows the correlation in terms of resource rent per capita.

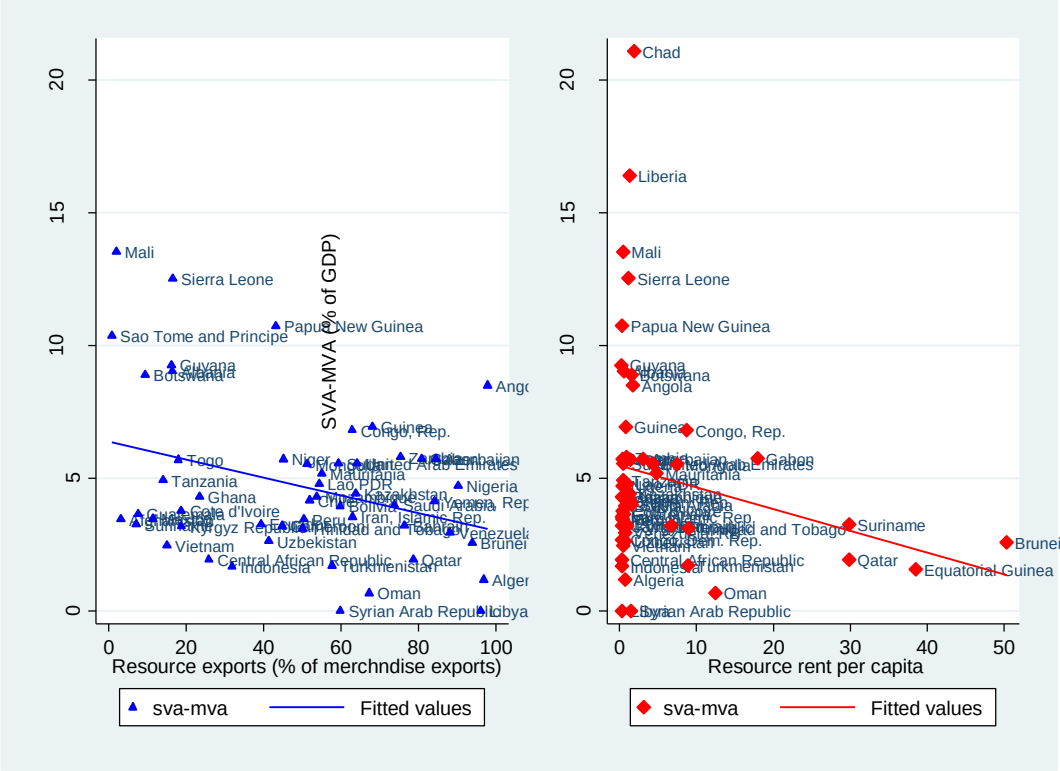


Figure 11. Resources measures with SVA to MVA ratio.

Resources exports and resource rents per capita (measures of dependence on natural resources and resources abundance) indicate a glaring negative correlation with SVA to MVA ratio in figure 11 with the blue triangle hollows representing resource exports and the red diamond ones representing resource rent per capita. The negative correlation means that natural resources are likely useful means of achieving increased manufacturing relative to services value-added. The scatter plots further suggest that while more countries in the sample are increasingly dependent on resources less are becoming resource-abundant. Again, the degree of correlation is reported in the next section to show the magnitude of the correlation between the variables – including other explanatory variables.

The trend in the country and time heterogeneity in the sample. The diamond hollows show the mean SVA to MVA ratio while the circles ones show the observed SVA to MVA ratio in figure 12 below.

Figure 12. Country and year heterogeneity of SVA to MVA ratio.

Figure 12 indicates the heterogeneity across countries and years. Notably, the circle hollows represent the observed SVA to MVA ratio and the corresponding diamond ones stand for the mean index. The figure suggests that there is heterogeneity both across country and years. In the second part of the figure it is observed that unique events in 2005 may have impacted on the mean index for diversification hence it becomes more expedient to control for time effects in the estimation.

To show the degree of correlation between the variables, the correlation matrix between the variables in the benchmark model is summarised. Table 24 and 25 in the next section contain the coefficients.

3.4.2. Correlation Coefficient Result

The correlation coefficients result for the variables of the benchmark model is shown in tables 24 and 25. The correlation matrix is divided into two tables but analysed together for clarity.

Table 24. Correlation Coefficients
Dependent variable : SVAMVA

Variable	SVAMVA	Tax/GDP	Govt HE	Govt EE	Reg	PSC	r	Openn
SVAMVA	1	-	-	-	-	-	-	-
Tax/GDP	-0.163	1	-	-	-	-	-	-
Govt HE	-0.153	0.045	1	-	-	-	-	-
Govt EE	-0.112	-0.156	-0.024	1	-	-	-	-
Reg	-0.156	-0.061	0.144	0.219	1	-	-	-
PSC	-0.136	0.324	0.118	0.094	0.128	1	-	-
r	-0.261	0.233	0.385	-0.653	0.045	-0.018	1	-
Openn	-0.398	0.629	0.079	-0.111	-0.159	0.384	0.159	1
Tariff	0.172	-0.391	-0.308	0.226	-0.039	-0.356	-0.604	-0.437
GDP/C	-0.120	-0.025	-0.038	-0.513	0.141	0.264	0.484	0.161
Ex const	-0.006	0.074	0.404	-0.096	-0.040	0.250	0.418	0.129
Res exp	-0.180	-0.068	-0.064	-0.615	-0.027	-0.060	0.555	0.044
Res r/p	-0.164	0.298	0.341	-0.329	0.166	0.584	0.356	0.454
Agric ex	0.108	-0.248	-0.053	0.418	0.165	0.114	-0.511	-0.221
Netfdii	-0.106	0.385	0.064	-0.049	0.281	0.178	0.374	0.236

Source: Author's Computation using Stata 17, 2022. **Note:** SVAMVA – is the measure of economic diversification measured by the ratio of SVA to MVA, Tax/GDP – is tax potential measured as a ratio of GDP, Govt HE – is government health expenditure, Govt EE – is government education expenditure, Reg – is the measure of government regulation, PSC – is private sector credit, r – is interest rate, Openn – is openness, GDP/C – is GDP per capita, Ex const – is executive constraint, Res exp – is resource exports, Agric ex – is agriculture exports, and Netfdii – is net foreign direct investment.

Table 25. Correlation Coefficients (continued from Table 24)
Dependent variable: SVAMVA

Variable	SVAMVA	Tariff	GDP/C	Ex const	Res exp	Res r/p	Agric ex	Netfdii
SVAMVA	1	-	-	-	-	-	-	-
Tax/GDP	-0.163	-	-	-	-	-	-	-
Govt HE	-0.153	-	-	-	-	-	-	-
Govt EE	-0.112	-	-	-	-	-	-	-
Reg	-0.156	-	-	-	-	-	-	-
PSC	-0.136	-	-	-	-	-	-	-
r	-0.261	-	-	-	-	-	-	-
openn	-0.398	-	-	-	-	-	-	-
Tariff	0.172	1	-	-	-	-	-	-
GDP/C	-0.120	-0.459	1	-	-	-	-	-
Ex const	-0.006	-0.590	0.140	1	-	-	-	-
Res exp	-0.180	-0.224	0.639	-0.029	1	-	-	-
Res r/p	-0.164	-0.477	0.595	0.324	0.154	1	-	-
Agric ex	0.108	0.402	-0.312	-0.114	-0.401	-0.150	1	-
Netfdii	-0.106	-0.325	0.031	0.171	0.114	0.191	-0.212	1

Source: Author's Computation using Stata 17, 2022

Tables 24 reveals there is a negative but low correlation between tax to GDP and SVA to MVA ratio with a correlation coefficient of -0.163. This indicates that increases in SVA to MVA ratio is associated with decreases in tax to GDP as confirmed in the scatter plot in figure nine. The degree of correlation between government health expenditure and SVA to MVA ratio also indicates low negative correlation with the coefficient of -0.153. Other variables such as government education expenditure, regulation, private sector credit, interest rate, and openness also indicate low negative correlation with SVA to MVA ratio with coefficients of -0.112, -0.156, -0.136, -0.261, -0.398 respectively. Only tariff amongst the key variables indicates a low positive correlation with SVA to MVA ratio with a coefficient of 0.172. Amongst the control variables, only agricultural exports indicate a positive and low correlation with SVA to MVA ratio with a coefficient of 0.108. GDP per capita, executive constraints, resource exports, resource rents per capita and net FDI inflows indicate negative and low correlation with SVA to MVA ratio with the coefficients -0.12, -0.006, -0.18, -0.164, and -0.106 respectively.

The correlation between the other explanatory variables shows that there is a low degree of correlation between them as revealed in tables 24 and 25. A few high correlations can though be seen. For instance, the correlation between openness and tax to GDP is 0.629 which is high and positive – though not severe. In addition,

the correlation between interest rate and government education expenditure, resource exports and government education expenditure, and resource exports and GDP per capita are reportedly high (above 0.5) amongst other few that are about 0.5. More so, the presence of high correlation between these variables does not matter since the no evidence of severe correlation is reported between the key regressors and this tend to reduce the problem of multicollinearity - the Variance Inflation Factors (VIFs) reported in Appendix III also confirm this claim.

3.4.3. Panel Fixed Effects Result

Table 26 depicts the panel fixed effects benchmark regression result output for equation 2 for the various forms of the model. Column 1 is the default fixed effect result. Column 2 includes the year fixed effects and column 3 captures the country fixed effects. Column 4 includes both the year and country fixed effects.

Table 26. Panel fixed effects result
Dependent variable: SVA to MVA ratio

VARIABLES	(1) I	(2) II	(3) III	(4) IV
Tax revenue to GDP	-0.222*	-0.526***	-0.222*	-0.526**
	(0.0988)	(0.160)	(0.117)	(0.216)
Govt health expend	0.766***	0.844***	0.766**	0.844***
	(0.206)	(0.176)	(0.245)	(0.238)
Govt edu expenditure	-0.111	-0.214***	-0.111	-0.214**
	(0.100)	(0.0622)	(0.119)	(0.0838)
Regulation	-0.0280***	-0.0194**	-0.0280***	-0.0194*
	(0.00679)	(0.00709)	(0.00805)	(0.00956)
Private credit by banks	0.0139	-0.0464	0.0139	-0.0464
	(0.0422)	(0.0921)	(0.0500)	(0.124)
Interest rate	-0.239*	-0.313**	-0.239	-0.313*
	(0.110)	(0.105)	(0.131)	(0.141)
Openness	-0.0347**	-0.0326	-0.0347*	-0.0326
	(0.0146)	(0.0191)	(0.0173)	(0.0257)
Tariff	-0.0679	-0.172**	-0.0679	-0.172*
	(0.0476)	(0.0659)	(0.0565)	(0.0889)
GDP per capita	-0.00202	-0.00414***	-0.00202	-0.00414***
	(0.00111)	(0.000926)	(0.00132)	(0.00125)
Executive constraints	-0.727	0.387	-0.727	0.387
	(0.573)	(0.799)	(0.681)	(1.077)
Resource exports	-0.0155	-0.00330	-0.0155	-0.00330
	(0.0160)	(0.0187)	(0.0190)	(0.0252)
Resource rent pc	-0.534**	-0.637*	-0.534*	-0.637
	(0.222)	(0.331)	(0.263)	(0.446)
Agricultural exports	-0.148***	-0.145*	-0.148**	-0.145
	(0.0385)	(0.0714)	(0.0457)	(0.0963)
Net FDI inflows	0.0868***	0.115***	0.0868**	0.115***
	(0.0233)	(0.0231)	(0.0276)	(0.0312)
Observations	46	46	46	46
R-squared	0.756	0.920	0.971	0.990
Number of countries	10	10		
Country FE	No	No	Yes	Yes
Year FE	No	Yes	No	Yes

Source: Author, 2021. Robust standard errors in parentheses
***, **, and * indicate the statistical significance at 1%, 5% and 10% respectively.

It is evident from table 26 that columns 1 and 3 report identical coefficients while columns 2 and 4 also have the similar coefficients. They however slightly differ in their statistical significance. Based on the descriptive statistics above and the econometric literature on panel fixed effects the paper considers columns 2 and 4 as more robust than the other columns since the inclusion of the robust option

helps control for heteroscedasticity and the tests of time and country fixed effects show that the dummies for all the years and countries matter. In addition, the standard errors of most of the estimates in columns 2 and 4 are lower thereby making them more reliable for making predictions.

In column 1, the result shows that the SVA to MVA ratio in resource-rich developing countries is reduced as tax revenue to GDP, government expenditures on education, regulation, interest rate, openness and tariff increase as their coefficients are negative. The negative signs of these coefficients imply that they have the tendency to shrink the non-tradable sector (services value-added) and strengthen the tradable sector (manufacturing value-added). In other words, the negative-signs coefficients could bias value addition more towards manufacturing than services. More so, tax revenue to GDP and interest rate are statistically significant at 10% while regulation and openness are significant at 1% and 5% respectively. The controls with negative significant impact on the index for economic diversification are resource rent per capita and agricultural exports (at 5% and 1% respectively) indicating that they tend to decrease services value added relative to manufacturing value added. Government expenditures on health and net foreign direct investments inflows are however positive and significant at 1% level of significance which imply that they tend to increase services value added relative to manufacturing. These positive-sign coefficients are worrisome because they imply that they have shrinking effect on the tradable sector (manufacturing) while strengthening the non-tradable sector (services). This could mean that government expenditures on health benefit the dominant services sector while foreign direct investment inflows might be services-enhancing instead of promoting manufacturing investments or value-added.

The results in columns 2-4 show the outcomes of the variations in the model according to the time and country fixed effects. In column 2, the result indicates that when we include the time fixed effects the coefficients increased marginally, tariff, government expenditure on education, and GDP per capita become significant at 5% and 1% respectively. In column 3 where country fixed effects are included, the coefficient estimates remain the same as in column 1 but interest rate though negative turns to be statistically insignificant. In column 4 where both time and country fixed effects are included, the coefficients are the same as in

column 2 but resource rent per capita and agricultural exports turn insignificant. Strikingly, the results from the various specifications seem to suggest that the level of income, agricultural exports and more importantly natural resources rent could be useful for strengthening development in poorer countries by promoting manufacturing which seems to differ from the evidence of Sachs and Warner (1999) that natural resources are sometimes associated with declining income per capita.

To check for the robustness and sensitivity of the result in table 26, additional controls of country size (population, population density, land area and aged dependency ratio) and other controls such as investment, external balances on goods and services and the entry of new firms are added to the model. As mentioned earlier, Can and Gozgor (2018) and Lashitew, Ross, and Werker (2020) identified these variables as possible important determinants of value addition in the non-resource sector. The results emanating from these robust checks are presented in Appendix III. The checks indicate that the signs of the coefficients in the benchmark regression are robust to additional controls.

Given the benchmark regression results, it might be important for policy makers to explore the relative importance of the interventionists' tools in affecting economic diversification. This important aspect is missing in the literature and the beta coefficients provide an effective way of making such comparisons (Bring, 1994). Using the coefficients in columns 2 and 4, table 27 provides the impact of a favourable change in each of the key variables by one standard deviation on SVA to MVA ratio expressed as units of standard deviations.

Table 27. Relative contribution of the key variables in affecting SVA to MVA ratio

Var	Tax rev.	Health exp	Educ. exp	Reg.	PSC	r	Openn.	Tariff
β	-0.428	0.371	-0.271	-0.081	-0.144	-0.689	-0.176	-0.19
α	5%	1%	5%	10%	Not sig	10%	Not sig	10%

Source: Author, 2021. B is the standardized coefficient, α is the level of statistical significance.

It is evident from table 27 that a one standard deviation increase in tax revenue to GDP will decrease SVA to MVA ratio by 0.428 standard deviation. As can be seen, the shrinking effect on the index of economic diversification due to increase tax revenue to GDP is more than the contribution of increases in government expenditure on education; while increases in government expenditure on health has a strengthening effect, regulation clearly has the least shrinking effect on economic diversification. On the other hand, it can also be seen that interest rate is more important than tariff while private credit and trade openness are insignificant. Overall, to strengthen the tradable sector interest rate seems to be the most useful tool follow by tax revenue to GDP, government expenditure on education, tariff, regulation, government expenditure on health, private credit, and openness in that order.

3.4.3 Interaction Effects Result

Estimating the interaction effects of government fiscal and liberal tools with regulation as captured in equation (5) yields the result in table 28. As reported in table 26, the various specifications are indicated in columns 1-4. Here, focus is on the interaction coefficients in the first seven rows as shown in table 28.

Table 28. Interaction effects of Interventionists tools with Regulation
Dependent variable: SVA to MVA ratio

Variables	(1) I	(2) II	(3) III	(4) IV
Tax revenue x Regulation	-0.0167	-0.0234***	-0.0167	-0.0234***
	(0.0126)	(0.00391)	(0.0160)	(0.00705)
Govt health exp x Regulation	0.00942	0.0299***	0.00942	0.0299*
	(0.0189)	(0.00744)	(0.0240)	(0.0134)
Govt edu exp x Regulation	0.00785	0.00735***	0.00785	0.00735***
	(0.00506)	(0.00114)	(0.00640)	(0.00205)
Private credit by banks x Regulation	0.00203	0.00338	0.00203	0.00338
	(0.00673)	(0.00326)	(0.00851)	(0.00588)
Interest rate x Regulation	0.0124***	0.0161***	0.0124***	0.0161*
	(0.00281)	(0.00486)	(0.00356)	(0.00875)
Openness x Regulation	0.00106	6.23e-05	0.00106	6.23e-05
	(0.00226)	(0.000523)	(0.00286)	(0.000943)
Tariff x Regulation	0.00924	0.00760**	0.00924	0.00760
	(0.00625)	(0.00303)	(0.00791)	(0.00546)
Tax revenue to GDP	0.205	0.240*	0.205	0.240
	(0.304)	(0.128)	(0.385)	(0.232)
Govt health expend	0.0496	-0.517**	0.0496	-0.517
	(0.409)	(0.169)	(0.518)	(0.305)
Govt edu expend	-0.367**	-0.497***	-0.367**	-0.497***
	(0.120)	(0.0822)	(0.152)	(0.148)
Regulation	-0.301	-0.258*	-0.301	-0.258
	(0.235)	(0.120)	(0.297)	(0.216)
Private credit by banks	-0.125	-0.121	-0.125	-0.121
	(0.215)	(0.136)	(0.272)	(0.246)
Interest rate	-0.798***	-1.327***	-0.798**	-1.327**
	(0.201)	(0.290)	(0.254)	(0.524)
Openness	-0.0674	-0.0489**	-0.0674	-0.0489
	(0.0720)	(0.0216)	(0.0910)	(0.0389)
Tariff	-0.368	-0.359***	-0.368	-0.359*
	(0.241)	(0.107)	(0.305)	(0.193)
GDP per capita	-0.00297	-0.00457***	-0.00297	-0.00457***
	(0.00241)	(0.000307)	(0.00305)	(0.000554)
Executive constraints	1.070	2.174**	1.070	2.174
	(1.016)	(0.943)	(1.285)	(1.700)
Resource exports	-0.0223	-0.00496	-0.0223	-0.00496
	(0.0219)	(0.00334)	(0.0277)	(0.00602)
Resource rent per capita	-0.511*	-0.294***	-0.511	-0.294***
	(0.245)	(0.0347)	(0.311)	(0.0625)
Agricultural exports	-0.0556	-0.207***	-0.0556	-0.207***
	(0.0901)	(0.0199)	(0.114)	(0.0359)
Net FDI inflows	0.0570	0.0329*	0.0570	0.0329
	(0.0408)	(0.0164)	(0.0516)	(0.0295)
Observations	46	46	46	46
R-squared	0.862	0.997	0.984	1.000
Country FE	No	No	Yes	Yes
Year FE	No	Yes	No	Yes

The results from the various specifications also confirm that Columns 2 and 4 are more robust with lower standard errors and more significant coefficient estimates. The robust standard errors are in parentheses while the asterisks indicate the levels of significance as earlier defined. It is clear from table 28 that the interaction of tax revenue to GDP with government regulation yields a shrinking effect on our index of economic diversification which is significant at 1% This implies that where the tax revenue potentials in the sample are regulated it becomes an important strategy for promoting economic diversification via the shrinking of services value-added and the strengthening of the tradable sector or manufacturing.

The interactions of the other tools (see table 28) with regulation, however, yields a positive impact on SVA to MVA ratio implying that their increases tend to increase economic diversification index. While the interaction of government expenditures on health and education, and interest rate with regulation are significant at 1%, the interaction of tariff with regulation is significant at 5%. Again, the interactions of private credit by banks and openness with regulation yield no significant impact on SVA to MVA ratio. The positive signs of these estimates are again worrisome as they imply that these interactions could make resource-rich countries more services-oriented than manufacturing. This means strengthening non-tradable sector at the expense of the tradable sector which could make the countries less competitive internationally. This is in line with the literature that excessive government intervention might not work in developing countries where regulatory institutions are weak and inefficient (Lall, 2013).

Additionally, while other key and significant variables remain negative, government expenditure on health turns negative and significant at 5% level of significance while openness also reports a negative and significant estimate at 5% level. Hence, these negative signs further confirm the shrinking effect of the variables on the index of economic diversification as reported earlier. Level of income, resources rents and agricultural exports also remain instrumental in explaining economic diversification as earlier reported.

Table 29 below shows the relative importance of the interaction effects in affecting economic diversification. Again, the beta coefficients are estimated

using column 4 in table 28 and the levels of significance are as stated.

Table 29. Relative contribution of the interactions in affecting SVA to MVA ratio

Var	Tax x Reg	Health exp x Reg	Education exp x Reg	Private credit x Reg	Interest rate x Reg	Openness x Reg	Tariff x Reg
ß	-1.57	0.86	0.58	0.49	1.54	0.019	0.43
α	1%	10%	1%	Not sig	10%	Not sig	5%

Source: Author, 2021. B is the standardized coefficient, α is the level of statistical significance.

It is evident from table 29 that a one standard deviation increase in the interaction of tax revenue to GDP with regulation yields a decrease in SVA to MVA ratio by 1.57 standard deviation. Thus, it follows that while the interaction of tax revenue to GDP with regulation is the most preferred strategy the interaction of government expenditure on education with regulation might be preferred to the interaction of government expenditure on health with regulation. Similarly, regulating tariff might be preferred to regulating interest rate while regulating private credit and trade seem not to matter in the economic diversification of resource-rich developing countries.

Overall, the econometric panel results above are robust with robust and clustered standard errors. More so, the VIFs in Appendix III confirm that there is no evidence of multicollinearity or severe correlation between the variables given that the VIFs between 0 and 5 indicate that there is no high correlation between the variables in the model (Grewal et al., 2004; Senthilnathan, 2019).

3.5. Lessons

The results from the various panel regressions show that state intervention in terms of fiscal and regulation tools indeed matter in diversifying the economies in resource-rich developing countries. While, taxes, government expenditure on education and regulation report negative significant impact on the index of economic diversification implying a decrease in value added from services relative to manufacturing, government health expenditure indicates a positive significant impact. Liberalisation in terms of interest rate, trade openness and tariff also indicate negative significant impact on the index of economic diversification. Level of income, resource rents, and agricultural exports further show negative

significant impact on economic diversification among the controls. Net foreign direct investment inflows report a positive significant impact on the index of economic diversification while institutional quality and resource exports (measure of dependence on resources) though negative, but they report to be insignificant. Thus, while negative coefficients or estimates imply that the increase in the variables in context decrease economic diversification index (which means reducing services sector value added at the expense of manufacturing) the positive estimates mean encouraging services sector more than manufacturing.

