The Role of Mediators in the Relationship Between Export Diversification and Economic Development

Hajer Abdulla Basodan
Claremont Graduate University

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The Role of Mediators in the Relationship Between
Export Diversification and Economic Development

By

Hajer Basodan

Claremont Graduate University

2023
Approval of the Dissertation Committee

This dissertation has been duly read, reviewed, and critiqued by the Committee listed below, which hereby approves the manuscript of Hajer Basodan as fulfilling the scope and quality requirements for meriting the degree of Doctor of Philosophy in Economic Development and Global Political Economy.

Melissa Rogers, Chair
Claremont Graduate University
Associate Professor, International Studies Co-Director, Inequality and Policy Research Center
Field Chair, Comparative Politics

Yi Feng, Member
Claremont Graduate University
Luther Lee Jr. Memorial Chair Professor

Pierangelo De Pace, Member
Claremont Graduate University
Professor of Economics; Chair of Economics
Abstract

The Role of Mediators in the Relationship Between Export Diversification and Economic Development

By

Hajer Basodan

Claremont Graduate University, 2023

As the global economy has become interconnected, international trade has become a common medium for developing and developed countries to interact. However, there is a gap in the scholarly literature when considering the effects of export diversification. The goal of this dissertation is to study and identify the relationship between export concentration and economic development in developing countries. Data were collected from the International Monetary Fund World Bank for quantitative analysis. Using mediator analysis and these mediators included export volatility (export instability), net barter (terms of trade), and current account balance (competitiveness). The findings from the quantitative analysis revealed that export diversification has a significant positive direct effect on economic development when considering the model with export volatility mediation. For the case study, three countries (Indonesia, Saudi Arabia, and Qatar) were analyzed, examining how factors impact economic development in each case and highlighting the factors contributing to sustainable economic development in emerging economies. The findings support how the structure of an economy, as represented by its export diversification, can influence both the development trajectory and the volatility of a country's economy.

Keywords: Global economy, export concentration, economic development
Acknowledgments

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I am also grateful to King Abdulaziz University for providing the necessary funding that enabled me to carry out this study.

Furthermore, I would like to extend my sincere appreciation to my family for their unwavering support and encouragement. Their love, understanding, and patience have been a constant source of motivation throughout this journey.
Dedication

I dedicate this thesis for my family. I thank and give very special gratitude to my beloved parents. Thank you, mom & dad. I love you so. My husband for all your support and help.
# Table of Contents

Abstract............................................................................................................................ iv  

Acknowledgments ........................................................................................................... v  

Dedication ........................................................................................................................... vi  

List of Diagrams .............................................................................................................. ix  

List of Figures .................................................................................................................... ix  

List of Tables ..................................................................................................................... x  

Chapter 1: Introduction ..................................................................................................... 1  
  1.1 Purpose and Contributions of Research ................................................................. 1  
  1.2 Outline of Research .................................................................................................. 4  

Chapter 2: Literature Review ............................................................................................. 5  
  2.1 Theories .................................................................................................................... 5  
    2.1.1 Balance of Payments Determination ................................................................. 5  
    2.1.2 The Dutch Disease ............................................................................................ 10  
    2.1.3 The Resource Curse .......................................................................................... 14  
    2.1.4 On Export Concentration and Export Instability ............................................. 15  
    2.1.5 Houthakker-Magee Framework ........................................................................ 21  
  2.2 Empirical Literature .................................................................................................. 23  
    2.2.1 Economics of the Dutch Disease and the Resource Curse ............................... 23  
    2.2.2 Politics of the Dutch Disease and the Resource Curse ....................................... 28  
    2.2.3 Institutions and the Resource Curse .................................................................... 31  
    2.2.4 Export Concentration, Export Volatility, and Terms of Trade ......................... 34  
    2.2.5 Stylized Facts ..................................................................................................... 40  
  2.3 Empirical Relationships ............................................................................................... 43  

Chapter 3: Methods ............................................................................................................ 50  
  3.1 Research Methodology and Design .......................................................................... 50  
  3.2 Sample and Data Sources ......................................................................................... 52  
    3.2.1 Sample ............................................................................................................... 52  
    3.2.2 Data Source and Data ....................................................................................... 53  
  3.3 Data Collection and Analysis Procedures ................................................................... 55  
  3.4 Summary ..................................................................................................................... 59  