The cross effects results show that the interactions of regulation and fiscal tools as well as interest rate and tariff matter for economic diversification. Overall, it implies that resource-rich developing countries could use their natural resource endowments to develop the non-resource sector-especially manufacturing by using the appropriate mix of government and liberalisation policies. Notably, to improve confidence in our findings further evidence on a more disaggregated level (by products) and a deeper look at the place of the services sector could be helpful.

4. Structural Transformation Pathways in Developing Countries: Any Role for Global Value Chains?

4.1 Introduction

Production in the world has taken a global dimension since the early 1990s. This was driven by falling transport costs, advances in information and communication technology, and lower trade and investment barriers. Hauge (2020) reported using data from the World Bank's World Development Indicators database from 1990 to 2017 that the world's trade dependence ratio (defined by trade-to-GDP ratio) increased from 19.5% to 28.9% and world's inflows of foreign direct investment (FDI) as share of world GDP increased from 0.9% to 2.8%; and that the increase in FDI inflows has mostly taken place in developing countries whose share of FDI inflows surged from 17% to 46% between 1990 and 2017. Therefore, the growth in international trade and offshoring through the fragmentation of production processes and the dispersion of tasks and activities has led to complex and borderless business networks and production systems called global value chains (GVCs). The expansion of GVCs has invigorated debates on industrial policy. Scholars that study development and industrialisation issues through the framework of GVCs have in recent years started to show a keen interest in if and how industrial policy in developing countries—specifically those industrial policies that are oriented towards GVC participation and international trade—must change in this era of GVC expansion[12]. Scholars argue for a new way of thinking about

[12] The most important publications are Baldwin (2011), Gereffi (2014), Gereffi and Sturgeon (2013) and Milberg, Jiang, & Gereffi (2014). International organisations are also increasingly devoting attention to the topic, such as the International Labour Organisation (ILO), the Organisation for Economic Cooperation and Development (OECD), the United Nations Conference on Trade and Development (UNCTAD), the United Nations Development Programme

formulating industrial policy. They question whether "traditional" industrial policies, typical of the Asian "tigers" can serve as a useful inspiration for today's developing countries. Milberg, Jiang, and Gereffi (2014) observe that twentieth-century debates over the merits of industrial policy as a strategy for economic development occurred prior to the spread of these complex international production networks. Industrial policy viewed through the lens of GVCs will thus differ from traditional arguments for industrial policy as the recent ones put emphasis on firms and value-addition rather than the state. This means there has been a gradual and dynamic shift in emphasising the role of other actors as compared to that of the state partly due to the controversies surrounding the debate on the place of government intervention and economic liberalisation in promoting economic development. As a result of the globalisation of production, "companies, localities, and entire countries have come to occupy specialized niches within GVCs. Thus, today's industrial policies have a contrasting character and generate different outcomes than before" (Gereffi, 2014). In a related vein, Baldwin (2011) criticises "high development theory"—explicitly referring to those theories that advocate structural transformation based on emulation of previously successful industrialisation experiences—for not fully considering revolutionary transformations in industry that have occurred since the mid-1980s. He suggests that the missing element boils down to GVCs. Before 1985, successful industrialisation meant building a domestic supply chain. Today, industrialisers join supply chains and grow rapidly because offshore production brings elements such as cost reduction, diffusion of knowledge and technology, improved quality,

(UNDP), the United Nations Industrial Development Organisation (UNIDO), the World Bank and the World Trade Organisation (WTO). See Milberg, Jiang and Gereffi (2014) for an overview of publications from these international organisations that concern the topic.

environmentally safe production, and trade as well as international competitiveness that took Korea and Taiwan decades to develop domestically (Baldwin, 2011 and Lobel, 2006).

Milberg, Jiang, and Gereffi (2014) further observed three things: (a) that industrial policy must shift from the traditional stance aimed at developing fully integrated production structures (i.e., developing entire industries domestically) to a stance focusing on moving into higher-valued tasks associated with a certain industry. This is also known as vertical specialisation; (b) while traditional industrial policy may have included protection of domestic industry, success in the era of GVC expansion requires easy and cheap access to imports, in particular for necessary intermediates; and (c) whereas traditional industrial policy sought to build domestic capacity in order to eventually compete with leading transnational corporations (TNCs), industrial policy nowadays should focus more on negotiating and linking up to TNCs, as the issues facing firms and governments these days require moving up through the chain of production of a particular commodity or set of commodities.

Recently, especially since the beginning of the twenty-first century, the flows of trade and foreign investment for Sub-Sahara countries and Nigeria for example start to differ significantly from those of the world. Using data from the World Bank World Development Indicators Database from 2001 to 2019, the world's exports of goods and services increased from 25.3% to 30.5%, and world inflows of foreign direct investment (FDI) as share of world GDP first increased from 2.7% to 5.4% in 2007 before decreasing to 1.8% in 2019. In Sub-Sahara Africa (SSA) and Nigeria, the trend in the exports of goods and services have been very unstable over the same period (see figure 13). Overall, exports have fallen in Sub-Sahara

Africa from 31.5% in 2001 to 25.27% in 2019 and in Nigeria from 28.25% in 2001 to 14.22% in 2019. Unfortunately, net FDI inflows have stagnated within the period below 5% in Sub-Sahara Africa and Nigeria to be precise as seen in figure 13. While the world FDI inflows decreased from 2.6% in 2001 to 1.8% in 2019, in Sub-Sahara Africa FDI inflows decreased from 4.1% to 1.8% within the same period. In Nigeria, the case is worst as FDI inflows in 2001 were about 1.6% and have since decreased to as low as 0.73% in 2019. This is unambiguous evidence that though a chunk of FDI inflows is flowing to developing countries, the resulting impact on structural transformation via the concept of GVCs is not clear. This means that while FDI flows into developing countries in the form of GVCs their impact on structural transformation has not been documented in the literature. Thus, this study considers GVCs-structural transformation nexus as an important channel for understanding why most developing countries have failed to achieve sustainable growth and development over the years.

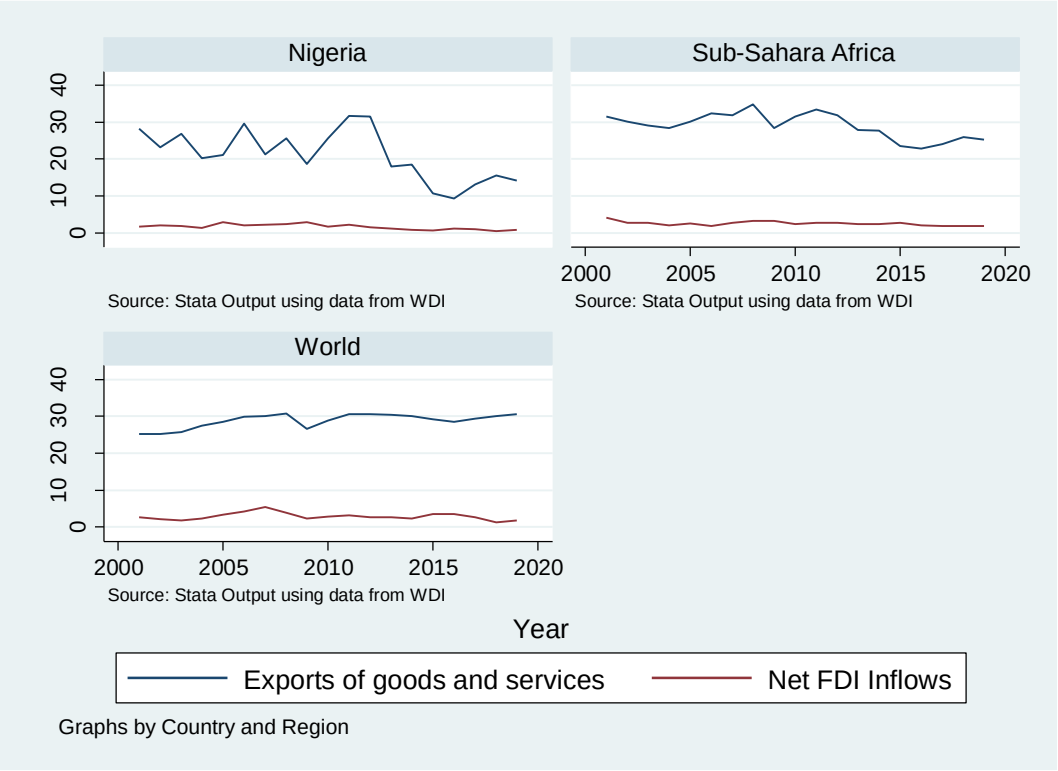


Figure 13. Exports of goods and services and FDI inflows to Sub-Sahara Africa and Nigeria compared with the World's.
Data source: World Development Indicators, 2020

In 2019 Nigeria was the number 25 economy in the world in terms of GDP (current USD), the number 50 in total imports, the number 140 in terms of GDP per capita (current USD) and the number 150 most complex economy according to the Economy Complexity Index (OEC, 2019). The top exports of Nigeria are crude petroleum, petroleum gas, scrap vessels, flexible metal tubing and cocoa beans exporting mostly to India, Spain, United States, France and Ghana. The top imports include refined petroleum, cars, wheat, laboratory glassware and package medicaments importing mostly from China, Netherlands, India, United States and Belgium. Crude oil has obviously been the mainstay of the Nigerian economy for decades.

Conversely, the latest available data on services from OEC show that in 2015 Nigeria exported $2.74 billion worth of services. The top services exported were sea transport, government services, financial services, miscellaneous business,

professional and technical services, and air transport. The top services imports were sea transport, air transport, miscellaneous business, professional and technical services, government services and business travel.

Figures 14-15 shows the trend of exports (in million USD) and value-added exports (in thousand USD – which means gross exports measured in terms of value-added) since the start of the twenty-first century. Value added shows a rising trend from 2001 to a peak in 2008 before falling in 2009. Thereafter, it has since continued to remain above the 2009 level. Conventional exports show a similar trend. However, before 2004 value added exports were below conventional exports but have since remained above exports until around 2011 and 2012 when they fell below exports again. Strikingly, since 2012 value added exports have been rising while conventional trade exports have since been falling to an all-time low in 2016 before it started to marginally increase. Similarly, in terms of exports as a share of GDP we observe similar trend as shown in figure 15. This underscores a clear example of how GVCs and exports in terms of value added have become increasingly popular in Nigeria and such is the trend in other similar developing countries (unfortunately the lack of data at regional levels would not afford us the opportunity to make distinct and concise comparisons).

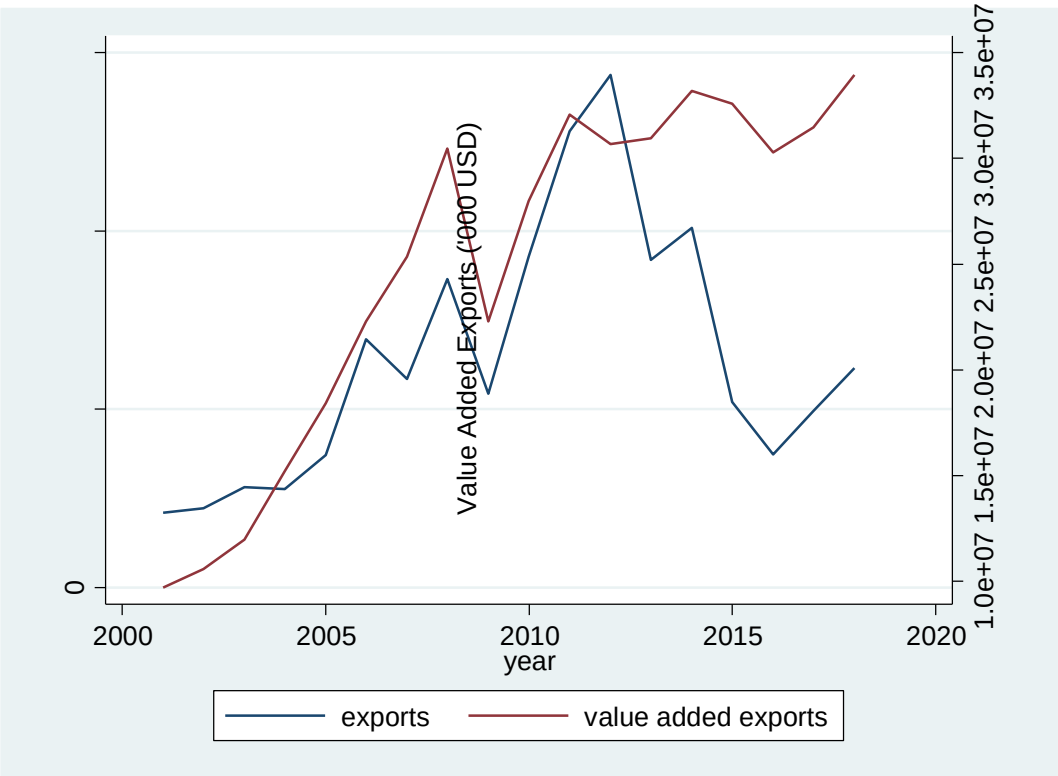


Figure 14. Conventional Exports vs Value Added Exports in Nigeria
Data source: WDI, 2020; UNCTAD-Eora, 2018

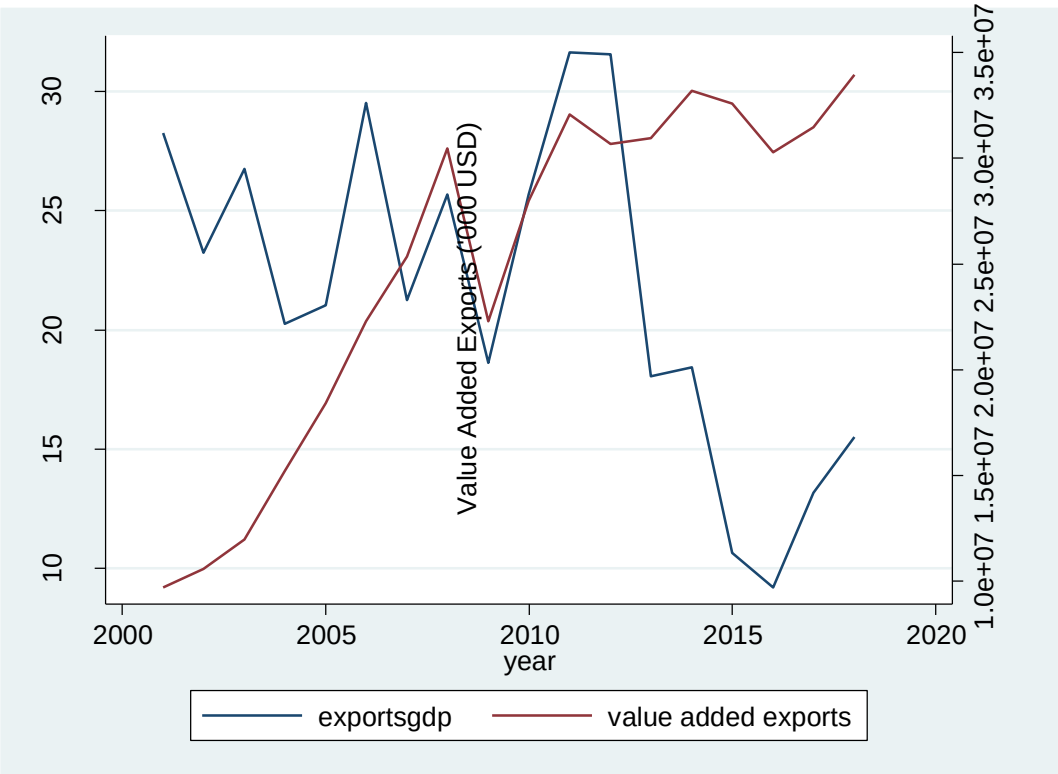


Figure 15. Conventional Exports (% of GDP) vs Value Added Exports in Nigeria
Data source: WDI, 2020; UNCTAD-Eora, 2018

In terms of the structure of production in the Nigerian economy, figure 16 shows the trend of value added by sector and the respective employment shares in figure 17 compared with SSA and the World. Figure 16 shows that value added in the services sector rises steadily above the other sectors not only in Nigeria but in SSA and the world. Atolia, Loungani, Marquis, and Papageorgiou (2018) through an IMF working paper called this the rise of "servicification". However, the value added in the manufacturing sector in Nigeria and SSA fall below value added in agriculture which implies that Nigeria and SSA tend to be more agrarian than manufacturing and this state could be described as premature deindustrialisation as explained in Atolia, Loungani, Marquis, and Papageorgiou (2018). The rest of the world on the other hand tends to have value added in manufacturing rising more rapidly than the rise in agriculture.

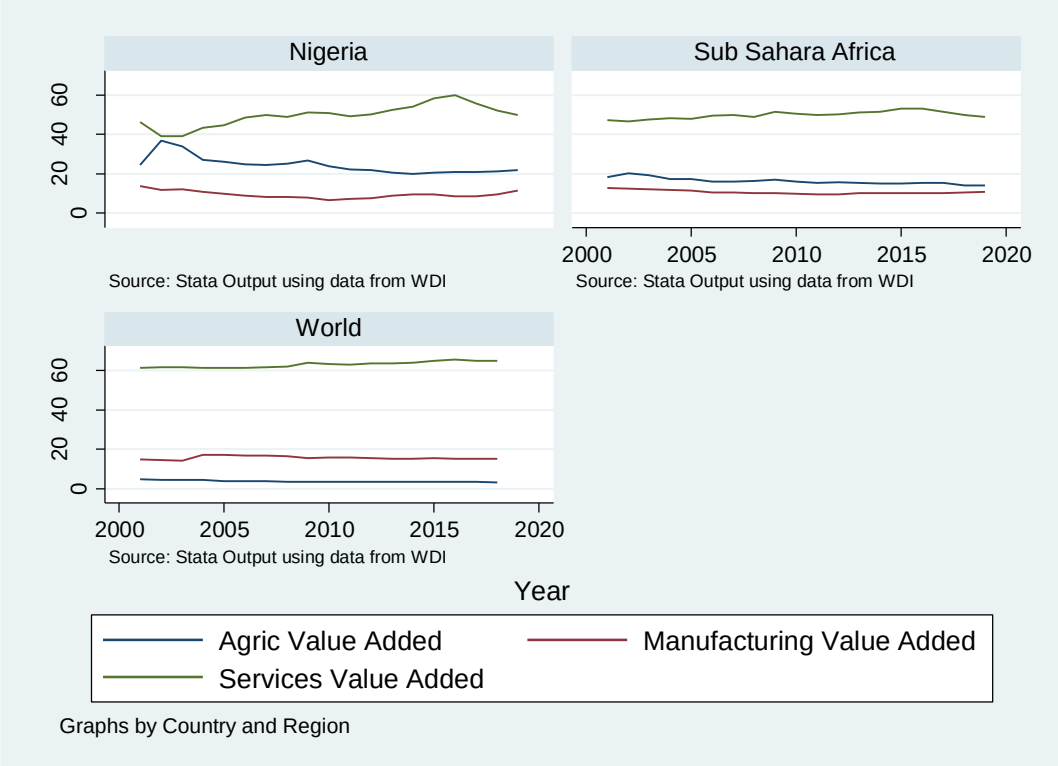


Figure 16. Structure of Value Added by Sector in Nigeria, SSA and the World
Data source: WDI, 2020

With respect to figure 17, the employment shares by sectors seem to follow the trend in value added in figure 16. Notably, in Nigeria it was until around 2006 that

employment shares in services started to rise above employment shares in agriculture. Also, the employment shares in agriculture in SSA lie above the employment shares in services and manufacturing. Overall, the employment share in agriculture is falling across the regions in recent times with that of the rest of the world falling more sharply than we observe in Nigeria and SSA. More so, the employment shares in Nigeria's manufacturing remain lower over time as seen in figure 17.

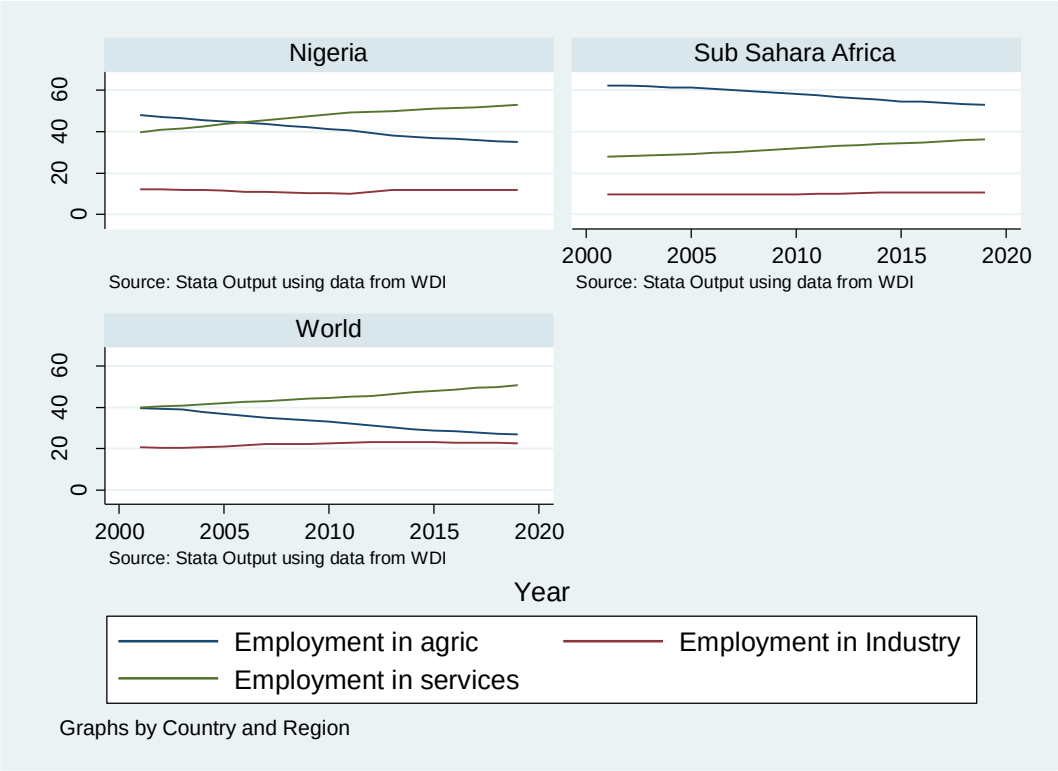


Figure 17. Structure of Employment Shares by Sector in Nigeria, SSA and the World
Data source: WDI, 2020

From the above, Nigeria and SSA – and by extension other resource-rich countries do not only have a structural imbalance problem (that is over dependence on traditional sectors), but they are grappling with stagnating FDI inflows and dwindling domestic and foreign value addition in their productive sectors as evident in the trend of domestic and foreign value-added exports. Recent theoretical literature has shown that countries can benefit from participation in GVCs through multiple channels with the trade channel as the most studied in

recent times[13]. The trade channel explains how countries can benefit from GVCs by trading in value chains – also called GVC trade (inputs) or finished products (conventional trade). Ignatenko, Rai and Mircheva (2019) showed that while GVCs have positive impact on income per capita, and on investments and productivity, their findings particularly uncover that such positive gains are linked to GVC trade and not conventional trade. They were also quick to caution that the gains from GVC participation are not automatic as there is large degree of heterogeneity. The upper-middle and high-income countries are benefiting from such participation, while less robust effects for low and lower-middle income countries were found. Other channels highlighted in the literature include exchange rate and structural change channels (Stöllinger, 2016). Stollinger finds a non-linear relationship between participation in GVCs and structural change towards manufacturing in Central Europe (CE) and deindustrialisation in other EU member states. While CE manufacturing core benefit from participation in GVCs in terms of structural change towards manufacturing, other EU Member States GVC participation, if anything, accelerates the deindustrialisation process. With respect to exchange rate, Ahmed et al., (2015) show that participation in GVCs tend to decrease the elasticity of real manufacturing exports to real effective exchange rate. This suggests that as countries integrate into global production processes a currency depreciation may only improves a fraction of the value of final goods exports.

However, little is known on the effect global supply chains could have on structural transformation particularly in developing countries in terms of the performance of the economic sub-sectors and their employment shares. In developed economies, GVCs provide access to more competitively priced inputs, higher variety, and the economies of scale (Baldwin and Lopez-Gonzalez, 2015). Meanwhile, for emerging economies GVCs are viewed as a fast track to industrialization. Baldwin (2011) argues that internationally fragmented

[13] Ignatenko, Raei, & Mircheva (2019) used the Eora MRIO database to compute the different measures of GVC participation and illustrate the global pattern of supply chains over time in addition to explaining the gains from participating in GVCs.

production allows emerging economies to join existing supply chains instead of building them. With increased sophistication of goods, joining a supply chain removes the need to gain comparative advantage in a broad range of production stages domestically.

Ignatenko, Raei, and Mircheva (2019) further provides that theoretical literature offers support for these views. Other studies have shown that productivity gains associated with offshoring and GVCs can arise through multiple channels such as finer division of labour across countries (Grossman and Rossi-Hansberg, 2008), availability of greater input varieties (Halpern, Koren, and Szeidl, 2015), increased competition, learning externalities, and technology spillovers (Kee and Tang, 2015; Li and Liu, 2014). While some of these gains are associated with conventional trade as well, welfare gains can theoretically be larger if one uses a multiple-sector framework and considers the input-output linkages (Caliendo and Parro, 2015).

Though empirical investigations of the effects of GVC participation have been limited, this area of research is expanding with increasing availability of data. Earlier empirical work on GVCs documented the considerable rise in fragmentation of production. Seminal works by Hummels, Ishii, and Yi (2001) show that GVCs are responsible for a large share of trade growth in world trade from 1970- 1990s. Works by Johnson and Noguera (2012) and Baldwin and Lopez-Gonzalez (2015) show that this growth accelerated further in between 2000 and 2009. The pace of expansion of supply chains slowed in the aftermath of global financial crisis, contributing to an important part of the trade slowdown in this period (IMF, 2016). A key step in the analysis of GVCs was put forward by seminal works of Koopman, Wang, and Wei (2014) and Wang, Wei, and Zhu (2013) who proposed methodologies to break-down gross trade flows to origins of value-added. Since then, such data and methodology have become available to researchers through several initiatives. These include the Trade in Value-Added Statistics (covering 63 countries), the World Input Output Database (43 countries), and most recently the Eora Multi-Region Input- Output (MRIO) database for 189 countries (Lenzen, Moran, Kanemoto, and Geschke, 2013). With availability of these data, the focus is shifting to analysing the impacts of GVCs on economic outcomes (Constantinescu, Mattoo, and Ruta, 2017).

Sequel to the above works on the channels through which GVCs could impact an economy and the limited empirical investigations available, this chapter aims at contributing to the scarce literature on the expansion of GVCs as it relates to structural transformation in developing countries. It specifically attempts to answer the following questions in the context of developing countries that are struggling to diversify and transform their production structure:

(i) How do GVCs trade (domestic and foreign value-added) affect structural transformation and how does the impact of GVCs compare with the effect of conventional trade in resource-rich and non-resource-rich developing countries?
(ii) Does the flow of foreign direct investments matter in studying the nexus between GVCs and structural transformation in developing countries?
(iii) What lessons could these countries learn from the findings?

4.2. Literature Review

4.2.1. Concept of Structural Transformation

The concept of structural transformation has received a lot of attention in the literature in recent times and is considered here as critical in achieving convergence in developing countries. This is vital to understand the peculiarity of the structure of developing countries. Structural transformation is used to mean the reallocation of economic activity across the broad sectors agriculture, manufacturing and services that accompanies the process of modern economic growth (Herrendorf, Rogerson, and Valentinyi, 2014). This concept has received a lot of attention in the policy debate of both developed and developing countries where some critiques have claimed that sectoral reallocation of economic activity is inefficient and calls for government intervention. While a sizable literature on the topic of structural transformation already exists, it is still imperative to look at the current state of evidence as it relates to the role of GVCs - particularly for developing countries, because the process of structural transformation continues and changes throughout the stages of development.

To measure structural transformation, three most common measures of economic activity at the sectoral level are commonly used: employment shares, value-added

shares, and final consumption expenditure shares (Herrendorf, Rogerson, and Valentinyi, 2014). It is important to note that employment and value-added shares are related to production while final consumption shares are related to consumption. Hence, these production and consumption measures may display different behaviour because value-added is not often the same as final output. However, the focus here is on production-related measure to better understand the process of structural transformation in developing countries in terms of productivity changes across different sectors.

The key driving forces of structural transformation identified in the literature include technological differences across sectors (usually in terms of differences in capital shares and in elasticity of substitution) and the effects coming from the changes in income and relative prices. Not only is an assessment of these driving forces and their propagation mechanisms important in understanding structural transformation but here we consider the role of GVCs-oriented industrial policies in promoting structural transformation, and economic development in general as central in achieving convergence in developing countries.

4.2.2. Concept of Global Value Chains

The World Bank has described GVCs as the international fragmentation of production which can lead to increased job creation and economic growth. Companies used to make things primarily in one country. But today that has all changed as a single finished product often results from manufacturing and assembly in multiple countries with each step in the process adding value to the product. Through GVCs, countries trade more than products, they trade knowledge and make things together. Consequently, imports of goods and services matter as much as exports. Ignatenko, Raei, & Mircheva (2019) proposed that based on the seminal work of Koopman et al. (2014) and Aslam, Novta, and Rodrigues-Bastos (2017) gross exports can be decomposed into value-added components based on the location of value-added creation and its purpose as shown in figure 16.

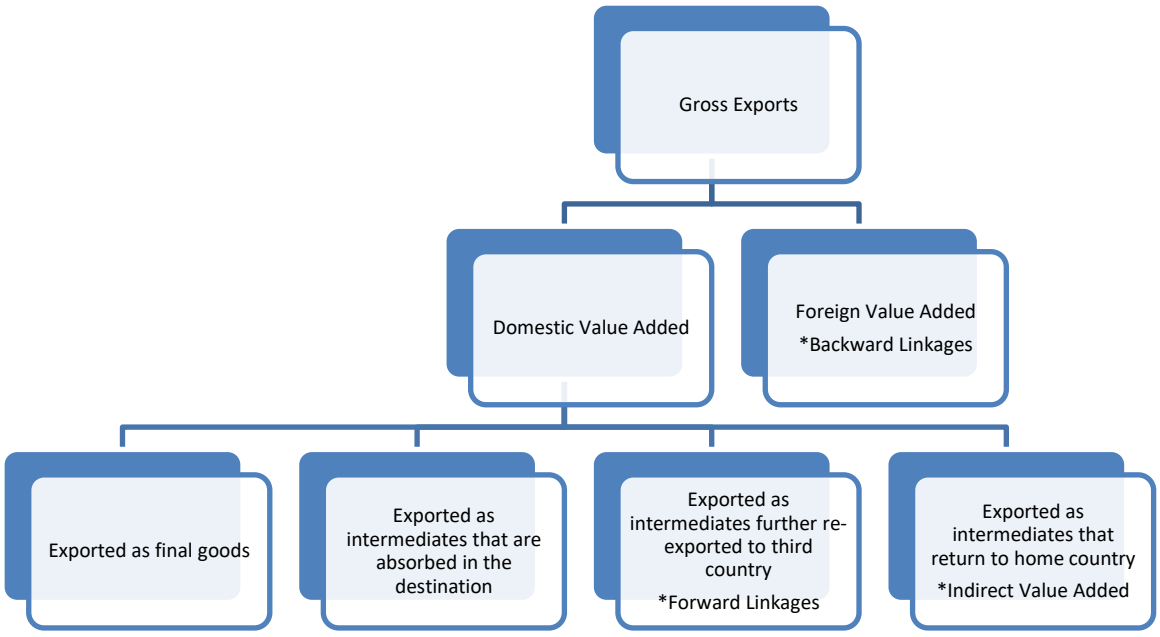


Figure 18. Decomposition of Gross Exports into Value-Added Exports.
Source: Koopman and others (2011), Rahman and Zhao (2013), Aslam and others (2017).

Figure 18 shows that gross exports are decomposed into two broad components: the foreign value-added (FVA) embedded in gross exports of a country (backward linkages) and the domestic value-added in exports (DVA). The latter part is further decomposed into exports that are absorbed in the destination country and those that are further used as intermediate inputs for exports to third countries (forward linkages) or returned home.

Ignatenko, Raei, and Mircheva (2019) further clarified that based on this decomposition, the two measures of GVC participation (vertical specialization) are defined as: backward linkages - the share of foreign value-added in total exports of a country; and Forward linkages - the domestic value-added embodied in intermediate exports that are further re-exported to third countries, expressed as a ratio of gross exports. While backward linkages, also known as foreign value-added exports, is a common measure of GVC integration, the forward linkages measure is less widely used and known. While foreign value-added exports refer to the import content in exports, it is important to note that it excludes imports that are in turn consumed in the domestic economy. However, it is important to utilize both measures of backward and forward linkages to understand the nature of vertical specialization. For instance, Ignatenko, Raei, and Mircheva (2019) showed that forward linkages are more useful in understanding GVC participation

of the service sector. Throughout their paper, GVC participation is defined as the sum of forward and backward linkages. More so, the separation of indirect value-added from the other components of domestic value-added (collectively called value-added exports) could provide useful insights into the components that could better enhance diversification and structural transformation.

Figure 19 shows the trend of the two major classifications – domestic and foreign value-added exports (in Nigeria as a typical example of a developing country that is rich in natural resources) since 2001. Domestic value-added exports are consistently above foreign value-added exports though both are rising recently. This means that there has been an increase in the domestic content in exports more than the import content over several years. We notice that foreign value-added reached an all-time high in 2011 and fell afterwards sharply before rising again marginally. Thus, FVA seems to be below DVA in recent times implying that there could be increasing self-reliance and use of local contents with the prevailing consequences seen in the staggered growth of developing countries. This trend is true for most resource-rich countries as they become attractive destinations for multinationals investing in natural resource manufacturing.

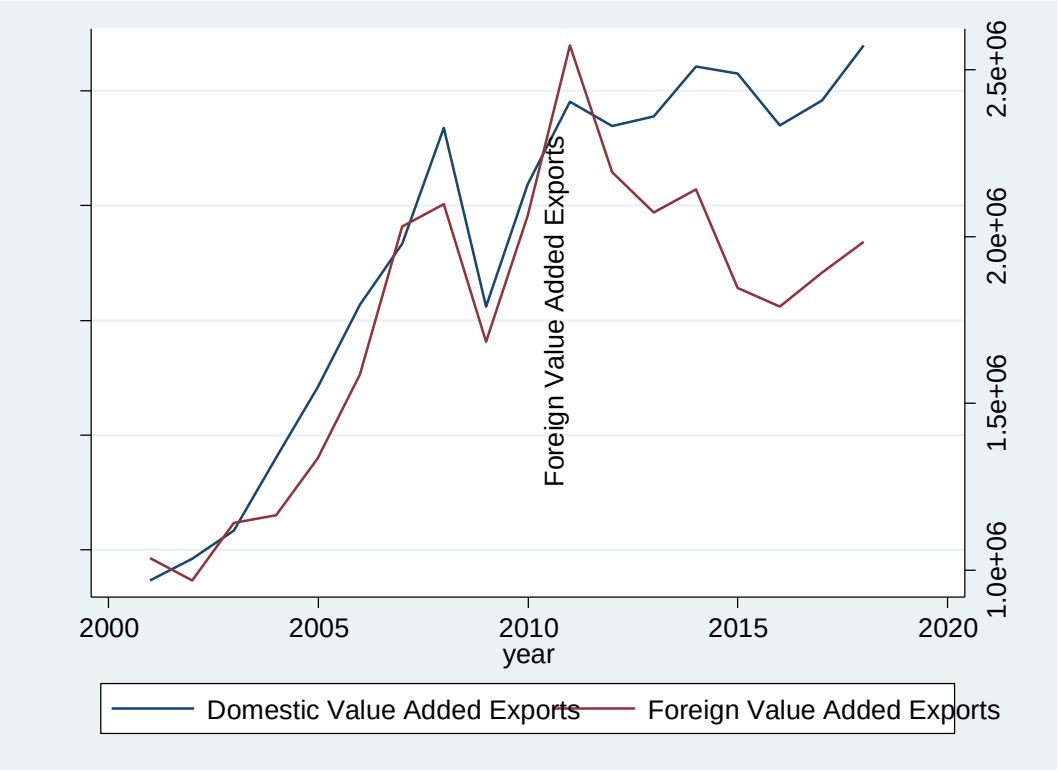


Figure 19. Domestic versus Foreign Value-Added Exports in Nigeria
Source: Author, using data from WDI, UNCTAD-Eora Database

4.2.3. How GVCs Can Affect Structural Transformation

The relation between GVC dynamics and economic development possibilities has coalesced around the general term 'upgrading' which has been used to mean the paths for value chains actors to 'move up the value chain' for economic and social gains. Thus, in the context of economic upgrading, there are two broad orientations. One relates to identifying the sources of firm capabilities that lead to their accessing new markets and increasing competencies. This has particularly been a long-standing cause of disagreement between theories focused on locational and institutional knowledge sources and those focused on knowledge transmission via lead firm-supplier relations (Giuliani, Pietrobelli, and Rabellotti, 2005; Morrison, Pietrobelli, and Rabellotti, 2007). A second orientation examines which conditions and trajectories can lead to 'a better deal' for disadvantaged actors along the GVC (Ponte and Ewert, 2009). Notably, economic upgrading is not worthwhile if it does not bring about economic development in the context of backward economies especially those that are dependent on natural resources and whose production structures have not yet been transformed. Thus, there is an evolving strand of the literature that focuses on the relation between GVC and economic transformation as well as productivity growth. Structural transformation and productivity growth are key and long-recognised features of economic development. In conventional development economics, modern economic development implies changes in the production structure of the economy that allows for the reallocation of resources from less productive traditional sectors to more productive modern sectors (Chenery & Taylor, 1968; Foster‐McGregor & Verspagen, 2016; Kuznets, 1966; Lewis, 1954; Park, 1989; Szirmai, 2015). Similarly, given the structure of production in developing countries the present challenges to governments in the region are those of devising policies for promoting the growth-enhancing structural changes needed to shift workers from productivity resistant sectors to more productive and dynamic sectors and to diversify exports away from primary commodities. Recent policy discussion in this direction has focused on exploring the potential of global value chains (GVCs) to fast-track this development. In many regards participating in GVCs is seen as an easier route to industrialization in developing countries, particularly in Africa. With global production increasingly sliced into different stages of value-creating activities or tasks that are performed in different cost-saving locations across the

world (Grossman and Rossi-Hansberg, 2008), and integration into global value chains is providing new windows of opportunity to generate more jobs and increase productivity in dynamic sectors (Antràs, 2020).

This chapter is linked to an evolving strand of literature focusing on the relationship between GVC integration and jobs and productivity growth. In an OECD Report, Jouanjea et al. (2020) report that integration into GVCs can act as a catalyst for the process of economic transformation and productivity growth by hastening the reallocation of resources to higher productivity tasks and sectors. Sen (2017) finds that trade integration positively impacts on employment in developing countries via the scale and composition of production effect but has a negative impact via the labour intensity effect. The scale effect explains how increase in the size of manufacturing leads to increase in the demand for labour thereby leading to jobs being created in the manufacturing sector under the assumption of excess supply of labour in agriculture. On the other hand, composition and labour intensity effects explain the extent of employment creation in manufacturing. The composition effect shows whether the increase in manufacturing output occurs mostly in the labour-intensive industries relative to capital intensive ones. Labour intensity on the other hand explains whether the increase in manufacturing output is mostly due to an increase in labour productivity (or a fall in labour intensity of production), which would mute the effect of manufacturing output growth on employment creation.

Lopez-Gonzalez (2016) finds a positive effect of intermediate imports on employment and value added, with particularly strong effects in services, albeit only in the short run. While focusing on ASEAN countries, Lopez-Gonzalez show that GVCs and export competitiveness are linked to importing and that foreign sourcing is a complement to rather than a substitute for the creation of domestic value added and employment in exports. In his contribution, Baldwin (2014) finds evidence of an initial productivity-enhancing and employment creation effect of GVC integration, but a possible stunted development overall as GVC integration makes industrialization less meaningful since capacity building and upgrading through GVCs is not guaranteed as most value-added in the supply chain is captured by large multinationals in developed countries.

Contrary to the positive but mixed picture painted above, UNCTAD (2017) reports that integration in GVCs will not unambiguously strengthen growth-enhancing structural change and that for some countries integration in GVCs could accelerate the de-industrialization process, as was evident in the case of non-central European countries. This evidence also supports that GVCs are increasing servicification in some countries especially non-business services. Similarly, Stöllinger and Holzner (2017) and Stöllinger (2017) report statistically weak support for a positive impact of GVC related trade on structural upgrading. Though, his findings show that the enhancing effect of increasing GVC trade on structural upgrading could be identified for transition and emerging economies this effect is undistinguishable from the corresponding structural effect of trade in general. Thus, once transition and emerging economies capture more world market share in trade, it goes hand in hand with accelerated structural upgrading but tends to be irrelevant whether this is due to trade integration that is taking place via GVC trade or other forms. Stollinger therefore cautions that his findings provide limited optimism for the high hopes in GVCs as an effective industrial policy tool in developing countries. Additionally, Rodrik (2018) asserts that the technologies associated with GVC participation are providing diminishing possibilities to substitute other factors of production with unskilled labour, suggesting that developing countries such as those in Africa may not be able to take advantage of GVC participation to create employment opportunities in modern and productive sectors. In a recent study, Pahl et al., (2019) find convincing evidence for the positive effects of GVC integration on productivity growth in the formal manufacturing sector. The authors, however, found no evidence on employment creation. All these mixed findings are pointers to the inconclusive role that GVCs could play in developing countries.

In their study, Criscuolo and Timmis (2017) argue that little is known about the link between the broader aspects of GVC integration, structural change, and productivity, especially in developing countries, such as those in sub-Saharan Africa (henceforth SSA), partly due to paucity of data on GVCs and their evolving nature as well as the dependence of most of these countries on crude commodities. Notably, the crucial role of resource endowments is also largely ignored in many of the earlier extant studies. Accounting for the role of resource endowments in this relationship is important for several reasons. Resource

endowments are often an important determinant of a country's comparative advantage in trade, participation in GVCs, the type of GVC activity undertaken (in terms of the sector and positioning within the GVC) and are consequently a potential factor in the scale, timing or pattern of a country's industrialization or any other form of structural transformation that it might undergo at stages of its development (IMF, 2012; World Bank, 2015). The Heckscher-Ohlin theory also suggests that a country's factor endowments determine the relative costs of production and hence the pattern of specialization in GVC integration and exports. Consequently, the pattern of a country's GVC integration and the resultant productivity growth and structural change it may undergo are a function of its resource endowments (Krugman, 1980; Schott, 2008).

As highlighted in Pahl et al., (2019) and stressed, for example, in Havranek and Irsova (2011) and Ivarsson and Alvstam (2010) that resource-intensive countries, particularly from developing countries are likely to experience different dynamic upgrading in GVCs. They engage differently in GVCs as forward suppliers, selling raw materials or basic inputs in the value chain which limits their opportunity for upgrading through GVC. Conversely, non-resource intensive countries on the other hand participate more through backward participation. These sets of countries are therefore able to import essential intermediates needed for quality upgrading, boosting productivity, and economic diversification.

For many years, economists have also held the strong view that resource-intensive countries, particularly oil resource-intensive countries, could suffer negative long-term growth effects due to the so-called Dutch Disease phenomena, which brings about the appreciation of the exchange rate. Based on this, Sachs, and Warner (2001) considered natural resources to be a 'curse' for development rather than a potential driver of development. For this reason, the rapid expansion of an economy's resource- intensive industries and the export of goods from these industries in the value chain was thought to lead to an increasing 'commoditization' of the production structure, supplying basic inputs in the value chain (Venables, 2016), with a subsequent slowdown of the transition to other more technologically dynamic and productive industries and fields of production.

In a recent paper, however, Katz and Pietrobelli (2018) argued that over the past two decades, resource-intensive industries, particularly non-oil resource-intensive

industries, have become an important source of growth and innovation due to the technological transformation going on in the sector, primarily due to a rapid expansion of world demand and the drastic transformation in the way in which these commodities are being produced, exported and consumed which nowadays involves several agents comprising manufacturing enterprises producing the basic commodity – minerals, timber and forestry products, soyabean oil among others – their suppliers of production equipment and engineering services and the public sector regulatory agencies monitoring their environmental impact. The above discussion shows that examining the GVC- productivity growth relationship and more particularly GVC-structural transformation relationship in the context of countries' resource endowments remain under-studied. Existing studies have also paid little if any, attention to countries in SSA due to data limitations. The use of proxy measures of GVC further adds to the limitation in extant studies. For this reason, little if anything is known of the mechanisms benchmarking the non-conclusive findings of what drives potential GVC associated productivity changes and structural change. In other words, since there are only non-conclusive findings on the GVC-structural transformation nexus more needs to be done in this line especially in the context of developing countries. This gap in the literature also calls for improvements in the measurement of GVC integration and investigating its subsequent impact on productivity and structural transformation in developing economies as well as the mechanisms underlying such a potential relationship.

Owusu (2021) further argued that GVCs can stimulate productivity gains through different channels. First, integration into GVCs provides firms and countries with important opportunities to access international markets, access higher quality and sophisticated intermediate inputs, and benefit from knowledge spillovers and pro-competitive effects of global competition to stimulate productivity gains and expand the scale of exports (Criscuolo and Timmis, 2017; Constantinescu et al., 2019; Collier and Venables, 2007; Schott, 2008). There are several ways through which GVCs may impact upon productivity, some of which would be captured by the within effect and others by the between effect (structural change effect). In terms of the former, to participate in GVCs, global lead firms require their suppliers (entrant firms) to have certain technological and managerial capabilities to enter and remain competitive in the value chain. Firms need specific capabilities for the specific GVC functions and activities they perform in the value

chain. To remain competitive in the value chain, firms must introduce modern technologies, adopt a mix of innovations, change their organizational structure, and engage in the skill upgrading of their workers to utilize equipment and information efficiently. A great deal of industrial upgrading is involved in this process. For instance, a typical GVC could involve process upgrading whereby production systems are made more efficient through the adoption of superior technology and through product upgrading in which firms move into more sophisticated product lines. The process involved in GVC participation could also involve functional upgrading in which firms within an industry acquire new functions such as moving from performing assembling activities to product design and redesign, logistics, after-sales services, and repairs that facilitate the movement of workers into more sophisticated business functions in GVCs over time (Humphrey and Schmitz, 2002; De Vries et al., 2019). All these processes and activities in GVCs involve industrial shifts in employment shares and value-added creation within industries, particularly in more knowledge and capital-intensive industries. This implies that the reallocation of resources within sectors affects the performance of firms across different industries (Lall, 1992; Morrison et al., 2007; Newman et al., 2017). For instance, the existing literature has shown that the move into upstream and downstream GVC activities could be driven by trade, consumption, and technological changes. For some Asian countries, de Vries, Chen, Hasan, and Li, (2019) find that employment tends to increase in R & D and other support services relative to fabrication activities. Humphrey and Schmitz (2002) further show that industrial clusters are inserted into GVCs in separate ways and that this has consequences for enabling and disenabling local level upgrading efforts.