Chapter 4: Results .............................................................................................................. 60  
  4.1 Research Questions .................................................................................................... 60  
  4.1 Descriptive Analysis .................................................................................................. 61  
  4.2 Empirical Analyses .................................................................................................... 63  
  4.3. Robustness Check ................................................................................................... 66
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.4 Case Study Analysis</td>
<td>74</td>
</tr>
<tr>
<td>4.4.1 Case Study Introduction</td>
<td>74</td>
</tr>
<tr>
<td>4.4.2 Case Study Literature Review</td>
<td>76</td>
</tr>
<tr>
<td>4.4.3 Methodology</td>
<td>82</td>
</tr>
<tr>
<td>4.4.4 Case Study Analysis</td>
<td>84</td>
</tr>
<tr>
<td>4.4.5 Case Study Findings</td>
<td>92</td>
</tr>
<tr>
<td>4.4.6 Case Study Conclusion</td>
<td>94</td>
</tr>
<tr>
<td>Chapter 5: Discussion and Conclusion</td>
<td>96</td>
</tr>
<tr>
<td>5.1 Discussion of Case Study</td>
<td>96</td>
</tr>
<tr>
<td>5.2 Implications of the Findings</td>
<td>97</td>
</tr>
<tr>
<td>5.3 Limitations of the Study</td>
<td>100</td>
</tr>
<tr>
<td>5.4 Recommendations for Future Research</td>
<td>100</td>
</tr>
<tr>
<td>5.5 Conclusion</td>
<td>101</td>
</tr>
<tr>
<td>References</td>
<td>103</td>
</tr>
<tr>
<td>Appendix A</td>
<td>113</td>
</tr>
<tr>
<td>Appendix B</td>
<td>121</td>
</tr>
</tbody>
</table>
List of Diagrams

Diagram 1. Effect on Price.................................................................16
Diagram 2. Effect on Export Earnings .................................................17
Diagram 3. Supply Side Effects on Instability.......................................17
Diagram 4. Rightward Shifts in the Supply Curve.................................18
Diagram 5. Theory Applied to Country Cases......................................19

List of Figures

Figure 1. Economic Diversification Index and Real GDP per Capita........45
Figure 2. Economic Diversification Index and 10-year S.D. of Current
        Account Balance........................................................................46
Figure 3. Real GDP per Capita and 10-year S.D. of Current Account Balance ....47
Figure 4. Real GDP per Capita and Natural Resource Rents (as % of GDP) ....48
Figure 5. Economic Diversification Index Over Time............................49
Figure 6 Mediation Analyses ................................................................56
Figure 7. Export Diversification and Income per Capita........................61
Figure 8. Export Diversification and Export Volatility.............................62
Figure 9. Export Diversification and Natural Resource Rents....................62
Figure 10. Export Diversification and Terms of Trade..............................63
Figure 11 Mediation by Export Volatility (10-Year Window)....................88
Figure 12 Mediation by Export Volatility (5-Year Window).......................89
Figure 13 Mediation by Current Account Balance (% of GDP)...............90
Figure 14 Mediation by net Barter Terms of Trade Index........................91
List of Tables

Table 1 Dutch Disease Effects ........................................................................................................13
Table 2 Country Samples..............................................................................................................43
Table 3 Unbalanced Panel of Countries ..................................................................................52
Table 4 Variables in the Sample ...............................................................................................54
Table 5 Summary of the Empirical Estimation .....................................................................65
Table 6 Robustness Check - by Period Analyses (FE).........................................................67
Table 7 Robustness Check – Moderation Effect ..................................................................69
Table 8 Robustness Check .......................................................................................................73
Chapter 1: Introduction

The external exposure and vulnerabilities of developing countries have remained an important topic in the literature over the years. It is well known that developing countries tend to specialize not only in the production of commodities but also in the production of just a few commodities, and therefore their export baskets are often highly concentrated. This dissertation aims to explore the relationship between export concentration and economic development and its structure.

1.1 Purpose and Contributions of Research

This research analyzes the role of mediators in the relationship between export diversification and economic development across countries. While the role of export diversification has been studied intensively in the scholarly literature, the current study will critically investigate the relationship by focusing on some novel areas. First, this study aims to examine the impact of export diversification on economic development under specific circumstances where mediators are taken into account. A mediator is defined as a factor intermediating the impact between two variables. Second, under the premise that there are mediating variables, the research examines the significant variables that mediate the impact of export diversification on development. Third, subject to the nature of the specific conclusions derived, there was an expectation of adding policy implications of the findings as part of the overall conclusions.

As the global economy has become interconnected like never before, international trade has become a common medium for both developing and developed countries to interact with each other. Every country attempts to utilize international trade with a major objective - to derive maximum benefit and growth from trading. There are other objectives as well, such as a
country’s desire to increase the social welfare of its citizens through the acceleration of economic growth. In a modern economy, where the gross domestic product per capita is the primary macroeconomic indicator for economic development comparison across countries, boosting exports is one way to expand development. Thus, when a country has large reserves of economically valuable endowments, such as natural resources, it also enjoys a great potential to expand its GDP per capita through export.

Unfortunately, being endowed with abundant natural resources does not necessarily alleviate all hardships over the period during which developing countries attempt to develop their economic capacity. Two well-known economic phenomena, namely, the resource curse and Dutch disease, are examples of the type of hardships developing countries may struggle with as they invest in economic development. Both terminologies refer to the finding that resource-rich countries tend to experience slower economic progress than resource-poor countries. In other words, a low degree of export diversification tends to be associated with slower economic development.