In terms of the between effect (structural change effect), participating in GVCs can act as a catalyst for growth-enhancing structural change, allowing for the shifting of resources into more productive and dynamic sectors of the economy (movement of resources across sectors) (Baldwin, 2016; Criscuolo and Timmis, 2017; Jouanjean et al., 2017). This happens through chain or inter-sectoral upgrading, whereby firms move into completely new categories of production altogether (cf. Humphrey and Schmitz, 2002). Based on the mentioned literature, the evidence supporting the positive effect of GVCs on structural transformation

is inconclusive and particularly scarce in the context of resource endowments due to some caveats such as data and sample limitations amongst others.

The focus of this chapter is, therefore, unique because of the use of sub-sample analysis of GVCs-structural transformation nexus in the context of developing countries - based on their resource endowments. This is particularly important in understanding the pathways to transform the economies of these countries structurally and strategically given that reliance on natural resources has not helped these backward countries to transform their economies for years. We now turn to a review of some of these challenges to GVC-oriented industrial policies in developing countries.

4.2.4. GVC-Oriented Industrial Policies and Challenges in Developing Countries

Scholvin (2020) showed that there are both exogenous and endogenous conditions that limit the extent to which resource-rich countries especially in Africa benefit from being plugged into GVCs. The exogenous factors identified include economies of scale in gateways, sector-specific entry barriers and power yielded by transnational corporations while endogenous obstacles range from obstacles to investing, hiring labour and purchasing inputs, to public safety and challenges from legal regulatory systems as well as corruption. Scholvin further argued that given such unfavourable business environment, activities beyond for instance the mere extraction of oil and gas happen in the gateway (in this case South Africa) thereby leaving out other regions out from the benefits accruing to the linkages that go with GVCs in resource-rich countries. While gateways could be seen as an entrance into an area as well as an exit out of the same area which connect resource-abundant locations to global markets, in parts of the world marked by economic and political instability they are attractive locations for transnational companies because of their economies of scale in terms of stability. Gateways thus, play critical role in how developing countries benefit from integrating into global markets. They are seen as drivers of growth and leading areas that transmit impulses to their wider hinterlands. Unfortunately, these gateways and the economies of scale associated with them are rare in developing countries thereby limiting their benefits from participating in GVCs.

Scholvin (2020) while using the oil and gas sector give some detailed explanation of sector-specific entry barriers and other challenges relating to investing, hiring labour, and purchasing inputs in Africa's hydrocarbon-rich countries. Also, using interviews other problems such as public safety, corruption, language barriers, legal and regulatory lapses and how the various difficulties lead to firms adopting strategies that work against consumption, fiscal, horizontal and production linkages have been identified. It's worth mentioning that there are challenges specific to other manufacturing sub-sectors, services and agriculture across different developing countries.

Industrial policies in developing countries are now more GVC-oriented than ever before. Andreoni, Mondiwa, Roberts, and Tregenna (2021) emphasized that developments such as the changing nature of value-chain linkages between activities alongside 'industrialisation of freshness', digitalization and technological upgrading all point to the need for a sophisticated and nuanced approach to sub-sectors and to diversity of activities within sectors. 'Industrialization freshness' as a concept was used by Cramer and Chisoro-Dube in Andreoni et'al, (2021) to mean how advances in technology have been a key mechanism through which structural transformation towards high-value fruit has occurred in South Africa's fresh fruit industry. This means that structural transformation is being recognized internationally as critical for economic development. It figures prominently on the international development agenda and national policy debates especially among developing countries. More so, structural transformation approach understands the relationships between economic structure and performance in dynamic terms, taking into cognizance sector- and country-specific conditions as well as institutional and political economy factors that underpin the process of structural change. Therefore, not only are industrial policies in most developing countries GVC-oriented but their overall development agenda emphasize the place of structural transformation in GVCs especially with increased liberalisation. However, Spolaore and Wacziarg (2013) point out that obstacles such as intergenerational transmission of human traits – particularly culturally transmitted traits have led to divergence of populations over the course of history which have in turn induced barriers to the diffusion of technologies and consequently GVCs across countries especially developing countries.

4.3. Methodology

4.3.1. Introduction

This is the section for the empirical strategy employed in achieving the objectives and answering the questions raised earlier in the chapter. The variables, data and sample are described, and the models and techniques are specified and identified too. Notably, the techniques (descriptive statistics and panel fixed effects) used in the last chapter (chapter three) are also used in this chapter due to similarity in the approach, data, and sample structure.

4.3.2. Variables, Data and Sample

The definitions of the variables in our models and their sources of data are highlighted here. Following Herrendorf, Rogerson, and Valentinyi (2014), sectoral value added, and employment shares are used as the most common measures of structural transformation. These indicators measure sectoral performance in terms of value-added and labour employment (by three major sectors-manufacturing, services, and agriculture) over time. The use of sectoral measures helps us to gauge activities by sector and their performance over time. Data on these measures are obtained from the World Bank's World Development Indicators (WDI) database and measured as percentage of GDP. Based on Ignatenko, Raei, and Mircheva (2019), we used the two major classifications of gross exports by value-added to measure participation in GVCs. The measures are foreign value-added and domestic value added (measured in millions of USD). The use of these measures helps us to gauge the relevance of both domestic and foreign participation in GVC-related trade. The data for these measures of gross exports by value-added are sourced from the UNCTAD-Eora Database and are available from 1990-2018. On the other hand, conventional trade is the sum of exports and imports of goods and services measured as share of GDP – with its data sourced from WDI. This trade indicator is the most widely used in the literature (Dollar and Kraay, 2003; Findlay, 1984; Frankel and Romer*, 2017).

Data on relevant controls such as institutional and country-characteristic factors which include school enrolment, regulation quality, population, land, population density are also sourced from the WDI. More so, data on controls such as inflation,

foreign direct investment inflows and measures of natural resource endowments (that is fuel exports and ore and metal exports) are also sourced from the WDI. The inclusion of these controls (more especially-the measures of natural resource endowment) is an important and unique step in the proper gauging of the place of GVCs and conventional trade in structural transformation in developing countries. This informs why we classified the sample into resource-rich countries (RRCs) and non-resource-rich countries (NRRCs). While school enrolment and regulation quality relate to the quality of institutions as vital determinant of economic performance as used in the previous chapters, it follows that population, land and population density are important measures of country size. Inflation is used to control for the effect of fluctuation in relative prices. Notably, FDI net inflows are used as additional control to verify if the flow of investments across borders really matters in developing countries. The inclusion of FDI is in line with the offshoring model of Feenstra and Hanson (1996) as it captures the potential structural effect of foreign investors creating new employment opportunities in the offshoring sector of the offshoring destination.

Thus, amongst the 189 countries in the UNCTAD-Eora Database, the study sample include 107 developing countries for which data are available for the period 1990-2018. Out of the 107 developing countries about 49 are NRRCs while the remaining are RRCs (refer to the appendix for a comprehensive list of these countries and their respective classifications).

4.3.3. Model

The empirical models are summarized thus:

$$\mathrm{ST}_{\mathrm{vait}} = \sum_{\mathrm{it}=1}^{\mathrm{NT}} \beta\, \mathrm{GVC}_{\mathrm{it}} + \sum_{\mathrm{it}=1}^{\mathrm{NT}} \gamma \mathrm{TRADE}_{\mathrm{it}} + \sum_{\mathrm{it}=1}^{\mathrm{NT}} \sigma \mathrm{CV}_{\mathrm{it}} + \mathrm{T}_{\mathrm{t}} + \varepsilon_{\mathrm{it}} \quad (6)$$

$$\mathrm{ST}_{\mathrm{emit}} = \sum_{\mathrm{it}=1}^{\mathrm{NT}} \beta'\, \mathrm{GVC}_{\mathrm{it}} + \sum_{\mathrm{it}=1}^{\mathrm{NT}} \gamma' \mathrm{TRADE}_{\mathrm{it}} + \sum_{\mathrm{it}=1}^{\mathrm{NT}} \sigma' \mathrm{CV}_{\mathrm{it}} + \mathrm{T}_{\mathrm{t}} + \varepsilon_{\mathrm{it}} \quad (7)$$

Where ST_{vait} and $\mathrm{ST}_{\mathrm{emit}}$ are the measures of structural transformation in terms of sectoral value-added and employment respectively in country i at time t; it must be pointed out here that the main goal of using the two measures of structural transformation is to evaluate whether the impact of GVC-related trade and

conventional trade on sectoral value-added and employment are consistent. This could in turn have implications on whether labour inputs could be shifted from productivity-resistant sectors to more productive ones. Worthy of note here is the fact that since structural transformation is measured by sector and the explanatory variables on the right-hand side of equations (6) and (7) are for the entire economy, we apply the adjustment of standard errors by clustering in estimations to make the estimates robust (Abadie, Athey, Imbens, and Wooldridge, 2017). Based on Abadie et'al, clustering is though suitable in our case it is more justified in regressions that include specific fixed effects at the level of relevant clusters and heterogeneity is observed in the treatment effects.

While $\mathrm{GVC_{it}}$ and $\mathrm{TRADE_{it}}$ represents measures of Global Value Chains and conventional trade as described. $\mathrm{CV_{it}}$ is the set of control variables, $\mathrm{T_t}$ is the time fixed effects, ε_{it} is the disturbance term and i denotes the cross-section units with i= 1, 2, 3, …, N, where N is the number of countries and t denotes the time periods with t= 1,2, 3, …, T where T is the total time period.

The models follow the econometric assumptions of fixed effects as documented in the literature (Wooldridge, 2010) and draw from earlier studies on the changes in the production structure. For instance, Kuznets (1957) – in (Oberholzer, 2020) show how manufacturing increases with rising per capita income to the analysis of Herrendorf, while Rogerson and Valentinyi (2014) provide similar evidence on growth and structural transformation as well as the work of Ignatenko, Raei and Mircheva (2019) on why countries participate in GVCs. What really makes our approach different and original is the attempt to link GVCs to the measures of structural transformation (as viewed here in terms of sectoral value added and employment). The justification for using panel fixed effects estimation is as described in chapter three.

Theoretically, it is expected that the coefficients of GVC and TRADE are to have positive signs on sectoral value-added and employment in manufacturing and services but negative on sectoral value-added and employment in agriculture. This is because structural transformation in developing countries entails a shift away from primary production to secondary and tertiary productive activities. More so, Stollinger (2017) explain that the presence of dual economy in most developing countries leads to the expectation of a positive relationship between structural

upgrading and active participation in GVCs. Such expectation suffices if offshoring leads to new employment opportunities in modern sectors in place of the traditional sector. The argument that GVCs facilitate the move to new activities where capabilities are acquired for a particular task in the value chain as opposed to all tasks along the value chain; and that lead firms of international production networks have intrinsic interest to share their technology with partners within the network by Collier and Venables (2007) and Baldwin (2016) respectively point to the same direction. Where such apriori expectations are not met then there could be enormous challenges to these countries plugging into the benefits of GVCs and trade.

4.4. Empirical Results and Discussion

4.4.1. Descriptive Statistics by Sub-Sample

Tables 30 and 31 show the descriptive statistics for RRCs and NRRCs. The tables depict the variables with their respective observations, mean, standard deviation, minimum and maximum values.

Table 30. Descriptive Statistics for Resource-Rich Countries
Dependent variables: Sectoral Value Added and Employment Shares in Manufacturing, Agriculture, and Services

VARIABLES	(1) N	(2) Mean	(3) SD	(4) Min	(5) Max
Agric. value added	1,319	16.31	14.38	0.117	79.42
Manufac. value added	1,245	10.94	7.046	0.233	49.19
Services value added	1,279	40.18	14.83	1.859	75.74
Employment in Agriculture	1,400	37.30	26.02	0.551	86.82
Employment in Industry	1,400	15.00	9.781	1.120	59.58
Employment in Services	1,400	38.96	20.57	1.393	85.30
Foreign value added	1,449	573,790	1.308e+06	46.80	9.879e+06
Domestic value added	1,450	1.215e+06	1.983e+06	1.841	9.776e+06
Trade	1,256	62.06	36.98	0.269	311.4
School enrolment	894	49.83	31.60	1.397	116.5
Regulation quality	365	3.063	0.524	2	4.500
Inflation	1,216	9.422	18.71	-16.12	448.5
Population	1,450	1.236e+07	3.047e+07	1,419	2.616e+08
Population density	1,429	63.34	162.2	1.138	1,915
Land	1,429	74,669	210,560	69	2.382e+06
FDI net inflows	1,368	3.752	6.866	-37.15	86.99
Fuel exports	963	34.20	36.62	0.113	99.99
Ore and metal exports	999	12.95	19.67	3.36e-06	88.18

Source: Author, 2021 -using data from WDI and UNCTACD-Eora Databases.

Table 31. Descriptive Statistics for Non-Resource-Rich Countries
Dependent variables: Sectoral Value Added and Employment Shares in Manufacturing, Agriculture, and Services

VARIABLES	(1) N	(2) Mean	(3) SD	(4) Min	(5) Max
Agric. value added	1,536	13.64	11.12	0.111	62.74
Manufac. value added	1,494	13.81	9.075	0.972	56.42
Services value added	1,451	47.91	18.10	3.370	91.92
Employment in Agriculture	1,596	29.67	24.19	0.115	92.37
Employment in Industry	1,596	17.45	8.811	0.281	41.65
Employment in Services	1,597	46.31	24.85	1.223	152.7
Foreign value added	1,653	635,225	1.386e+06	15.14	9.675e+06
Domestic value added	1,653	1.168e+06	1.993e+06	133	9.959e+06
Trade	1,522	71.92	63.91	0.167	442.6
School enrolment	1,067	55.52	31.28	1.122	132.8
Regulation quality	326	3.786	2.425	-9.616	33.81
Inflation	1,378	7.306	9.593	-18.19	89.11
Population	1,650	1.736e+07	9.206e+07	6.298	1.353e+09
Population density	1,650	283.4	982.1	1.346	7,953
Land	1,653	58,360	357,214	0.426	9.425e+06
FDI net inflows	1,542	3.879	5.017	-7.595	58.52
Fuel exports	1,182	8.591	16.35	3.21e-07	96.50
Ore and metal exports	1,269	6.027	11.05	0.111	76.85

Source: Author, 2021 -using data from WDI and UNCTACD-Eora Databases.

The descriptive statistics in tables 30-31 show that value added is lower in manufacturing in both resource-rich and non-resource rich countries relative to other sectors. Notably too, there is greater evidence of increased 'servicification' in NRRCs (where the maximum services value-added is as high as 91.92%) than in RRCs where the maximum services value-added is 75.74%. The values added in agriculture in both RRCs and NRRCs are still substantially large (the maximum values are about 80% in RRCs and 63% in NRRCs) implying that the countries in the sample are still largely engaged in primary productive activities. The standard deviations and sample mean for the sectoral values added show that the observations are also closer to their respective sample means especially in agriculture and manufacturing in both RRCs and NRRCs. We however, observed some large variations in the observations for services value added in both categories of countries as the standard deviations and sample means tend to be farther apart. As shown by the descriptive statistics for the years 1990 and 2018 (see the attached appendix for the sub-samples and overall sample statistics), the values for the beginning of the sample in 1990 and the end in 2018 confirms that

‘deindustrialisation’ and ‘servicification’ are indeed common features trending in developing countries. For instance, the overall sample statistics show that the average manufacturing value added in 1990 was 14.55% and the maximum was 55.92%; the average and maximum value added in manufacturing however by 2018 diminished to 11.73% and 51.65% respectively. Value added in agriculture also averaged 19.82% and peaked at 62.74% in 1990 but by 2018 both the average and maximum collapsed to 11.91% and 58.93% respectively. On the other hand, the average and maximum services value added were 37.84% and 69.24% in 1990 with both rising to 47.18% and 88.77% respectively by 2018. Similar trend is observed in the shares of labour employed for the various sectors in the sample categories.

However, while we observed some variations in the share of foreign value added in gross exports (FVA) it tends to be higher in resource-rich countries than non-resource countries. This is also evident in the higher FDI inflows in resource-rich countries relative to non-resource rich countries. An explanation could be that RRCs are often more attractive destinations to multinationals and FDI inflows especially in the mining and marketing operations of natural resources. The share of domestic value added in gross exports (DVA) and conventional trade on the other hand are higher in non-resource-rich countries than the resource-rich ones. This suggests that NRRCs could be more prone to seeking local ways of adding value in GVC-related trade which in turn has the potential of making them more tradable partners to the rest of the world that could lead to increase in their exports. There is also observed variations in the distribution of DVA and trade as we noticed marked difference between the minimum and maximum values as well as between the standard deviations and the respective sample means.

In terms of the control variables, the differences between the minimum and maximum values show that there are some variations among the observations across the sample categories. The variations, however, tend to be more pronounced amongst the country characteristics and natural resource indicators and less evident amongst the institutional measures such as regulation quality and school enrolment across the sub-samples.

4.4.2. Correlation Analysis

Tables 32-37 below summarize the correlation between the measures of structural transformation and the key explanatory variables in terms of GVC participation and trade as well as the controls. First, Table 32 below shows the correlation coefficients for MVA model.

Table 32. Correlation Coefficients for MVA model
Dependent variable: MVA

Var	MVA	DVA	FVA	TR	SCH	REG	INF	POP	PD	FEX	OM	LN	FDII
MVA	1	-	-	-	-	-	-	-	-	-	-	-	-
DVA	.24	1	-	-	-	-	-	-	-	-	-	-	-
FVA	.24	.99	1	-	-	-	-	-	-	-	-	-	-
TR	-.03	-.19	-.13	1	-	-	-	-	-	-	-	-	-
SCH	.08	.06	.09	.50	1	-	-	-	-	-	-	-	-
REG	-.03	-.04	-.03	.15	.33	1	-	-	-	-	-	-	-
INF	-.02	.16	.12	.00	-.04	.07	1	-	-	-	-	-	-
POP	.26	.97	.94	-.24	.02	.00	.14	1	-	-	-	-	-
PD	-.02	.42	.39	-.21	.02	.02	.11	.45	1	-	-	-	-
FEX	-.05	.13	.05	-.08	-.04	-.23	.16	.08	-.07	1	-	-	-
OM	-.15	-.12	-.09	.10	-.24	-.21	-.11	-.12	-.30	-.08	1	-	-
LN	.07	.73	.71	-.31	-.24	-.23	.06	.77	.14	.24	.21	1	-
FDII	-.15	-.13	-.10	.44	.06	.12	-.01	-.13	-.12	-.10	.33	-.06	1

Source: Author's Computation using Stata 17, 2022.
Note: TR – trade, SCH – school enrolment, REG – regulation, POP – population, PD – population density, FEX – fuel exports, OM – ore and metal exports, LN – land, FDII – net foreign direct investment inflows, while MVA, DVA and FVA are as earlier defined.

Table 32 shows that increases in MVA is associated with increases in DVA and FVA though with low correlation coefficient of 0.24. Also, MVA has a negative and low correlation with trade with a coefficient of -0.03. With respect to the correlation of MVA with the controls, it tends to have low correlation and it is negatively correlated with regulation, inflation, population density, fuel exports, ore, metal and mineral exports and net foreign direct investment. However, it is positively correlated with school enrolment, population, and land. Theoretically, it is expected that increases in the regressors would increase MVA in developing countries, thus negative signs of correlation coefficients imply a possible negation of theoretical expectations.

In terms of the correlation between the independent variables, we find the correlation low in most cases with just a few exceptions. DVA and FVA tend to be

highly correlated. This is understandable as we find from the data source that it is difficult to separate domestic value added from foreign value added. Population is also highly correlated with DVA. The same trend is also notice between land and DVA, land and population. Thus, it is possible to estimate the model with MVA as dependent variable without any of the highly correlated variables as revealed by the VIFs in Appendix IV though the signs and significance of the estimates of the key variables remain robust (unchanged). This is further evidence that multicollinearity is not a too serious problem in panel data regressions (Hsiao, 2005).

Table 33 below depicts the correlation matrix with the share of employment in industry as dependent variable. The pattern of correlation is like what is obtained in table 32 as shown below.

Table 33. Correlation Coefficients for EI model
Dependent variable: EI

Var	EI	DVA	FVA	TR	SCH	REG	INF	POP	PD	FEX	OM	LN	FDII
EI	1	-	-	-	-	-	-	-	-	-	-	-	-
DVA	.27	1	-	-	-	-	-	-	-	-	-	-	-
FVA	.26	.99	1	-	-	-	-	-	-	-	-	-	-
TR	.30	-.19	-.13	1	-	-	-	-	-	-	-	-	-
SCH	.62	.07	.09	.50	1	-	-	-	-	-	-	-	-
REG	.14	-.03	-.03	.15	.32	1	-	-	-	-	-	-	-
INF	-.09	.14	.11	.00	-.06	.09	1	-	-	-	-	-	-
POP	.26	.97	.94	-.24	.03	.00	.13	1	-	-	-	-	-
PD	.11	.41	.38	-.22	.03	.01	.09	.44	1	-	-	-	-
FEX	-.04	.14	.06	-.07	-.02	-.22	.14	.08	-.06	1	-	-	-
OM	-.25	-.12	-.09	.09	-.23	-.23	-.11	-.12	-.29	-.08	1	-	-
LN	.05	.73	.70	-.30	-.23	-.22	.06	.76	.12	.24	.20	1	-
FDII	-.05	-.13	-.10	.43	.05	.12	.00	-.13	-.14	-.10	.31	-.05	1

Source: Author's Computation using Stata 17, 2022. Note: EI – is share of labour employment in industry.

Table 33 also indicates that EI is positively correlated with DVA and FVA though with low correlation coefficient of 0.27 and 0.26 respectively. Here, EI has a positive and low correlation with trade with a coefficient of 0.3. With respect to the correlation of EI with the controls, there is low correlation, and it is negatively correlated with inflation, fuel exports, ore, metal and mineral exports and net foreign direct investment. However, it is positively correlated with school enrolment, regulation, population, population density and land. It is also expected

here that increases in the regressors would increase EI in developing countries, thus negative signs of correlation coefficients imply that jobs creation in industry is falling leading to de-industrialisation in developing countries.

More so, the correlation between the independent variables reveals the correlation is low in most cases. Though we find DVA and FVA to be highly correlated and population is also highly correlated with DVA and FVA with some further strong correlation between land and DVA, land and FVA as well as land and population, the attempt to remove the variables with severe correlation tend not to significantly affect the signs and significance of our estimates in the panel regressions as revealed in the VIFs in Appendix IV.

Next is the correlation coefficient for the model with SVA as dependent variable. Table 34 summarizes the coefficients.

Table 34. Correlation Coefficients for SVA model
Dependent variable: SVA

Var	SVA	DVA	FVA	TR	SCH	REG	INF	POP	PD	FEX	OM	LN	FDII
SVA	1	-	-	-	-	-	-	-	-	-	-	-	-
DVA	-.01	1	-	-	-	-	-	-	-	-	-	-	-
FVA	-.03	.99	1	-	-	-	-	-	-	-	-	-	-
TR	.16	-.18	-.13	1	-	-	-	-	-	-	-	-	-
SCH	.42	.07	.10	.50	1	-	-	-	-	-	-	-	-
REG	.33	-.03	-.02	.15	.31	1	-	-	-	-	-	-	-
INF	-.11	.14	.11	.00	-.05	.09	1	-	-	-	-	-	-
POP	-.02	.97	.94	-.24	.4	.01	.13	1	-	-	-	-	-
PD	.17	.41	.38	-.21	.04	.01	.09	.44	1	-	-	-	-
FEX	-.03	.13	.06	-.06	-.01	-.21	.13	.08	-.07	1	-	-	-
OM	-.34	-.13	-.10	.10	-.22	-.22	-.12	-.13	-.30	-.09	1	-	-
LN	-.33	.73	.71	-.29	-.22	-.21	.05	.77	.12	.24	.20	1	-
FDII	.05	-.14	-.10	.43	.05	.13	.00	-.13	-.14	-.10	.31	-.05	1

Source: Author's Computation using Stata 17, 2022. Note: SVA – is value added in services sector.

Contrary to the previous evidence of positive correlation table 34 also reveals that SVA is negatively correlated with DVA and FVA though with low correlation coefficient of -0.01 and -0.03 respectively. Also, we notice a positive correlation between SVA and trade, SVA and school enrolment, SVA and regulation and between SVA and population density as well as between SVA and net foreign direct

investment – the correlation is low in all these scenarios. The correlation between SVA and other controls is negative and low in each case.

Again, while we notice low and moderate correlation between most of the independent variables a few are highly correlated. DVA and FVA remains highly correlated, population is again highly correlated with DVA and FVA. Land is also highly correlated with DVA, FVA, and population. As highlighted above, a plausible option is to exclude the regressors with very high VIFs (more than 5) as reported in Appendix IV with respect to the model involving MVA as the dependent variable – though with no significant changes to the results.

Table 35 reports the correlation matrix with the share of labour employment in the services sector as dependent variable.

Table 35. Correlation Coefficients for ES model
Dependent variable: ES

Var	ES	DVA	FVA	TR	SCH	REG	INF	POP	PD	FEX	OM	LN	FDII
ES	1	-	-	-	-	-	-	-	-	-	-	-	-
DVA	-.05	1	-	-	-	-	-	-	-	-	-	-	-
FVA	-.07	.99	1	-	-	-	-	-	-	-	-	-	-
TR	.43	-.19	-.13	1	-	-	-	-	-	-	-	-	-
SCH	.56	.07	.09	.50	1	-	-	-	-	-	-	-	-
REG	.22	-.03	-.03	.15	.32	1	-	-	-	-	-	-	-
INF	-.11	.14	.11	.00	-.06	.09	1	-	-	-	-	-	-
POP	-.10	.97	.94	-.24	.03	.00	.13	1	-	-	-	-	-
PD	-.05	.41	.38	-.22	.03	.01	.09	.44	1	-	-	-	-
FEX	.26	.14	.06	-.07	-.02	-.22	.14	.08	-.06	1	-	-	-
OM	-.26	-.12	-.09	.09	-.23	-.23	-.11	-.12	-.29	-.08	1	-	-
LN	-.19	.73	.70	-.30	-.23	-.22	.06	.76	.12	.24	.20	1	-
FDII	.03	-.13	-.10	.43	.05	.12	.00	-.13	-.14	-.10	.31	-.05	1

Source: Author's Computation using Stata 17, 2022. Note: ES – is share of labour employment in services sector.

Table 35 also reveals that ES is negatively correlated with DVA and FVA with low correlation coefficient of -0.05 and -0.07 respectively. There is also a positive correlation between EI and trade, EI and school enrolment, EI and regulation and between EI and fuel exports as well as between EI and net foreign direct investment – with low correlation in all these scenarios except between EI and school enrolment whose coefficient is greater than half. The correlation between EI and other controls is negative and low in each case.

There is also low and moderate correlation between most of the independent variables with a few highly correlated ones. DVA and FVA remains highly correlated, population is again highly correlated with DVA and FVA. Land is also highly correlated with DVA, FVA and population. The same approach used to treat multicollinearity in the MVA model, that is excluding the regressors with very high VIFs (more than 5) as reported in Appendix IV is adopted to check for robustness and confirm there was no significant changes to the results.

Next is the correlation coefficient where the traditional sector is the dependent variable. Table 36 reports the correlation matrix with respect to value added in agriculture.

Table 36. Correlation Coefficients for AVA model
Dependent variable: AVA

Var	AVA	DVA	FVA	TR	SCH	REG	INF	POP	PD	FEX	OM	LN	FDII
AVA	1	-	-	-	-	-	-	-	-	-	-	-	-
DVA	-.11	1	-	-	-	-	-	-	-	-	-	-	-
FVA	-.11	.99	1	-	-	-	-	-	-	-	-	-	-
TR	-.47	-.19	-.13	1	-	-	-	-	-	-	-	-	-
SCH	-.61	.07	.09	.50	1	-	-	-	-	-	-	-	-
REG	-.21	-.03	-.03	.15	.32	1	-	-	-	-	-	-	-
INF	.17	.14	.11	.00	-.06	.09	1	-	-	-	-	-	-
POP	-.07	.97	.94	-.24	.03	.00	.13	1	-	-	-	-	-
PD	.06	.41	.38	-.22	.03	.01	.09	.44	1	-	-	-	-
FEX	-.25	.14	.06	-.07	-.02	-.22	.14	.08	-.06	1	-	-	-
OM	.11	-.12	-.09	.09	-.23	-.23	-.11	-.12	-.29	-.08	1	-	-
LN	.06	.73	.70	-.30	-.23	-.22	.06	.76	.12	.24	.20	1	-
FDII	-.02	-.13	-.10	.43	.05	.12	.00	-.13	-.14	-.10	.31	-.05	1

Source: Author's Computation using Stata 17, 2022. Note: AVA – is value added in agricultural sector.

The correlation coefficients in table 36 shows that AVA is negatively correlated with DVA, FVA and trade with low correlation coefficient of -0.11, -0.11 and -0.47 respectively. The table further indicates that there is a positive correlation between AVA and inflation, AVA and ore, metal and mineral exports, AVA and land – all with low correlation coefficients. The correlation between AVA and other controls is negative and low coefficients.

Low and moderate correlation is reported between most of the independent variables with a few being highly correlated. DVA and FVA remains highly

correlated, population also remains highly correlated with DVA and FVA. Land is also highly correlated with DVA, FVA and population. We used the earlier highlighted approach used to treat multicollinearity in the MVA model to check for robustness of the estimates in the AVA model and confirm there was no significant changes to the results.

Next is the correlation coefficient where the share of labour employed in agriculture is used as the dependent variable. Table 37 reports the correlation matrix.

Table 37. Correlation Coefficients for EA model
Dependent variable: EA

Var	EA	DVA	FVA	TR	SCH	REG	INF	POP	PD	FEX	OM	LN	FDII
EA	1	-	-	-	-	-	-	-	-	-	-	-	-
DVA	-.06	1	-	-	-	-	-	-	-	-	-	-	-
FVA	-.04	.99	1	-	-	-	-	-	-	-	-	-	-
TR	-.42	-.19	-.13	1	-	-	-	-	-	-	-	-	-
SCH	-.62	.07	.09	.50	1	-	-	-	-	-	-	-	-
REG	-.20	-.03	-.03	.15	.32	1	-	-	-	-	-	-	-
INF	.12	.14	.11	.00	-.06	.09	1	-	-	-	-	-	-
POP	-.02	.97	.94	-.24	.03	.00	.13	1	-	-	-	-	-
PD	-.01	.41	.38	-.22	.03	.01	.09	.44	1	-	-	-	-
FEX	-.17	.14	.06	-.07	-.02	-.22	.14	.08	-.06	1	-	-	-
OM	.28	-.12	-.09	.09	-.23	-.23	-.11	-.12	-.29	-.08	1	-	-
LN	.12	.73	.70	-.30	-.23	-.22	.06	.76	.12	.24	.20	1	-
FDII	-.01	-.13	-.10	.43	.05	.12	.00	-.13	-.14	-.10	.31	-.05	1

Source: Author's Computation using Stata 17, 2022. Note: EA – is the share of labour employment in agricultural sector.

Table 37 reveals that EA is negatively correlated with DVA and FVA with low correlation coefficient of -0.06 and -0.04 respectively. There is a negative correlation between EA and trade, EA and school enrolment, EA and regulation and between EA and population, EA and population density, EA and fuel exports as well as between EA and net foreign direct investment – with low correlation in all these scenarios except between EA and school enrolment whose coefficient is greater than half. The correlation between EA and other controls is negative and low in each case.

There is also low and moderate correlation between most of the independent variables with a few highly correlated ones. DVA and FVA remains highly

correlated, population is again highly correlated with DVA and FVA. Land is also highly correlated with DVA, FVA and population. The VIFs of the highly correlated variables in the EA model were also check using the same approach used to treat multicollinearity in the MVA model to check for robustness and confirm there was no significant changes to the results.

Overall, the sectors in which we have GVCs participation include agriculture, fishing, mining, and quarrying, food and beverages, textiles and wearing apparel, wood and paper, petroleum, chemical and non-metallic mineral products, metal products, electrical and machinery, transport equipment and other manufacturing. Other sectors constitute services sectors such as recycling, electricity, gas and water, wholesale trade, retail trade, hotels and restaurants, transport, post and telecommunications, financial intermediation and business activities, public administration, education, health and other services, private households, re-export, and re-imports amongst others. The positive correlation between measures of GVC participation and MVA is in line with apriori expectations that increases in the share of domestic and foreign values added in gross exports would tend to favour structural transformation through increases in MVA. The negative correlations between DVA, FVA and AVA as well as EA are also in line with theoretical expectation that increases in the shares of domestic and foreign value added are expected to decrease engagement in primary activities such as agriculture and increase those in other sectors in developing countries for structural transformation to take place. However, the negative correlation of the measures of GVCs with value added and employment in services negates the theoretical expectation of a positive relationship. This is because structural transformation also entails increased performance in the modern services sector, and we expect developing countries to positively benefit from GVC participation in services sector. The negation of this theoretical expectation may be partly due to some institutional and structural problems in developing countries as posited in related studies (Svejnar and Lin, 2021) and partly due to constant shifts in the roles of industry and agriculture across time (Syrquin, 2010).

More so, the negative correlation of trade with MVA which negates theoretical expectation could justify the infrastructural and logistics challenges bedevilling the smooth trade (particularly in trade in manufactures) in developing countries

and the dominance of trade in natural resources over manufactures. The negative correlation with agricultural value added and employment and the positive correlation with services value added and employment, as well as labour employment in industry are however, in line with apriori expectation partly due to reasons already explained.

4.4.3. Results

Using panel sub-sample approach, the models are estimated according to the classifications of the sample of countries into RRCs and NRRCs. Tables 23-28 contain the results for the various sectors according to the measures of structural transformation.

Table 38. GVC, Trade and Manufacturing Value Added (MVA)
Dependent Variable: MVA

Variables	(1) Resource-Rich	(2) Non-Resource-Rich	(3) Resource-Rich Robust	(4) Non-Resource-Rich Robust
DVA	-1.99e-07	8.68e-08**	-1.56e-07	8.29e-08**
	(2.24e-07)	(3.77e-08)	(2.17e-07)	(3.56e-08)
FVA	1.68e-06	-4.28e-07**	3.97e-07	-4.03e-07**
	(2.22e-06)	(1.91e-07)	(2.08e-06)	(1.69e-07)
Trade	-0.0605***	-0.00626	-0.0425**	-0.00172
	(0.0149)	(0.0422)	(0.0148)	(0.0402)
School enrolment	-0.0713*	0.0635	-0.0727*	0.0629
	(0.0384)	(0.0518)	(0.0381)	(0.0529)
Regulation quality	-0.233	-0.770	-0.268	-0.795
	(0.719)	(0.560)	(0.807)	(0.537)
Inflation	0.101***	0.00793	0.0954**	0.0153
	(0.0342)	(0.0367)	(0.0394)	(0.0389)
Population	-1.84e-07***	1.12e-08	-2.00e-07***	9.35e-09
	(4.19e-08)	(2.55e-08)	(4.16e-08)	(2.42e-08)
Population density	0.190***	0.0154	0.191***	0.0171
	(0.0323)	(0.0165)	(0.0284)	(0.0179)
Fuel exports	-0.00261	-0.104***	-0.00417	-0.103***
	(0.00750)	(0.0273)	(0.00891)	(0.0273)
Ore and metal exports	0.0131	-0.147**	0.0139*	-0.130**
	(0.00838)	(0.0567)	(0.00746)	(0.0514)
Land		-0.00677***		-0.00731***
		(0.00156)		(0.00189)
FDI net inflows			-0.0756**	-0.0770
			(0.0271)	(0.109)
Observations	134	111	134	111
R-squared	0.405	0.469	0.431	0.473
Number of countries	18	18	18	18
Year FE	Yes	Yes	Yes	Yes

Source: Author, 2021. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 38 shows the results for manufacturing sector value added where columns 1 and 2 are specific to RRCs and NRRCs respectively with the share of domestic and foreign value added in gross exports and trade as the key variables. Columns 3 and 4 are the corresponding additional specifications with net FDI inflows as additional control variable. The results in columns 1 and 2 are consistent with the findings from similar studies (Ignatenko, Raei and Mircheva, 2019; Pahl and Timmer, 2019; and Constantinescu, Mattoo and Ruta, 2017) which show that GVC-related trade indicators and conventional trade determine a country's economic performance. However, due to the uniqueness of this study's approach where the focus is on structural transformation, the results here in terms of manufacturing

value added differ according to the sub-samples depending on the resource endowments (IMF, 2012 and World Bank, 2015). In RRCs, while conventional trade is negative and significant at one percent, GVC-related trade variables are insignificant implying that increases in conventional trade in RRCs tend to lead to significant decreases in manufacturing value added. The negative coefficient of conventional trade in RRCs is not in line with theoretical expectation partly because of the barriers associated with trade in commodities. RRCs are widely known for exporting crude natural resources and importing refined products. They also export raw agricultural products and import processed foods, thereby leading to a negative impact on value-added in manufacturing. More so, the diminishing impact of conventional trade on manufacturing in RRCs reduced from about minus six percent to minus four percent (columns 1 and 3) with the addition of net FDI inflows. On the other hand, GVC-related trade variables in terms of DVA and FVA prove to be significant while conventional trade is insignificant in NRRCs. While DVA is positive (consistent with theoretical expectation) FVA is negative which implies that GVC-related trade in terms of domestic value added is growth-enhancing in the manufacturing sector of NRRCs with FVA proving to be growth-retarding as increase in DVA tends to lead to increase in MVA while increase in FVA tends to lead to decrease in MVA. This means that while backward participation (measured by FVA) is positive but not significant in RRCs, it is negative and significant in NRRCs meaning that the use of imported inputs in the manufacturing sector of developing countries is not particularly productivity-enhancing. This is partly related to the findings of Baldwin (2014) that GVC-related trade could only have a short run positive impact on an economy's economic output which turns negative overall as multinationals' profit-motive eventually overshadows the trade in supply chains in these countries. Although our analysis is a short run one, it is further evidence that casts some doubt on the short run positive impact of GVC-related trade on the economic performance of developing countries where cognisance is taken of their resource endowments.

With respect to the controls, school enrolment, inflation, population, and population density seem to matter in RRCs. Inflation and population density report positive and significant impact while school enrolment and population are negatively significant. The positive sign of inflation is contrary to expectation because instead of increases in prices to make manufacturing more costly they

serve as incentives for manufacturers in developing countries to increase their value addition. It is on the other hand conventional for population to impact positively on manufacturing as more people means more cheap labour availability to manufacturing – though in terms of population density it is negative (this is found not to be the case in RRCs) implying that too much of concentration of people in an area turns to be advantageous to manufacturing with an overall increase in the population (explosion) being disadvantageous. School enrolment also reports to be contrary to expectations in RRCs meaning that as more young people enrol in secondary education, cheap labour availability to manufacturing might be reduced and hence its negative impact on manufacturing value added. This might be temporary as the enrolment gradually turns out to graduates that are available for work (assuming they do not pursue further education). However, in NRRCs the measures of resource endowments in terms of fuel exports, ore and metal exports and land are all negative and significant which mean that increasing dependence on natural resources could lead to a reduction in manufacturing value added of NRRCs. Again, this negates theoretical expectations and further questions the role of natural resources in increasing productivity which reiterates the Dutch-disease literature (Sachs and Warner, 2001; Venables, 2016).

The results of the additional specifications in columns 3 and 4 indicate that controlling for net FDI inflows yields robust results. Column 3 shows that net FDI inflows have negative significant impact on MVA in RRCs which means that increases in net FDI inflows could trigger significant decline in MVA in RRCs. This also negates theoretical expectation partly because of the challenges developing countries are facing in plugging into the benefits of foreign direct investments. Ore and metal exports turns to be positively significant in RRCs with a one percent increase in ore and metal exports causing about two percent increase in MVA. This underscores the importance of solid minerals in the structural transformation of resource-rich developing countries.

Table 39. GVC, Trade and Employment in Industry
Dependent Variable: Employment in Industry

Variables	(1) Resource-Rich	(2) Non-Resource Rich	(3) Resource-Rich Robust	(4) Non-Resource Rich Robust
DVA	8.99e-08	-3.58e-08***	8.12e-08	-3.91e-08***
	(9.93e-08)	(9.51e-09)	(9.42e-08)	(9.67e-09)
FVA	2.66e-07	8.15e-08	5.19e-07	9.87e-08**
	(1.67e-06)	(4.71e-08)	(1.56e-06)	(3.57e-08)
Trade	0.00652	-0.00365	0.00313	-0.000538
	(0.0140)	(0.0194)	(0.0123)	(0.0190)
School enrolment	0.0412	-0.0237	0.0412	-0.0243
	(0.0239)	(0.0239)	(0.0240)	(0.0253)
Regulation quality	-0.738	0.614	-0.729	0.602
	(0.735)	(0.411)	(0.724)	(0.387)
Inflation	0.0109	0.0130	0.0122	0.0171
	(0.0162)	(0.0247)	(0.0163)	(0.0264)
Population	-1.65e-07***	6.95e-08***	-1.62e-07***	6.93e-08***
	(3.88e-08)	(1.33e-08)	(3.86e-08)	(1.25e-08)
Population density	0.139***	-0.00609	0.139***	-0.00545
	(0.0349)	(0.00657)	(0.0341)	(0.00665)
Land	0.00599*	0.00138	0.00647*	0.000870
	(0.00318)	(0.00147)	(0.00355)	(0.00173)
Fuel exports	0.00147	0.00539	0.00167	0.00592
	(0.00902)	(0.00841)	(0.00896)	(0.00820)
Ore and metal exports	0.00795	0.0389*	0.00787	0.0510**
	(0.00964)	(0.0198)	(0.00977)	(0.0199)
FDI net inflows			0.0150	-0.0537*
			(0.0362)	(0.0300)
Observations	146	113	146	113
R-squared	0.713	0.761	0.714	0.766
Number of countries	19	18	19	18
Year FE	Yes	Yes	Yes	Yes

Source: Author, 2021. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 39 reports the result for the share of labour employed in industry in RRCs and NRRCs. The result corroborates the recent findings of Pahl and Timmer (2019) that GVC-related trade impacts positively only on output in manufacturing but not employment. Specifically, the result indicates GVC-related trade is negative and significant in terms of DVA in NRRCs. This means that increase in DVA tend to lead to decrease in employment in industry. The negative impact of share of DVA in gross exports on employment in industry could mean that increases in domestic value addition in NNRCs is associated with increases in labour productivity which could in turn reduce employment. This means less labour is required in industry

with increase in domestic value added though the reverse effect is the case in RRCs implying that increase DVA tends to increase employment in industry, but by an insignificant margin. Amongst the set of controls, population is negative and significant in RRCs but positive and significant in NRRCs. This means that increases in population tend to lead to decreases in employment in RRCs while the in NRRCs, such increases in population tend to increase the share of labour employment in industry. The negative impact of population in RRCs is contrary to expectations which could be because of overdependence on commodities in these countries and the resulting near neglect of manufacturing. This means more of the population could be engaged in primary or crude production with less people available for work in industry. While population density and land report positive effect and are significant only in RRCs, ore and metal exports again report positive and significant impact in NRRCs. In resource rich countries, it is almost common feature for population to be concentrated in resource-rich regions which tend to be more industrialised than their hinterlands. Thus, the increases in population density and land could mean more employment in industry in RRCs. In addition, NRRCs are associated with some recent mining activities in ore and metals, thus increases in these exports could provide more job opportunities and employment especially in the mining industry. Columns 3 and 4 show that the results are robust to adding net FDI inflows as additional controls. Additionally, FVA though remains positive turns to be significant in NRRCs and FDI inflows also reports negative and significant impact on employment in industry. While the negative impact on employment negates theoretical expectation the positive one confirms it, that GVC-related trade and FDI are expected to lead to the reallocation of labour resources to more modern productive industrial sector in developing countries for them to achieve structural transformation (Szirmai, 2015; Baldwin, 2016; UNIDO, 2017). Thus, while backward linkages are relevant in increasing labour employment in the industrial sector of NRRCs, vertical linkages retard industrial labour reallocation in these countries.

Next, tables 40 and 41 are analysed simultaneously below. They report the results for value added and employment respectively for the services sub-sector.

Table 40. GVC, Trade and Services Value Added (SVA)
Dependent Variable: SVA

VARIABLES	(1) Resource-Rich	(2) Non-Resource Rich	(3) Resource-Rich Robust	(4) Non-Resource Rich Robust
DVA	-1.82e-07	9.37e-08	-1.91e-07	8.72e-08
	(4.92e-07)	(1.12e-07)	(4.92e-07)	(1.05e-07)
FVA	-2.68e-06	-1.66e-07	-2.44e-06	-1.32e-07
	(4.87e-06)	(3.22e-07)	(5.16e-06)	(3.15e-07)
Trade	0.0184	0.0457	0.0152	0.0515
	(0.0385)	(0.104)	(0.0519)	(0.0960)
School enrolment	-0.127	-0.0358	-0.127	-0.0371
	(0.0927)	(0.103)	(0.0928)	(0.100)
Regulation quality	2.414**	3.344*	2.423**	3.315*
	(1.026)	(1.751)	(1.030)	(1.798)
Inflation	-0.134	-0.0526	-0.133	-0.0441
	(0.0813)	(0.0695)	(0.0772)	(0.0790)
Population	3.72e-08	-6.61e-08	3.99e-08	-6.66e-08
	(1.63e-07)	(6.91e-08)	(1.65e-07)	(7.10e-08)
Population density	0.123	0.0780***	0.123	0.0793***
	(0.118)	(0.0189)	(0.119)	(0.0181)
Land	0.00898	-0.00193	0.00944	-0.00287
	(0.00638)	(0.00608)	(0.00676)	(0.00549)
Fuel exports	-0.0569*	-0.0201	-0.0567*	-0.0199
	(0.0296)	(0.0573)	(0.0300)	(0.0565)
Ore and metal exports	-0.0358	-0.0829	-0.0359	-0.0621
	(0.0414)	(0.178)	(0.0417)	(0.154)
FDI net inflows			0.0142	-0.0989
			(0.0862)	(0.298)
Observations	146	108	146	108
R-squared	0.315	0.479	0.315	0.481
Number of countries	19	17	19	17
Year FE	Yes	Yes	Yes	Yes

Source: Author, 2021. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 41. GVC, Trade and Employment in Services
Dependent Variable: Employment in Services

VARIABLES	(1) Resource-Rich	(2) Non-Resource Rich	(3) Resource-Rich Robust	(4) Non-Resource Rich Robust
DVA	-3.65e-07	-2.44e-08	-3.35e-07	-2.19e-08
	(3.13e-07)	(1.44e-08)	(3.07e-07)	(1.45e-08)
FVA	6.79e-06**	4.18e-07***	5.94e-06*	4.06e-07***
	(3.18e-06)	(1.08e-07)	(3.07e-06)	(8.83e-08)
Trade	-0.00527	-0.0285	0.00618	-0.0308
	(0.0158)	(0.0214)	(0.0182)	(0.0231)
School enrolment	0.165**	-0.0370	0.165**	-0.0365
	(0.0664)	(0.0494)	(0.0645)	(0.0484)
Regulation quality	-1.747**	1.338***	-1.778**	1.347***
	(0.637)	(0.381)	(0.687)	(0.384)
Inflation	0.0225	0.0655	0.0180	0.0624
	(0.0321)	(0.0402)	(0.0348)	(0.0378)
Population	-8.74e-08	-6.93e-08*	-9.70e-08	-6.91e-08*
	(1.57e-07)	(3.37e-08)	(1.58e-07)	(3.32e-08)
Population density	0.178	-0.0231	0.177	-0.0236*
	(0.135)	(0.0134)	(0.135)	(0.0134)
Land	0.00320	-0.00762	0.00159	-0.00724
	(0.00296)	(0.00458)	(0.00312)	(0.00437)
Fuel exports	0.0147	-0.0337	0.0141	-0.0341
	(0.0151)	(0.0214)	(0.0155)	(0.0213)
Ore and metal exports	0.0291*	-0.0871*	0.0294*	-0.0961*
	(0.0154)	(0.0419)	(0.0141)	(0.0479)
FDI net inflows			-0.0505	0.0399
			(0.0292)	(0.107)
Observations	146	113	146	113
R-squared	0.890	0.752	0.893	0.753
Number of countries	19	18	19	18
Year FE	Yes	Yes	Yes	Yes

Source: Author, 2021. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

The result from table 40 indicates that in terms of the key variables no significant impact was found on SVA in both categories of countries. However, the corresponding table (41) shows that FVA have a positive impact on employment in services in both sub-samples, but the impact tends to be higher in RRCs than NRRCs. This means that increase in FVA could lead to increase in employment in services sub-sectors of RRCs and NRRCs. Based on this finding, the importation of foreign inputs has the tendency to generate employment in the services sector in developing countries. This is in tandem with the findings of Constantinescu, Mattoo and Ruta (2017) who found that backward linkages or participation in value chains is particularly important in improving economic outcomes. Thus, backward

linkages are vital tool for the reallocation of labour resources to the services sector in developing countries. However, it is important to note that this increases in labour employment in the sector may not necessarily lead to increased productivity in the sub-sector depending on the kinds of employment created at a point in time – suffice to say that developing countries tend to benefit from foreign value addition in terms of increase job opportunities in the services sector.

Important controls such as school enrolment, regulation quality, population, population density, fuel exports, ore and metal exports prove to have significant effects. School enrolment reports positive and significant effect on labour employment in the services sector in RRCs but turns negative effect in NRRCs. This means that the service sector of RRCs have the tendency to benefit from increases in school enrolment more than their non-resource rich counterparts. Regulation quality reveals positive significant impact on SVA in both RRCs and NRRCs but turns a negative significant effect on employment in the sector in RRCs. This means that improvements in business regulatory environment tends to increase value addition in services in developing countries but with a price to pay in RRCs in terms of reduced employment in the services sector. Population density reports positive and significant effect on SVA (but turns negative on employment) in only NRRCs, implying that the increased concentration of people in NRRCs could yield some value addition in services but it has the tendency to reduce employment in the sector. Total population in NRRCs also report negative impact on employment in services implying that increases in population could lead to decreases in employment in services. With respect to the measures of resource endowments, fuel exports have a negative significant impact on SVA in RRCs, while ore and metal exports have positive and significant impact on employment in the services sector in RRCs but report a negative significant impact in NRRCs. These mean that increase in fuel exports tend to decrease SVA in RRCs; increases in ore and metal exports tend to increase employment in the services sector of RRCs but decrease employment in services in NRRCs. All these findings further confirm that country characteristics, institutional factors and resource endowments are important determinants of structural transformation.

Now we turn to the impact of GVCs and trade on the traditional sector (agriculture) in developing countries. Tables 42 and 43 summarize the results in terms of value added and employment in agriculture.

Table 42. GVC, Trade and Agriculture Value Added (AVA)
Dependent Variable: AVA

VARIABLES	(1) Resource-Rich	(2) Non-Resource-Rich	(3) Resource-Rich Robust	(4) Non-Resource-Rich Robust
DVA	3.91e-07	-8.80e-08	3.97e-07	-8.69e-08
	(4.90e-07)	(6.42e-08)	(5.00e-07)	(6.27e-08)
FVA	-6.76e-06	4.03e-08	-6.92e-06	3.44e-08
	(5.95e-06)	(1.49e-07)	(6.32e-06)	(1.54e-07)
Trade	-0.00197	0.0495**	0.000206	0.0484**
	(0.0247)	(0.0215)	(0.0304)	(0.0195)
School enrolment	0.206*	-0.0709	0.206*	-0.0707
	(0.104)	(0.0516)	(0.103)	(0.0516)
Regulation quality	-3.195**	-2.106***	-3.201**	-2.101***
	(1.192)	(0.622)	(1.193)	(0.631)
Inflation	0.111**	-0.00505	0.110**	-0.00647
	(0.0396)	(0.0500)	(0.0413)	(0.0546)
Population	4.55e-07**	1.01e-07*	4.53e-07**	1.01e-07*
	(1.61e-07)	(4.97e-08)	(1.60e-07)	(5.03e-08)
Population density	-0.518***	-0.0138	-0.518***	-0.0140
	(0.145)	(0.0181)	(0.146)	(0.0189)
Land	-0.0108	0.00416	-0.0112	0.00433
	(0.00742)	(0.00419)	(0.00855)	(0.00422)
Fuel exports	0.0104	0.0292	0.0102	0.0290
	(0.0190)	(0.0177)	(0.0193)	(0.0175)
Ore and metal exports	-0.000975	-0.0514	-0.000920	-0.0556
	(0.0262)	(0.0816)	(0.0268)	(0.0772)
FDI net inflows			-0.00962	0.0183
			(0.0626)	(0.137)
Observations	146	113	146	113
R-squared	0.628	0.682	0.629	0.682
Number of countries	19	18	19	18
Year FE	Yes	Yes	Yes	Yes

Source: Author, 2021. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 43. GVC, Trade and Employment in Agriculture
Dependent Variable: Employment in Agriculture

VARIABLES	(1) Resource-Rich	(2) Non-Resource-Rich	(3) Resource-Rich Robust	(4) Non-Resource-Rich Robust
DVA	2.76e-07	6.05e-08***	2.55e-07	6.13e-08***
	(3.56e-07)	(1.46e-08)	(3.54e-07)	(1.41e-08)
FVA	-7.06e-06	-5.01e-07***	-6.46e-06	-5.05e-07***
	(4.23e-06)	(8.67e-08)	(4.29e-06)	(8.12e-08)
Trade	-0.00116	0.0322	-0.00920	0.0313
	(0.0166)	(0.0186)	(0.0184)	(0.0189)
School enrolment	-0.206**	0.0607	-0.206**	0.0609
	(0.0797)	(0.0577)	(0.0788)	(0.0581)
Regulation quality	2.487*	-1.949***	2.509*	-1.945***
	(1.199)	(0.578)	(1.239)	(0.583)
Inflation	-0.0332	-0.0785*	-0.0301	-0.0795*
	(0.0404)	(0.0448)	(0.0417)	(0.0437)
Population	2.52e-07	-3.29e-10	2.59e-07	-2.58e-10
	(1.74e-07)	(2.12e-08)	(1.74e-07)	(2.14e-08)
Population density	-0.317**	0.0291**	-0.316*	0.0290**
	(0.150)	(0.0117)	(0.151)	(0.0116)
Land	-0.00918	0.00622	-0.00805	0.00635
	(0.00547)	(0.00566)	(0.00595)	(0.00565)
Fuel exports	-0.0161	0.0284	-0.0157	0.0283
	(0.0166)	(0.0216)	(0.0169)	(0.0217)
Ore and metal exports	-0.0371*	0.0481	-0.0373*	0.0449
	(0.0210)	(0.0374)	(0.0204)	(0.0395)
FDI net inflows			0.0355	0.0140
			(0.0494)	(0.0944)
Observations	146	113	146	113
R-squared	0.895	0.843	0.896	0.843
Number of countries	19	18	19	18
Year FE	Yes	Yes	Yes	Yes

Source: Author, 2021. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

The results in tables 42-43 indicates that amongst the set of key variables only conventional trade reveals significant impact (which is positive) on AVA in NRRCs implying that increases in trade tend to increase AVA in NRRCs. This means that trade is an instrument for promoting the traditional sector in NRRCs though this could partly retard the reallocation of resources to more modern productive sectors. With respect to employment in agriculture, DVA reports positive and significant impact in NRRCs while FVA reveals a negative and significant impact on AVA still in NRRCs. Thus, these mean that while increase in DVA tend to increase employment in agriculture in NRRCs increase in FVA could lead to decrease in AVA. These findings further confirms that while backward linkage could fasten

structural transformation, forward or vertical linkage could aggravate the expansion of the traditional sector in NRRCs. It is important to point out here that a further investigation is required to ascertain how the positive impact of GVCs and trade on the agricultural sector could affect the more modern industrial sector.

Some controls here also prove to be significant determinants of structural transformation. School enrolment reports positive significant impact on AVA and a negative significant impact on employment in agriculture in RRCs. This means that increases in school enrolment may promote value addition in agriculture though employment in the sector could decline. The quality of regulation is also found to have negative significant effect on AVA in both RRCs and NRRCs which means that increase in the quality of regulation could decrease AVA in both RRCs and NRRCs. However, the effect of regulatory quality on employment in the agricultural sector is positive and significant in RRCs and remain negative in NRRCs. These could mean that increase in regulation quality tends to lead to increase in employment in agriculture (but not in its value addition) in RRCs but it tends to decrease employment (and value addition) in NRRCs. Inflation turns a positive and significant impact on AVA in RRCs but reports a negative and significant impact on employment in agriculture in NRRCs implying that increase in inflation tends to increase AVA in RRCs but decrease employment in agriculture in NRRCs. Population affects AVA positively and significantly in both RRCs and NRRCs with population density exerting a negative and significant effect on share of labour employment in agriculture in both categories of developing countries. Thus, this means that while increase in population tends to increase AVA in RRCs and NRRCs the increase in population density tend to lead to decrease in employment in agriculture in both RRCs and NRRCs. More so, the effect of ore and metal exports on labour employed in agriculture is negative and significant in RRCs implying that increases in ore and metal exports could decrease employment in agriculture.

Again, the results are robust to controlling for FDI net inflows as an important ingredient in studying the GVCs-structural transformation nexus in developing countries. In the appendix, we also present results from an alternative specification where the full sample is used, and the three key explanatory

variables are used alongside multiplicative dummies representing RRCs (resource rich countries). The impact of GVCs-related trade and conventional trade on structural transformation tend to vary according to resource endowments and most importantly GVC-related trade tend to matter more than conventional trade in the structural transformation of developing countries. Specifically, the share of foreign value added in gross GVC exports is found to be responsible for increased 'servicification' and reduced employment in agriculture while conventional trade on the other hand significantly reduced employment in services but increased employment in agriculture.

4.5. Lessons

Though our analysis show that the share of domestic value added in gross GVC-related exports and conventional trade have the tendency to aggravate employment and value addition respectively in the agricultural sector of NRRCs, it does not show how such effects could translate into a robust or weak modern industrial sector. More so, the findings that increases in conventional trade tend to significantly decrease value-added in manufacturing in RRCs while the increase in share of foreign value added in gross GVC-related trade tends to increase significantly the share of labour employment in services but not the value added in the sub-sector tend to have strong implications for what constitute an appropriate development strategy in developing countries. As posited by Svejnar and Lin (2021) that every country requires the right development strategy to tap into their potential, the analysis in this chapter further re-enforces what Lin calls China's pragmatic dual-track strategy. China's economic ascent since the end of the 1970s provides an interesting and challenging case for the study of structural transformation-led economic progress because of its political economy and size as well as structural imbalances since the mid-1990s (Yao, 2014). In fact, it is a contemporary sample for other developing countries. The dual-track strategy means that a developing country embarking on structural reforms should be pragmatic employing transitory and transitional protection. In more clear terms, it means that for developing countries to leapfrog their economies into advanced ones they must not discard the traditional sectors completely. In other words, labour intensive traditional sectors where these countries have comparative advantage requires government facilitation while liberalisation is being carefully

pursued to prepare them for more fertile removal of distortions and a result-oriented comparative advantage defying strategy that also taps into their sectors of comparative advantage. Carefully participating in GVCs therefore has the potential to turn developing countries' sectors of comparative advantage into their competitive advantage in the global economy.

The findings that institutional and regulatory factors as well as population matter in structural transformation have implications for the development of domestic capabilities in developing countries. This implies that developing domestic capabilities in terms of institutional and regulatory infrastructure in developing countries is vital for effective structural transformation (Mijiyawa, 2017; Morrison et al., 2007; Tiwari et al., 2012). Developing countries must be willing to pay the huge price for correcting their structural imbalances by increasing investments in the development of domestic capabilities and infrastructure which are required for increased technological innovations and consequently lead to industrial upgrading. This would no doubt require years or decades of consistent and appropriate macroeconomic policies.

5. Conclusion

5.1. Summary of Findings

First, it is important to give a brief background to the findings and conclusions drawn from the thesis. The role of finance in economic growth and development has long been studied and debated (Levine, 2005). This is because financial systems all over the world could play fundamental roles in enhancing the growth and development of economies. The effectiveness and efficiency in performing these roles, particularly the intermediation between the surplus and deficit units of the economy, depend on the level of development of the financial system. Thus, development economists have argued that economic growth depends on capital accumulation and underscored this as a central problem in economic development. Since capital accumulation requires financing through financial intermediation, it influences economic growth and development by affecting the extent to which savings become available and are allocated to investment opportunities that bring the highest returns. It is to ensure its soundness that the financial sector appears to be the most regulated and controlled by the government and its agencies.

Dominant evidence on financial development and growth tend to ignore exploring whether finance could help explain the source of growth based on the specialization of countries. The general idea that financial systems could play essential role in promoting economic development dates to Bagehot (1873) and Schumpeter (1911). Since then, empirical evidence on the relationship between finance and growth keep evolving over time with most developing countries still very unsuccessful in achieving sustainable economic growth and development. Whether mainstream or heterodox, what constitute appropriate growth strategies for developing countries is complex and highly debatable.

Hence, it is the goal of this thesis to explore some of the arguments and consider the prevailing conditions and targets specific to developing countries that could help to understand the possible effective strategies for achieving sustainable growth. This is done by considering first the role of financial development in determining growth strategies in developing countries, follow by examining the

impact of liberal and interventionist policies on economic diversification and finally investigating the role of GVCs in structural transformation.

To achieve these aims, the thesis is designed to include three empirical chapters in addition to two chapters - one for the introduction and the other for the conclusion. The first empirical chapter studies the relationship between financial development and growth strategies. The second considers the role of liberal and state policies in economic diversification while the third empirical chapter investigates the impact of GVC-related trade on structural transformation.

The main results of this thesis can be summarised as follows:

Chapter two (the first empirical chapter) shows financial development in terms of credit to the private sector tends to lead developing countries to specialize according to their comparative advantage (comparative advantage – following growth strategy). This is because this measure of financial development is reported to have a negative and significant impact on technology choice. In terms of deposit money banks assets, we also find their effects on the measure of growth strategy to be negative and significant. Hence, financial development in terms of deposit banks' assets tend to lead to CAF in developing countries. Another important finding in this chapter is that investment (measured by gross fixed capital formation, net foreign investment inflows (used as measure of international capital flows) and fuel exports (measure of resource dependence) are found to be statistically significant controls in determining technology choice in developing countries. Investment and net FDI inflows tend to lead to CAD, while we find that fuel exports tend to lead to CAF. Other relevant controls found to be significant in our robustness checks include country size characteristics such as population density and land area. More so, past values (lagged) growth strategy is found to be positive and significant. Thus, it could be concluded based on this that in addition to financial factors other economic and non-economic factors are determinants of growth strategies and that past growth strategy is useful in determining current strategy in developing countries.

The main finding in chapter three is that state intervention in terms of fiscal and regulatory tools seem to matter in the economic diversification of resource-rich developing countries. Specifically, we find that fiscal measures such as tax to GDP

ratio, government expenditure on education and regulation appear to have a negative significant impact on the index of economic diversification. This means these measures tend to promote the manufacturing sector more than services in the sampled countries. Thus, this could mean increased industrialisation as manufacturing sector gets more boost because of these interventionists policies. It is also found that government expenditure on health appear to have a positive significant impact on the index of economic diversification. This means while government expenditure on education tend to promote manufacturing relative to services sector, government expenditure on health seems to have the contrary impact.

The third chapter also finds that financial liberalisation in terms of interest rate, trade openness and tariff tend to have a negative and significant impact on the index of economic diversification. Thus, they are vital tools for promoting manufacturing relative to services in resource-rich developing countries. In addition, the chapter finds that the level of income, resource rents per capita, and agricultural exports affect our diversification index negatively meaning they tend to increase manufacturing relative to services. Strikingly, net FDI inflows report to have a positive impact on diversification index implying that the inflows of foreign capital tend to promote services relative to manufacturing in developing countries. In addition, it is found in this chapter that the interaction of fiscal measures with regulation indeed matter. It reveals that the interaction of regulation with tax potentials yields negative and significant effect on diversification index while the interaction of regulation with government expenditures on health and education tend to have a positive effect on diversification index. Hence, we can conclude that the interaction of regulation with government expenditures could lead to the promotion of services at the expense of manufacturing while regulating tax potentials could help promote manufacturing relative to services in developing countries. The interaction of regulation with financial liberalization in terms of interest rate and tariff also reveals a positive significant impact on diversification index leading to the conclusion that regulating interest rates and tariff could lead to the promotion of services relative to manufacturing in the sampled countries

The key findings of chapter four are summarized based on the categories of the sample of counties and in terms of the key sectors based on the definition of structural transformation as the reallocation of economic activities across the broad sectors manufacturing, services, and agriculture. First the chapter reveals that conventional trade seems to have a negative and significant impact on manufacturing output while GVC-related trade variables turn to be insignificant in RRCs. In NRRCs however, it reveals the contrary as GVC-related trade variables tend to have significant impact on manufacturing output and conventional trade returns insignificant estimate. It further shows that DVA is positive while FVA is negative. With respect to the impact on employment in the industrial sector, the chapter finds that DVA reports a negative and significant impact on employment in industry.

Next, with respect to the services sector the chapter reports important evidence that FVA tends to have a positive and significant effect on employment in the sector in both RRCs and NRRCs. It is however surprising that no evidence is found on the effects of the key variables on value added in the services sector.

Finally, the chapter also reveals some interesting findings with respect to the agricultural sector. Conventional trade is found to have a positive and significant impact on agricultural value added in NRRCs. While DVA reports a positive significant effect on employment in agriculture, FVA tends to have a negative significant impact on employment in the sector in NRRCs. The institutional controls and country characteristics seem to also matter in both RRCs and NRRCs.

5.2. Academic Contributions

Some of the findings of this thesis can be viewed as important academic contributions to the debate on strategizing growth in developing countries. The main contributions of the thesis can be summarized as follows:

The findings of chapter two help to provide some evidence on whether financial development could lead to CAF or CAD growth strategies in developing countries. This is unique evidence that has been ignored in the literature on finance and development. Previous studies dwell on the relationship between financial development and growth and the relationship between growth strategy and

economic development. Thus, the finding that financial development tends to lead to CAF in developing countries is a vital literature contribution to the proponents of CAF growth strategy in developing countries.

Another important contribution of the chapter is that it tends to provide some useful evidence on the determinants of growth strategies in developing countries. For instance, apart from the evidence the past strategy could significantly affect current strategy it was found that investment, net FDI inflows, fuel exports, openness and country characteristics are critical in modelling growth strategy and financial development. In other words, they are found to be important determinants of strategies for growth in developing countries. This is a good step towards igniting further debates on the crucial factors that are likely to be considered when strategizing economic growth and development especially in countries that are economically backward.

In chapter three, there are few contributions to knowledge too. First, the finding that fiscal measures (except government expenditure on health) and regulation tend to promote the manufacturing sector relative to services is an important contribution to the literature on the effects of government intervention on economic diversification. It is notably in tandem with the claims in the literature that government intervention could promote more industrialisation (manufacturing) which is often considered by some economists as the magic bullet for economic growth and development in developing countries.

The finding that financial and trade liberalization tend to also promote manufacturing relative to services helps in shading light on some of the misgivings about liberalization in developing countries. This means that if properly harnessed, liberalisation could be useful stimulating factors for industrialization via improvement in manufacturing. In addition, the findings on the interaction effects of regulation with other tools yield another important contribution that regulation indeed matters in determining the efficacy of the other interventionist and liberal measures. Except for the interaction of regulation and tax revenue which tends to lead to the promotion of manufacturing relative to services, the rest of the interaction effects tend to favour services relative to manufacturing. This supports the claims that the services sector in developing countries is developing more rapidly than manufacturing.

The findings in the fourth chapter also provide some useful contribution on the role of GVCs-related trade and conventional trade in structurally transforming RRCs and NRRCs. The sub-sample approach is particularly unique as it clarifies that integration into the global economy could have different effects on RRCs and NRRCs. With respect to improving value addition in manufacturing, GVC-related trade seems to matter in NRRCs but not in RRCs though FVA (a component of GVC-related trade) matters for employment in the services sector in both NRRCs and RRCs. Moreover, conventional trade matters for value addition in the agricultural sector of NRRCs while DVA and FVA also prove to be useful determinants of employment in agriculture in these countries. It is important to note that the approach of using sectoral value-added as measure of output and sectoral employment shares as measure of labour use in each sector to proxy structural transformation is unique and could be important in understanding how the determinants of structural transformation could positively affect employment but may fail to increase output. This could be a situation where increase in employment fails to translate into increase in output in developing countries.

5.3. Policy Implications

Sequel to the academic contributions, it is important to highlight some of the salient policy implications. Though the analysis carried out and the findings in the thesis are simple and hence limited, a few policy implications can be drawn from them. The policy implications do not in any way amount to recommendations because it is not the goal of this thesis to determine or endorse any growth strategies or policies to developing countries but to strictly focus on giving evidence based on the data and theory. We describe the policy implications thus below.

The findings reported in chapter two suggests that financial development (especially in terms of financial depth) could help in promoting CAF growth strategy in developing countries and that previous growth strategy could influence present strategy. This underscores the relevance of financial liberalisation in harnessing the endowments in developing countries. However, as argued by Coniglio et al., (2021) a country's specialisation evolves over time, with shifts in comparative advantages resulting in new products which may be related or unrelated to the country's initial specialisation pattern. In addition to the

dynamism in specialisation, financial development is endogenous hence it may equally make sense to say that specialisation of countries could influence their financial development. While current comparative advantage may matter, latent comparative advantage may even matter more in the growth process of developing countries. The findings of the chapter consequently raise questions on the counter-intuitiveness of the principle of comparative advantage in developing countries as increases in financial development (in terms of depth) tends to lead them to follow their comparative advantage but in terms of financial efficiency, financial development tends to be CAD. This is contrary to expectations.

The results shown in chapter three imply that interventionists policies and liberalisation could matter for economic diversification in resource-rich developing countries. The chapter shows that the use of these policies could help encourage moving towards more modern productive sectors such as manufacturing and services. The findings further suggest that implementing interventionists and liberal policies in resource-rich countries has the tendency to favour manufacturing more than services sector. The interaction of these policies with regulation quality, however, suggests that increase regulation in developing countries could be responsible for increase servicification (the expansion of the services sector in terms of size and output). This could mean that regulated policies are a more potent way of improving the services sector although it is not clear how such improvement in services could lead to industrialization. In addition, it could also mean that focusing on fixing regulatory institutions in developing countries has the potential to help in economic diversification. More efficient regulatory institutions could mean more efficient interventionists and liberal policies.

In the fourth chapter, the findings have implication for designing strategies for structurally transforming developing countries based on their integration with the rest of the world and their factor endowments. In RRCs, the finding that conventional trade tends to negatively affect MVA implies that trade openness may not be useful strategy in these countries if the goal is to encourage industrialization. However, FVA seems to matter in encouraging employment in services in both RRCs and NRRCs. The findings in terms of GVC-related trade suggests that NRRCs may benefit more as DVA tends to promote manufacturing

and agriculture and conventional trade seems to matter in improving the agricultural sector in these countries. Since they are not rich in natural resources, this could be to their advantage since the improvement in agricultural value added and services might be helpful in enhancing their industrialization. Though our analysis does not show how development in one sector could lead to development in another sector, the findings are useful in understanding how integration into the global economy by developing countries could be useful in enhancing value addition and employment in different sectors.

Overall, the findings of the thesis imply that all hope is not lost in developing countries. Given their factor endowments, developing countries could harness them with the appropriate combination of interventionists and liberal policies as well as the right mix of domestic and foreign value addition in promoting economic diversification and structural transformation. It remains however, a challenge for these countries to draw a line between what constitutes effective strategies or policies and those that tend to retard economic growth and development.

5.4. Suggestions for Further Research

As pointed out earlier, the analysis in this thesis is simple and though limited by a few challenges such as methodological issues (endogeneity of financial development and growth strategies, the sensitivity of GMM to instruments and lags and data porosity) it has succeeded in opening areas for further research. Thus, below are some suggestions for a deeper dive into analysing strategizing growth in developing countries.

The empirical analysis in chapter two focuses on banking sector development and specialisation in developing countries. This suggests that we neglect the development of the capital market in the model. Though data on capital market development is scarce, modelling the role of capital markets may yield intriguing results and further enhance understanding growth strategies in developing countries. In addition, our analysis does not show what strategies could yield more desirable industrialization outcomes. Hence, determining the superiority of one strategy over another could be a critical area to investigate. Recently, sustaining growth even in developed countries is a challenge given the impact of climate change and other determinants of sustainable growth. This means it may not be

out of place to extend the contribution in this chapter to some selected advanced countries to find out the possible role of finance in strategizing sustainable growth amid climate crises. More so, as more data become available a product-level approach may be worth delving into.

Other areas for further research based on the focus of chapter two could be on the effect of financial technology on financial development. The emergence of Industry 4.0 – the fourth industrial revolution has brought rapid developments in finance and the world's financial system is dramatically changing. This could have profound consequences for financial development in both developed and developing countries. In addition, the possible cumulative impact on financial inclusion and income inequality remains a subject of debate thereby making adjusting financial sector policies and regulation more challenging than ever before. Future researchers may, therefore, find this a fertile area for investigation especially in developing countries.

From the analysis of chapter three, the striking role of regulation quality found in the chapter could also provoke research into the role of specific regulatory institutions in developing countries. This is a major area of research as the mainstream economists often attributes the failure of market forces to weak institutions in developing countries. In addition, further study could be undertaken on policy mix where a nuanced analysis of combining specific interventionists and liberal policies may be undertaken. Notably, the debate on state intervention versus liberal policies remains far from being conclusive. This chapter only succeeded in igniting the debate leaving room for more research on them in achieving more specific targets and goals in developing countries.

In chapter four, the sectoral approach used could ignite future research on structural transformation in developing countries which could be more microeconomic in approach. Though this depends on the availability of data, a more disaggregated approach could yield more specific findings and implications especially for industrial upgrading in developing countries. Based on the findings of the chapter, another key area for further research is to take a deeper investigation into the role of the services sector in promoting industrialization in more open developing countries. While conventional theory has it that developing countries could industrialize faster if they focus on manufacturing, the current

pattern of structural transformation (increase in services sector, with agriculture still playing a key role) in these countries means there is more room for research in this area.

5.5 Limitations of the Study

The study is limited by some methodological issues. First, the GMM method of analysis used in chapter two is prone to generating estimators that could carry great and underappreciated risk where estimates could be invalid but may test valid (Roodman, 2009). To have some confidence in the GMM results therefore, we follow Roodman's suggestions that is customary to report the one step results in addition to two step results and because of the downward bias in the computed standard errors in two step results. More so, we applied the Windmeijer (2005) correction which greatly reduced this problem. Though the study also relied on economic theory to determine the exogeneity and endogeneity of the variables in the GMM model estimation, the Sargan and Hansen statistics were reported to test for overidentifying restrictions, and the AR (2) statistics were also reported to confirm the absence of second order serial correlation. In addition, lags were restricted to two to avoid the problems of too many instruments.

Another limitation of the study has to do with the panel fixed effects approach used in chapters three – four. Though panel fixed effects have the advantage of having a data whose degree of freedom is large with less multicollinearity – which simplify computation and statistical inference as in our case, Hsiao (2005) argued that in fixed effects specifications it is often difficult to obtain enough degree of freedom to have precise information on the incidental parameters. Thus, the dependence of inference on the structural parameters on the imprecise incidental parameters affects the robustness of estimates. A plausible way out that was adopted in this study involves eliminating the incidental parameters or constants from the model estimation.

Sequel to the forgoing limitations, the findings and implications from the study are thus interpreted with some caution. Nonetheless, the insights from the study are helpful in shaping the course of research on finance and development especially in developing countries amongst other areas as identified in the previous section.

Appendix I

Classification of Countries

Distribution of Countries by Income Levels

High Income Countries:
Andorra, Antigua Barbuda, Aruba, Australia, Austria, Bahamas, Bahrain, Barbados, Bermuda, Virgin Islands, Brunei
Canada, Cayman Islands, Chile, Croatia, Curacao, Czech Republic, Denmark, Estonia, Faroe Islands, Finland, France, French Polynesia, Germany, Greece, Greenland, Guam, Hong Kong, Virgin Islands (US (United States)), Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea Rep, Kuwait, Latvia, Liechtenstein, Lithuania, Macao, Malta, Monaco, Nauru, Netherlands, New Caledonia, New Zealand, North Mariana Islands, Oman, Palau, Poland, Portugal, Puerto Rico, Qatar, San Marino, Saudi Arabia, Singapore, Sint Maarten, Slovakia, Slovenia, Spain, St Kitts & Nevis, St Martin, Sweden, Trinidad & Tobago, Turks & Caicos Islands, UAE (United Arab Emirates), UK (United Kingdom), US, Uruguay.

Middle Income Countries:
Angola, Algeria, Bangladesh, Belize, Benin, Bhutan, Bolivia, Cabo Verde, Cameroon, Comoros, Congo Rep, Cote d'Ivoire, Djibouti, Egypt, Elsavador, Eswatini, Haiti, Honduras, India, Indonesia, Iran, Kenya, Kiribati, Kyrgyz, Lesotho, Mauritania, Micronesia, Mongolia, Morocco, Myanmar, Nepal, Nicaragua, Pakistan, PNG, Philippines, Samoa, Sao Tome, Senegal, Solomon Islands, Sri Lanka, Tajikistan, Timor-Leste, Tunisia, Ukraine, Uzbekistan, Vanuatu, Vietnam, West Bank, Zimbabwe, Albania, Samoa, Argentina, Armenia, Azerbaijan, Belarus, Bosnia, Botswana, Bulgaria, China, Colombia, Costa Rica, Cuba, Dominica, Dominican Rep, Equatorial Guinea, Fiji, Gabon, Georgia, Grenada, Guatemala, Guyana, Iraq, Jamaica, Kazakhstan, Kosovo, Lebanon, Libya, Malaysia, Maldives, Marshal Islands, Mauritius, Moldova, Namibia, North Macedonia, Panama, Paraguay, Peru, Romania, Russia, South Africa, St Lucia, St Vincent, Suriname, Thailand, Tonga, Turkey, Turkmenistan, Montenegro

Lower Income Countries:
Afghanistan, Burkina Faso, Burundi, Central Africa Rep, Chad, Congo Dem Rep, Eritrea, Ethiopia, Guinea, Guinea-Bissau, Korea Dem PR, Liberia, Madagascar, Malawi, Mali, Mozambique, Rwanda, Sierra Leone, Somalia, South Sudan, Sudan, Syria, Togo, Uganda.

Source: World Bank's Classification, 2021

Note: HIC- are those countries whose 2020 GNI per capita is $12, 696 or more; LIC – are countries whose 2020 GNI per capita is $1, 045 or less and MIC – are countries whose GNI per capita is between $1, 046 and $12, 695.

Appendix II

Correlation Coefficients for Financial Depth (FD) Model

Variable	TCII	FD	GFCF	Fuel export	Openness	Pop density	Land area
TCII	1	-0.489	0.055	0.285	-0.113	-0.395	0.385
FD	-0.372	1	0.253	-0.069	0.264	0.273	-0.200
GFCF	0.092	0.226	1	0.065	0.206	0.081	0.012
Fuel export	0.327	-0.183	0.087	1	-0.041	-0.288	0.431
Openness	-0.137	0.509	0.154	-0.059	1	0.007	-0.331
Pop density	-0.162	0.493	0.071	-0.081	0.729	1	-0.540
Land area	-0.046	0.062	0.075	0.182	-0.178	-0.092	1

Correlation Coefficients for Financial Access (FA) Model

Variable	TCII	FA	GFCF	Fuel export	Openness	Pop density	Land area
TCII	1	-0.432	0.198	0.186	-0.026	-0.326	0.226
FA	-0.328	1	0.030	0.149	0.293	0.116	-0.115
GFCF	0.125	-0.038	1	0.102	0.210	-0.075	0.128
Fuel export	0.337	0.044	0.119	1	0.053	-0.315	0.410
Openness	-0.069	0.426	0.140	0.006	1	-0.134	-0.298
Pop density	-0.111	0.393	0.053	-0.065	0.693	1	-0.583
Land area	-0.068	-0.063	0.232	0.090	-0.216	-0.098	1

Correlation Coefficients for Financial Efficiency (FE) Model

Variable	TCII	FE	GFCF	Fuel export	Openness	Pop density	Land area
TCII	1	0.306	0.094	0.273	-0.106	-0.384	0.382
FE	0.136	1	-0.259	-0.100	-0.138	-0.240	0.049
GFCF	0.114	-0.262	1	0.035	0.206	0.049	0.014
Fuel export	0.328	-0.055	0.054	1	-0.037	-0.273	0.397
Openness	-0.141	-0.101	0.128	-0.062	1	-0.033	-0.311
Pop density	-0.162	-0.138	0.049	-0.084	0.739	1	-0.546
Land area	-0.051	-0.050	0.067	0.188	-0.172	-0.093	1

Correlation Coefficients for Financial Stability (FS) Model

Variable	TCII	FS	GFCF	Fuel export	Openness	Pop density	Land area
TCII	1	-0.173	0.086	0.267	-0.103	-0.387	0.379
FS	-0.165	1	0.044	-0.088	0.142	0.163	-0.139
GFCF	0.111	0.091	1	0.037	0.202	0.052	0.014
Fuel export	0.327	-0.123	0.055	1	-0.033	-0.266	0.391
Openness	-0.140	0.148	0.127	-0.061	1	-0.027	-0.313
Pop density	-0.163	0.120	0.050	-0.083	0.738	1	-0.545
Land area	-0.052	-0.047	0.068	0.188	-0.173	-0.092	1

Appendix III

Ranking of Countries with the Lowest and Highest SVA to MVA ratio

Top 10 Countries with the Lowest SVA to MVA Ratio

Rank	Country	SVA to MVA Ratio	SVA	MVA
1	Libya	0	.	5.18
2	Syrian Arab Rep.	0	.	5.29
3	Oman	0.67	42.56	6.12
4	Algeria	1.18	39.96	7.05
5	Equatorial Guinea	1.57	29.33	7.34
6	Indonesia	1.68	40.27	7.43
7	Turkmenistan	1.71	31.33	7.50
8	Qatar	1.93	39.35	8.10
9	Central African Rep.	1.94	37.28	.
10	Vietnam	2.47	40.39	.

Source: Author's Computation using Stata 14, 2021

Top 10 Countries with the Highest SVA to MVA Ratio

Rank	Country	SVA to MVA Ratio	SVA	MVA
1	Botswana	8.89	50.02	5.65
2	Albania	9.04	44.71	5.02
3	Guyana	9.26	37.58	4.31
4	Sao Tome & Princip	10.36	70.80	7.02
5	Papua New Guinea	10.74	44.37	4.76
6	Sierra Leone	12.52	29.57	3.00
7	Mali	13.53	36.14	2.68
8	Liberia	16.41	37.34	2.57
9	Chad	21.09	37.49	4.83
10	Madagascar	.	51.53	.

Source: Author's Computation using Stata 14, 2021

Robustness checks of benchmark regressions using additional controls

Result of adding population as a control

Dependent variable: SVA to MVA ratio

Variables	(1) I	(2) II	(3) III	(4) IV
taxrevgdp	-0.252**	-0.624***	-0.252*	-0.624**
	(0.110)	(0.182)	(0.131)	(0.251)
govhealthex	0.763***	0.758***	0.763**	0.758**
	(0.214)	(0.179)	(0.256)	(0.247)
govexedu	-0.123	-0.214**	-0.123	-0.214*
	(0.0990)	(0.0800)	(0.118)	(0.110)
totalreg	-0.0262***	-0.0298**	-0.0262**	-0.0298*
	(0.00777)	(0.0112)	(0.00929)	(0.0155)
privcreditbanks	0.0125	-0.153	0.0125	-0.153
	(0.0456)	(0.135)	(0.0545)	(0.186)
interestrate	-0.239*	-0.234*	-0.239	-0.234
	(0.110)	(0.126)	(0.132)	(0.174)
openness	-0.0326*	-0.0435**	-0.0326*	-0.0435
	(0.0148)	(0.0174)	(0.0177)	(0.0240)
tariffall	-0.0665	-0.204**	-0.0665	-0.204*
	(0.0450)	(0.0802)	(0.0538)	(0.111)
gdppc	-0.00232*	-0.00467***	-0.00232	-0.00467**
	(0.00115)	(0.00106)	(0.00137)	(0.00147)
exconst	-0.729	1.150	-0.729	1.150
	(0.567)	(1.129)	(0.677)	(1.557)
resourceexp	-0.0137	-0.00902	-0.0137	-0.00902
	(0.0154)	(0.0192)	(0.0185)	(0.0264)
resrentpc	-0.527**	-0.836*	-0.527*	-0.836
	(0.225)	(0.404)	(0.268)	(0.557)
agricexp	-0.139**	-0.116	-0.139**	-0.116
	(0.0494)	(0.0770)	(0.0591)	(0.106)
netfdii	0.0862***	0.138***	0.0862**	0.138***
	(0.0241)	(0.0306)	(0.0288)	(0.0422)
population	0.0781	-0.302	0.0781	-0.302
	(0.152)	(0.226)	(0.181)	(0.312)
Observations	46	46	46	46
R-squared	0.760	0.926	0.971	0.991
Number of c_id	10	10		
Country FE	No	No	Yes	Yes
Year FE	No	Yes	No	Yes

Robust standard errors in parentheses; Additional control in bold

*** p<0.01, ** p<0.05, * p<0.1

Result of adding land area as a control
Dependent variable: SVA to MVA ratio

Variables	(1) I	(2) II	(3) III	(4) IV
taxrevgdp	-0.216*	-0.524***	-0.222*	-0.526**
	(0.103)	(0.148)	(0.117)	(0.216)
govhealthex	0.767***	0.846***	0.766**	0.844***
	(0.209)	(0.184)	(0.245)	(0.238)
govexedu	-0.108	-0.213**	-0.111	-0.214**
	(0.103)	(0.0660)	(0.119)	(0.0838)
totalreg	-0.0288***	-0.0193**	-0.0280***	-0.0194*
	(0.00675)	(0.00792)	(0.00805)	(0.00956)
privcreditbanks	0.00978	-0.0442	0.0139	-0.0464
	(0.0426)	(0.0977)	(0.0500)	(0.124)
interestrate	-0.239*	-0.315**	-0.239	-0.313*
	(0.111)	(0.100)	(0.131)	(0.141)
openness	-0.0357**	-0.0332*	-0.0347*	-0.0326
	(0.0152)	(0.0161)	(0.0173)	(0.0257)
tariffall	-0.0629	-0.171**	-0.0679	-0.172*
	(0.0438)	(0.0616)	(0.0565)	(0.0889)
gdppc	-0.00188	-0.00412***	-0.00202	-0.00414***
	(0.00113)	(0.000885)	(0.00132)	(0.00125)
exconst	-0.673	0.375	-0.727	0.387
	(0.573)	(0.789)	(0.681)	(1.077)
resourceexp	-0.0165	-0.00382	-0.0155	-0.00330
	(0.0160)	(0.0164)	(0.0190)	(0.0252)
resrentpc	-0.556**	-0.639*	-0.534*	-0.637
	(0.218)	(0.338)	(0.263)	(0.446)
agricexp	-0.148***	-0.146*	-0.148**	-0.145
	(0.0398)	(0.0785)	(0.0457)	(0.0963)
netfdii	0.0877***	0.115***	0.0868**	0.115***
	(0.0225)	(0.0221)	(0.0276)	(0.0312)
Land area	0.133**	0.0272	1.93e-05***	3.90e-05***
	(0.0435)	(0.261)	(5.78e-06)	(1.10e-05)
Observations	46	46	46	46
R-squared	0.759	0.920	0.971	0.990
Number of c_id	10	10		
Country FE	No	No	Yes	Yes
Year FE	No	Yes	No	Yes

Robust standard errors in parentheses; Additional control in bold
*** p<0.01, ** p<0.05, * p<0.1

Result of adding population density as a control
Dependent variable: SVA to MVA ratio

Variables	(1) I	(2) II	(3) III	(4) IV
taxrevgdp	-0.106	-0.478***	-0.106	-0.478**
	(0.101)	(0.121)	(0.121)	(0.167)
govhealthex	0.749***	0.869***	0.749***	0.869***
	(0.170)	(0.167)	(0.203)	(0.231)
govexedu	-0.0792	-0.208**	-0.0792	-0.208*
	(0.0828)	(0.0731)	(0.0990)	(0.101)
totalreg	-0.0173***	-0.00968	-0.0173***	-0.00968
	(0.00443)	(0.00838)	(0.00530)	(0.0115)
privcreditbanks	0.0975***	0.0334	0.0975**	0.0334
	(0.0267)	(0.0694)	(0.0319)	(0.0957)
interestrate	-0.290***	-0.391***	-0.290***	-0.391**
	(0.0716)	(0.0932)	(0.0856)	(0.128)
openness	-0.0474***	-0.0443**	-0.0474**	-0.0443*
	(0.0134)	(0.0169)	(0.0160)	(0.0233)
tariffall	-0.0431	-0.145**	-0.0431	-0.145
	(0.0487)	(0.0579)	(0.0582)	(0.0798)
gdppc	-0.00248**	-0.00494***	-0.00248**	-0.00494**
	(0.000889)	(0.00111)	(0.00106)	(0.00153)
exconst	-0.241	0.245	-0.241	0.245
	(0.466)	(0.712)	(0.557)	(0.981)
resourceexp	-0.0126	-0.00397	-0.0126	-0.00397
	(0.0126)	(0.0183)	(0.0150)	(0.0252)
resrentpc	-0.350*	-0.481	-0.350	-0.481
	(0.188)	(0.303)	(0.225)	(0.417)
agricexp	-0.156***	-0.170**	-0.156***	-0.170*
	(0.0306)	(0.0626)	(0.0365)	(0.0863)
netfdii	0.0700**	0.0996***	0.0700*	0.0996***
	(0.0268)	(0.0187)	(0.0320)	(0.0257)
Population density	-0.109***	-0.0573*	-0.109***	-0.0573
	(0.0259)	(0.0261)	(0.0310)	(0.0360)
Observations	46	46	46	46
R-squared	0.786	0.924	0.974	0.991
Number of c_id	10	10		
Country FE	No	No	Yes	Yes
Year FE	No	Yes	No	Yes

Robust standard errors in parentheses; Additional control in bold
*** p<0.01, ** p<0.05, * p<0.1

Result of adding aged dependency ratio as a control
Dependent variable: SVA to MVA ratio

Variables	(1) I	(2) II	(3) III	(4) IV
taxrevgdp	-0.259**	-0.524***	-0.259*	-0.524**
	(0.113)	(0.152)	(0.136)	(0.210)
govhealthex	0.752***	0.850***	0.752**	0.850***
	(0.197)	(0.178)	(0.235)	(0.246)
govexedu	-0.126	-0.207**	-0.126	-0.207*
	(0.111)	(0.0722)	(0.132)	(0.0995)
totalreg	-0.0320**	-0.0175*	-0.0320**	-0.0175
	(0.0107)	(0.00808)	(0.0128)	(0.0111)
privcreditbanks	0.0117	-0.0422	0.0117	-0.0422
	(0.0379)	(0.0944)	(0.0453)	(0.130)
interestrate	-0.200	-0.353**	-0.200	-0.353*
	(0.118)	(0.128)	(0.140)	(0.177)
openness	-0.0293*	-0.0371	-0.0293	-0.0371
	(0.0140)	(0.0216)	(0.0168)	(0.0298)
tariffall	-0.0744	-0.164**	-0.0744	-0.164*
	(0.0413)	(0.0621)	(0.0494)	(0.0857)
gdppc	-0.00189	-0.00445***	-0.00189	-0.00445**
	(0.00109)	(0.00123)	(0.00130)	(0.00169)
exconst	-0.806	0.456	-0.806	0.456
	(0.548)	(0.917)	(0.655)	(1.264)
resourceexp	-0.0116	-0.00583	-0.0116	-0.00583
	(0.0176)	(0.0183)	(0.0210)	(0.0253)
resrentpc	-0.457*	-0.664*	-0.457	-0.664
	(0.246)	(0.349)	(0.294)	(0.481)
agricexp	-0.154***	-0.144*	-0.154**	-0.144
	(0.0439)	(0.0726)	(0.0525)	(0.100)
netfdii	0.0856***	0.118***	0.0856**	0.118***
	(0.0240)	(0.0255)	(0.0287)	(0.0352)
Dependency ratio	-0.106	0.0547	-0.106	0.0547
	(0.170)	(0.130)	(0.204)	(0.179)
Observations	46	46	46	46
R-squared	0.761	0.920	0.971	0.991
Number of c_id	10	10		
Country FE	No	No	Yes	Yes
Year FE	No	Yes	No	Yes

Robust standard errors in parentheses; Additional control in bold
*** p<0.01, ** p<0.05, * p<0.1

Result of adding investment (proxy by GFCF) as a control
Dependent variable: SVA to MVA ratio

Variables	(1) I	(2) II	(3) III	(4) IV
taxrevgdp	-0.263	-0.481***	-0.263	-0.481**
	(0.151)	(0.123)	(0.185)	(0.186)
govhealthex	0.794***	1.006***	0.794***	1.006***
	(0.176)	(0.180)	(0.216)	(0.272)
govexedu	-0.179**	-0.217***	-0.179*	-0.217**
	(0.0669)	(0.0583)	(0.0819)	(0.0881)
totalreg	-0.0376**	-0.0103*	-0.0376**	-0.0103
	(0.0124)	(0.00501)	(0.0152)	(0.00758)
privcreditbanks	0.0162	0.115	0.0162	0.115
	(0.0575)	(0.0643)	(0.0705)	(0.0972)
interestrate	-0.0451	-0.366**	-0.0451	-0.366
	(0.268)	(0.161)	(0.328)	(0.243)
openness	-0.0387**	-0.0558***	-0.0387**	-0.0558**
	(0.0123)	(0.0120)	(0.0150)	(0.0181)
tariffall	-0.0247	-0.0843***	-0.0247	-0.0843**
	(0.0563)	(0.0218)	(0.0690)	(0.0330)
gdppc	-0.00228	-0.00382**	-0.00228	-0.00382*
	(0.00189)	(0.00133)	(0.00232)	(0.00201)
exconst	-0.616	0.209	-0.616	0.209
	(0.689)	(1.019)	(0.844)	(1.540)
resourceexp	-0.00372	0.0345***	-0.00372	0.0345**
	(0.0256)	(0.00972)	(0.0313)	(0.0147)
resrentpc	-0.431	0.244	-0.431	0.244
	(0.307)	(0.149)	(0.376)	(0.225)
agricexp	-0.162**	-0.302***	-0.162**	-0.302***
	(0.0570)	(0.0520)	(0.0699)	(0.0786)
netfdii	0.0838**	0.107**	0.0838**	0.107
	(0.0300)	(0.0452)	(0.0367)	(0.0683)
GFCF	0.0204	-0.0856	0.0204	-0.0856
	(0.0364)	(0.0468)	(0.0445)	(0.0707)
Observations	43	43	43	43
R-squared	0.798	0.985	0.978	0.998
Number of c_id	10	10		
Country FE	No	No	Yes	Yes
Year FE	No	Yes	No	Yes

Robust standard errors in parentheses; Additional control in bold
*** p<0.01, ** p<0.05, * p<0.1

Result of adding external balances on goods and services as a control
Dependent variable: SVA to MVA ratio

Variables	(1) I	(2) II	(3) III	(4) IV
taxrevgdp	-0.253	-0.502***	-0.253	-0.502**
	(0.143)	(0.154)	(0.171)	(0.213)
govhealthex	0.769***	0.860***	0.769**	0.860**
	(0.210)	(0.212)	(0.251)	(0.292)
govexedu	-0.102	-0.219***	-0.102	-0.219**
	(0.0885)	(0.0651)	(0.106)	(0.0897)
totalreg	-0.0278***	-0.0196**	-0.0278***	-0.0196*
	(0.00616)	(0.00698)	(0.00736)	(0.00962)
privcreditbanks	0.0232	-0.0400	0.0232	-0.0400
	(0.0512)	(0.102)	(0.0612)	(0.140)
interestrate	-0.234*	-0.337**	-0.234	-0.337
	(0.110)	(0.137)	(0.131)	(0.189)
openness	-0.0338**	-0.0374	-0.0338*	-0.0374
	(0.0136)	(0.0254)	(0.0163)	(0.0350)
tariffall	-0.0657	-0.170**	-0.0657	-0.170
	(0.0510)	(0.0677)	(0.0609)	(0.0934)
gdppc	-0.00236	-0.00398***	-0.00236	-0.00398**
	(0.00176)	(0.00103)	(0.00210)	(0.00142)
exconst	-0.776	0.329	-0.776	0.329
	(0.566)	(0.814)	(0.677)	(1.122)
resourceexp	-0.0160	-0.00506	-0.0160	-0.00506
	(0.0178)	(0.0172)	(0.0213)	(0.0237)
resrentpc	-0.494**	-0.650*	-0.494**	-0.650
	(0.172)	(0.327)	(0.206)	(0.450)
agricexp	-0.146***	-0.154	-0.146**	-0.154
	(0.0395)	(0.0920)	(0.0472)	(0.127)
netfdii	0.0791***	0.120***	0.0791**	0.120***
	(0.0210)	(0.0252)	(0.0251)	(0.0348)
External balance	-0.0150	0.0109	-0.0150	0.0109
	(0.0401)	(0.0360)	(0.0479)	(0.0497)
Observations	46	46	46	46
R-squared	0.758	0.920	0.971	0.990
Number of c_id	10	10		
Country FE	No	No	Yes	Yes
Year FE	No	Yes	No	Yes

Robust standard errors in parentheses; Additional control in bold
*** p<0.01, ** p<0.05, * p<0.1

Result of adding entry of new firms as a control
Dependent variable: SVA to MVA ratio

Variables	(1) I	(2) II	(3) III	(4) IV
taxrevgdp	-0.616***	-0.767**	-0.616***	-0.767
	(0.128)	(0.236)	(0.159)	(0.431)
govhealthex	1.139***	1.192**	1.139***	1.192
	(0.0993)	(0.438)	(0.123)	(0.799)
govexedu	-0.190**	-0.203	-0.190*	-0.203
	(0.0736)	(0.199)	(0.0913)	(0.364)
totalreg	-0.0251*	-0.0241	-0.0251	-0.0241
	(0.0113)	(0.0383)	(0.0140)	(0.0699)
privcreditbanks	0.0858	0.116	0.0858	0.116
	(0.0548)	(0.252)	(0.0679)	(0.460)
interestrate	0.200	0.188	0.200	0.188
	(0.247)	(0.341)	(0.306)	(0.623)
openness	0.0295	0.0561	0.0295	0.0561
	(0.0240)	(0.0738)	(0.0297)	(0.135)
tariffall	-0.130*	-0.194**	-0.130	-0.194
	(0.0660)	(0.0670)	(0.0818)	(0.122)
gdppc	-0.00376*	-0.00468*	-0.00376	-0.00468
	(0.00172)	(0.00223)	(0.00213)	(0.00407)
exconst	-2.403***	-2.271	-2.403**	-2.271
	(0.565)	(3.271)	(0.700)	(5.972)
resourceexp	-0.0294	-0.0277	-0.0294	-0.0277
	(0.0212)	(0.0392)	(0.0263)	(0.0716)
resrentpc	-1.185**	-1.303	-1.185*	-1.303
	(0.410)	(0.810)	(0.508)	(1.479)
agricexp	-0.0792	-0.120	-0.0792	-0.120
	(0.141)	(0.221)	(0.175)	(0.404)
netfdii	0.0902	0.0575	0.0902	0.0575
	(0.0644)	(0.0532)	(0.0798)	(0.0971)
New entry	3.846**	4.155	3.846**	4.155
	(1.201)	(3.031)	(1.490)	(5.534)
Observations	36	36	36	36
R-squared	0.822	0.941	0.972	0.991
Number of c_id	8	8		
Country FE	No	No	Yes	Yes
Year FE	No	Yes	No	Yes

Robust standard errors in parentheses; Additional control in bold
*** p<0.01, ** p<0.05, * p<0.1

VIF Result for Panel Fixed Effect Model

Variable	VIF	1/VIF
interestrate	5.62	0.17778
gdppc	5.28	0.189245
resrentpc	4.42	0.226485
tariffall	3.69	0.270723
govexedu	3.53	0.283477
resourceexp	3.12	0.32008
taxrevgdp	2.56	0.391217
openness	2.3	0.435691
govhealthex	2.25	0.444262
privcredit~s	2.2	0.454246
exconst	2.14	0.467967
netfdii	1.84	0.543771
agricexp	1.67	0.597209
totalreg	1.62	0.618308
Mean VIF	3.02	

VIF Result for Panel Fixed Effect Model – Dropping GDP/capita

Variable	VIF	1/VIF
interestrate	5.48	0.182535
govexedu	3.53	0.283538
tariffall	3.18	0.314851
resrentpc	2.83	0.353677
resourceexp	2.41	0.415551
taxrevgdp	2.34	0.428081
openness	2.28	0.438636
privcredit~s	2.2	0.455332
exconst	2.08	0.481119
govhealthex	1.73	0.579335
agricexp	1.67	0.598029
netfdii	1.64	0.609715
totalreg	1.55	0.647056
Mean VIF	2.53	

VIFs between 0 and 5 shows there is no evidence of high correlation within explanatory variables.

Appendix IV

Sample Classifications

Distribution of Sampled Countries by Resource Category

Resource Rich Countries:

Afghanistan, Albania, Algeria, Angola, Azerbaijan, Bahrain, Bolivia, Botswana, Brunei, Cameroon, Central Africa Republic, Chad, Chile, Cote dIvoire, Democratic Republic of Congo, Ecuador, Gabon, Ghana, Guatemala, Indonesia, Iran, Iraq, Kazakhstan, Kyrgyzstan, Laos, Liberia, Madagascar, Mali, Mauritania, Mexico, Mongolia, Mozambique, Niger, Nigeria, Oman, Papua New Guinea, Peru, Qatar, Sao Tome and Principe, Saudi Arabia, Sierra Leone, South Sudan, Suriname, Togo, Trinidad and Tobago, United Arab Emirates, Tanzania, Venezuela, Vietnam, and Zambia.

Non-Resource Rich Countries:

Argentina, Bahamas, Barbados, Belize, Bhutan, Bosnia and Herzegovina, Brazil, Burundi, Cambodia, Cape Verde, China, Colombia, Costa Rica, Egypt, Elsavado, Fiji, Gambia, Georgia, Haiti, Honduras, Honkong, India, Jamaica, Jordan, Kenya, Kuwait, Lebanon, Lesotho, Malawi, Malaysia, Maldives, Mauritius, Montenegro, Morocco, Myanmar, Namibia, Nepal, Nicaragua, Pakistan, Panama, Paraguay, Philippines, Rwanda, Samoa, Senegal, Singapore, Somalia, South Africa, Swaziland, Tajikistan, Thailand, Tunisia, Turkey, Uganda, Ukraine, Uruguay, and Vanuatu.

Source: Author, 2021 using IMF (2012) Definition of Resource Rich Countries.

Variables, Data Sources and Measurement

Variable	Sources of Data	Measurement
Sectoral Value-added	World Bank World Development Indicators Database	Value- added measured for manufacturing, service to ISIC 50-99 and agriculture corresponds to ISIC
Sectoral employment	World Bank World Development Indicators Database	Employment in industry, services and agriculture r
Domestic value-added exports	UNCTAD-Eora Database	Measures share of domestic value-added in gross G
Foreign value-added exports	UNCTAD-Eora Database	Measures share of foreign value-added in gross GV
Trade	World Bank World Development Indicators Database	Measures the sum of exports and imports of goods
School enrolment	World Bank World Development Indicators Database	Represents secondary school enrolment measured a
Regulation quality	World Bank World Development Indicators Database	measured by CPIA business regulatory environmer
Inflation	World Bank World Development Indicators Database	Inflation is measured by the consumer price index,
Population	World Bank World Development Indicators Database	Total population is based on the counts of all resid
Population density	World Bank World Development Indicators Database	This is total population divided by land area in squ
Fuel exports	World Bank World Development Indicators Database	Fuels comprise the commodities in SITC section 3
Ore and metal exports	World Bank World Development Indicators Database	Ore and metals comprise the commodities in SITC
Land	World Bank World Development Indicators Database	Land is a country's total area, excluding area under
FDI net inflows	World Bank World Development Indicators Database	FDI are the net inflows of investment to acquire a l

Other Summary Statistics

Full Sample

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
ava	2,855	14.87	12.80	0.111	79.42
mva	2,739	12.51	8.337	0.233	56.42
sva	2,730	44.29	17.09	1.859	91.92
ea	2,996	33.24	25.35	0.115	92.37
ei	2,996	16.30	9.355	0.281	59.58
es	2,997	42.88	23.24	1.223	152.7
fva	3,102	606,527	1.350e+06	15.14	9.879e+06
dva	3,103	1.190e+06	1.988e+06	1.841	9.959e+06
trade	2,778	67.46	53.66	0.167	442.6
School enrolment	1,961	52.93	31.55	1.122	132.8
regulation quality	691	3.404	1.745	-9.616	33.81
inflation	2,651	9,090	123,833	-18.19	1.998e+06
population	3,100	1.502e+07	7.035e+07	6.298	1.353e+09
population density	3,079	181.3	735.5	1.138	7,953
land	3,082	65,921	298,385	0.426	9.425e+06
FDI net inflows	2,910	3.820	5.957	-37.15	86.99
fuel exports	2,145	20.09	30.19	3.21e-07	99.99
oreandmetalexports	2,268	9.076	15.83	3.36e-06	88.18

Year 1990

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
ava	82	19.89	14.18	0.323	62.74
mva	74	14.55	9.180	1.394	55.92
sva	74	37.84	17.43	3.370	69.24
es	1	123.7		123.7	123.7
fva	107	341,970	1.054e+06	261.1	7.850e+06
dva	107	561,438	1.188e+06	78.75	7.554e+06
trade	86	64.76	51.30	1.242	344.3
schoolenrolment	70	38.01	28.62	1.465	93.84
regulationquality	1	11.63		11.63	11.63
inflation	73	2,537	20,340	-0.859	173,757
population	107	1.879e+07	8.698e+07	56.12	8.733e+08
populationdensity	106	170.1	710.7	1.142	5,762
land	106	55,852	147,525	2.763	942,467
fdinetinflows	89	1.198	3.189	-19.77	15.42
fuelexports	24	22.92	31.51	0.264	93.48
oreandmetalexports	26	6.416	12.21	0.117	53.15

Year 2018

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
ava	102	11.91	11.28	0.218	58.93
mva	100	11.73	8.297	0.972	51.65
sva	102	47.18	17.63	4.112	88.77
ea	107	24.87	22.16	0.115	86.25
ei	107	17.31	9.603	1.223	54.32
es	107	49.02	22.91	1.342	135.5
fva	107	765,767	1.337e+06	94.70	8.121e+06
dva	107	1.633e+06	2.373e+06	575.6	9.336e+06
trade	99	68.56	54.26	5.948	376.9
schoolenrolment	56	56.78	37.87	1.511	132.8
regulationquality	45	3.106	0.604	1.500	4.752
inflation	97	2,256	22,167	-2.815	218,327
population	107	2.438e+07	1.332e+08	69.44	1.353e+09
populationdensity	107	188.4	786.6	1.481	7,953
land	107	112,733	354,834	3	2.382e+06
fdinetinflows	104	3.639	4.477	-6.370	26.83
fuelexports	81	15.89	25.86	0.112	95.56
oreandmetalexports	85	9.332	14.86	0.167	76.61

VIF Checks MVA Models only
MVA-RRCs

Variable	VIF	1/VIF
dva	19.45	0.051423
fva	15.45	0.064727
population	13.13	0.076139
population~y	7.91	0.126487
fuelexports	4.09	0.244308
land	3.21	0.311914
schoolenro~t	2.66	0.375628
trade	2.56	0.389949
regulation~y	1.96	0.509114
oreandmeta~s	1.47	0.679526
inflation	1.41	0.709107
Mean VIF	6.66	

Dropping population and population density yields:

Variable	VIF	1/VIF
dva	15.83	0.063175
fva	13.17	0.075921
fuelexports	4.09	0.244342
schoolenro~t	2.26	0.44226
trade	1.81	0.551906
land	1.58	0.634069
oreandmeta~s	1.44	0.694832
regulation~y	1.38	0.723932
inflation	1.33	0.753124
Mean VIF	4.77	

Dropping DVA yields:

Variable	VIF	1/VIF
fva	3.43	0.29188
fuelexports	3.27	0.306228
schoolenro~t	1.92	0.520328
trade	1.76	0.568985
land	1.53	0.654788
oreandmeta~s	1.44	0.695924
regulation~y	1.36	0.733247
inflation	1.31	0.762193
Mean VIF	2	

VIF MVA- NRR

Variable	VIF	1/VIF
dva	178.63	0.005598
fva	130.19	0.007681
population	90.72	0.011023
land	62.7	0.015948
trade	1.93	0.519104
schoolenro~t	1.92	0.521737
regulation~y	1.55	0.64442
fuelexports	1.43	0.701623
population~y	1.41	0.707428
oreandmeta~s	1.32	0.756196
inflation	1.3	0.767935
Mean VIF	43.01	

Dropping population yields;

Variable	VIF	1/VIF
dva	93.94	0.010645
fva	90.91	0.011
schoolenro~t	1.89	0.529681
trade	1.86	0.538171
regulation~y	1.44	0.696711
population~y	1.38	0.724934
fuelexports	1.27	0.784949
oreandmeta~s	1.2	0.83536
inflation	1.15	0.871241
Mean VIF	21.67	

Dropping DVA yields:

Variable	VIF	1/VIF
schoolenro~t	1.88	0.531169
trade	1.6	0.626845
fva	1.5	0.666158
regulation~y	1.41	0.711252
population~y	1.34	0.745905
fuelexports	1.26	0.792717
oreandmeta~s	1.19	0.839936
inflation	1.14	0.875041
Mean VIF	1.42	

Some Robustness Checks – Estimation Results for Full Sample (with DVA, FVA - resource category dummies interactions)

Dependent Variable: MVA

VARIABLES	(1) I	(2) II
c.dva#c.rrc	-1.43e-07	-1.39e-07
	(2.17e-07)	(2.23e-07)
c.fva#c.rrc	4.05e-06	3.98e-06
	(3.41e-06)	(3.54e-06)
c.trade#c.rrc	-0.0616***	-0.0589***
	(0.0167)	(0.0188)
schoolenrolment	0.0232	0.0240
	(0.0399)	(0.0403)
regulationquality	-0.380	-0.379
	(0.499)	(0.500)
inflation	0.0889***	0.0887***
	(0.0312)	(0.0317)
population	-7.89e-10	-1.02e-09
	(1.38e-08)	(1.41e-08)
populationdensity	0.0117	0.0114
	(0.0201)	(0.0205)
land	-0.00980***	-0.00989***
	(0.00236)	(0.00258)
fuelexports	0.000610	0.000580
	(0.0137)	(0.0138)
oreandmetalexports	0.0142	0.0144
	(0.00910)	(0.00944)
fdinetinflows		-0.00978
		(0.0363)
Observations	245	245
R-squared	0.219	0.220
Number of cid	36	36
Year FE	Yes	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Dependent Variable: Employment in Industry

VARIABLES	(1) I	(2) II
c.dva#c.rrc	-4.11e-08	-4.72e-08
	(8.43e-08)	(8.14e-08)
c.fva#c.rrc	1.45e-06	1.56e-06
	(1.07e-06)	(9.81e-07)
c.trade#c.rrc	-0.00639	-0.0105
	(0.0171)	(0.0170)
schoolenrolment	0.0463*	0.0449*
	(0.0235)	(0.0238)
regulationquality	-0.535	-0.535
	(0.564)	(0.566)
inflation	-0.00228	-0.00174
	(0.0200)	(0.0197)
population	3.78e-08***	3.82e-08***
	(5.06e-09)	(5.20e-09)
populationdensity	-0.0120	-0.0114
	(0.00858)	(0.00867)
land	0.00597***	0.00621***
	(0.00178)	(0.00198)
fuelexports	0.00626	0.00623
	(0.00747)	(0.00745)
oreandmetalexports	0.00889	0.00864
	(0.00805)	(0.00811)
fdinetinflows		0.0158
		(0.0282)
Observations	259	259
R-squared	0.588	0.589
Number of cid	37	37
Year FE	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Dependent Variable: SVA

VARIABLES	(1) I	(2) II
c.dva#c.rrc	2.52e-08	1.38e-08
	(4.20e-07)	(4.15e-07)
c.fva#c.rrc	-2.72e-06	-2.51e-06
	(5.22e-06)	(5.23e-06)
c.trade#c.rrc	0.0251	0.0177
	(0.0399)	(0.0561)
schoolenrolment	-0.0443	-0.0468
	(0.0550)	(0.0560)
regulationquality	2.951***	2.954***
	(0.778)	(0.784)
inflation	-0.0894	-0.0885
	(0.0676)	(0.0665)
population	9.75e-10	1.80e-09
	(1.97e-08)	(2.02e-08)
populationdensity	0.0721***	0.0731***
	(0.0159)	(0.0165)
land	0.00809	0.00855
	(0.00660)	(0.00682)
fuelexports	-0.0445**	-0.0446**
	(0.0196)	(0.0196)
oreandmetalexports	-0.0265	-0.0270
	(0.0364)	(0.0368)
fdinetinflows		0.0286
		(0.0836)
Observations	254	254
R-squared	0.300	0.301
Number of cid	36	36
Year FE	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Dependent Variable: Employment in Services

VARIABLES	(1) I	(2) II
c.dva#c.rrc	8.08e-08	8.32e-08
	(2.44e-07)	(2.45e-07)
c.fva#c.rrc	3.28e-06*	3.23e-06*
	(1.76e-06)	(1.76e-06)
c.trade#c.rrc	-0.0222*	-0.0206*
	(0.0110)	(0.0116)
schoolenrolment	0.107	0.108
	(0.0733)	(0.0744)
regulationquality	-0.545	-0.546
	(0.825)	(0.827)
inflation	0.0279	0.0276
	(0.0371)	(0.0377)
population	-1.25e-08	-1.26e-08
	(1.77e-08)	(1.77e-08)
populationdensity	-0.0483***	-0.0485***
	(0.0162)	(0.0164)
land	0.00586	0.00577
	(0.00399)	(0.00420)
fuelexports	0.0196	0.0196
	(0.0251)	(0.0251)
oreandmetalexports	0.0239**	0.0240**
	(0.0116)	(0.0116)
fdinetinflows		-0.00613
		(0.0326)
Observations	259	259
R-squared	0.749	0.749
Number of cid	37	37
Year FE	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Dependent Variable: AVA

VARIABLES	(1) I	(2) II
c.dva#c.rrc	2.21e-07	2.35e-07
	(4.51e-07)	(4.49e-07)
c.fva#c.rrc	-8.42e-06	-8.68e-06
	(6.74e-06)	(6.76e-06)
c.trade#c.rrc	0.0242	0.0339
	(0.0269)	(0.0316)
schoolenrolment	-0.0113	-0.00785
	(0.0722)	(0.0727)
regulationquality	-2.033**	-2.035***
	(0.760)	(0.742)
inflation	0.0357	0.0344
	(0.0428)	(0.0420)
population	3.35e-08*	3.26e-08*
	(1.95e-08)	(1.92e-08)
populationdensity	-0.0399*	-0.0411**
	(0.0197)	(0.0201)
land	-0.00346	-0.00403
	(0.00528)	(0.00526)
fuelexports	-0.0220	-0.0219
	(0.0274)	(0.0276)
oreandmetalexports	-0.0260	-0.0254
	(0.0273)	(0.0284)
fdinetinflows		-0.0369
		(0.0405)
Observations	259	259
R-squared	0.460	0.462
Number of cid	37	37
Year FE	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Dependent Variable: Employment in Agriculture

VARIABLES	(1) I	(2) II
c.dva#c.rrc	-3.93e-08	-3.56e-08
	(2.67e-07)	(2.72e-07)
c.fva#c.rrc	-4.73e-06**	-4.80e-06**
	(2.12e-06)	(2.13e-06)
c.trade#c.rrc	0.0287*	0.0312
	(0.0144)	(0.0197)
schoolenrolment	-0.154	-0.153
	(0.0912)	(0.0931)
regulationquality	1.083	1.083
	(1.255)	(1.257)
inflation	-0.0256	-0.0259
	(0.0472)	(0.0472)
population	-2.53e-08	-2.56e-08
	(1.80e-08)	(1.80e-08)
populationdensity	0.0602***	0.0599***
	(0.0199)	(0.0205)
land	-0.0118**	-0.0120**
	(0.00492)	(0.00519)
fuelexports	-0.0258	-0.0258
	(0.0290)	(0.0291)
oreandmetalexports	-0.0328*	-0.0327*
	(0.0164)	(0.0166)
fdinetinflows		-0.00967
		(0.0476)
Observations	259	259
R-squared	0.763	0.763
Number of cid	37	37
Year FE	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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