Export diversification itself is defined as the degree to which a country’s exports diversify across a number of products or trading partners (United Nations Development Programme [UNDP], 2009). Multiple research studies have been conducted on this topic, utilizing various methodologies that confirm the positive relationship between export diversification and economic growth, including the work of Sachs and Warner (1995, 2001), Rodriguez and Sachs (1999), and Manzano and Rigobon (2001), among others. However, these findings are not incontrovertible.

More specifically, opponents of export diversification argue that what is causing slow economic development is not necessarily diversification itself but is more the result of social
factors related to managing the abundance of natural resources, which in turn causes a low level of diversification in the country’s exports. Extrapolating from this viewpoint, research in this area should pay more attention to the role of mediating variables between export diversification and economic development. Second, if the role of mediating variables is significant, then it is crucial to identify some of those mediating variables and determine whether they are identical between developed and developing countries.

Although previous studies have not specifically utilized mediating analysis, some studies claim that the negative relationship between a low degree of export diversification and economic development is triggered by some mediating social variables, such as government effectiveness (Ahmadov et al., 2013), political regimes (Ross, 2001), corruption (Ades & Di Tella, 1999), institutional quality (Pike, 2010), and credit market (Manzano & Rigobon, 2001), among others. Other researchers have argued that slow economic growth is natural, as developing countries progress towards their ultimate steady state in which they naturally exhibit slower economic growth after a period. Finally, certain other studies have demonstrated that the negative relationship between these variables does not exist in some countries, thereby questioning the validity of the theories that claim the opposite (for example, see Sachs, 2017; Smith, 2015).

In conclusion, this research investigates the impact of export diversification on economic development from the perspective of mediation analysis. This research aimed to understand whether mediating factors play a significant role by affecting the degree to which the impact of export diversification is felt on economic development. If so, then what are those factors? This topic was chosen mainly to address the gap in the literature regarding export diversification, namely, that most of the studies in the same area assumed a direct relationship between export
diversification and economic development without taking into account the role of mediation variables.

In addition to the primary research (see Sections 2.0 through 4.3), a case study analysis (see Section 4.4) was conducted using three case studies (i.e., Indonesia, Saudi Arabia, and Qatar), highlighting the significance of export diversification as a means of reducing dependence on a single commodity and promoting economic development. The findings of this case study support the primary research in that export diversification can positively impact per capita GDP growth, but only if export instability over a long period is accounted for in the models.

1.2 Outline of Research

Chapter 2 presents a literature review, including relevant information to the research. The literature review includes the theoretical aspects of the balance of payments determination, the resource curse, the Dutch disease and export concentration, and the empirical literature on the economic, political, and institutional aspects of the resource curse, as well as on export concentration. Different empirical relationships under a simple bivariate methodology are also presented, and although it should not be used for causal inference, it provides more empirical context to the discussion. Chapter 3 presents a methodology section, and information on data collection and analysis is included. Chapter 4 presents the results of the primary study, and the case study of the three countries (Indonesia, Saudi Arabia, and Qatar), and Chapter 5 is the conclusion.
Chapter 2: Literature Review

The literature in the area of export diversification and economic development is generating debatable results even today. For example, Torvik (2009) argued that economists do not actually know the extent to which natural resource wealth dampens growth; thus, the relationship between natural resources and economic development remains doubtful, as does the impact of diversification on development. This paper presents an examination of the impact of various natural resources and other variables that may act as mediators. Thus, the findings address a gap in the scholarly literature when considering the effects of export diversification. Furthermore, Appendix A presents a compilation of analyzed literature and references based on relevancy to the research.

2.1 Theories

2.1.1 Balance of Payments Determination

There are various approaches to explain the dynamics of the balance of payments (henceforth, BOP). The first one is the absorption approach, using research by Thirlwall (1980a) to review the approach. The main claim is to consider the BOP not simply as the excess of residents’ receipts from foreigners over residents’ payments to foreigners but rather as the excess of residents’ total receipts over total payments. Namely:

\[ B = R_F - P_F, \]

where \( R_F \) represents the receipts by residents from foreigners, and \( P_F \) represents the payments by residents to foreigners. Since all the payments by residents to residents (\( P_R \)) are simultaneously receipts by residents from residents (\( R_R \)), \( B \) can be written as:

\[ B = R_F + R_R - P_F - P_R \]
Then, \( B = R - P \), where \( R \) represents the total receipts by residents and \( P \) represents the total payments by residents. This approach can be applied to the whole BOP or just to the current account (CA). In the CA case, if the national income equation is \( Y = C + I + X - M \), with a label of total expenditure \( A \) (from absorption), then:

\[
B = X - M = Y - A
\]

The CA, in this case, is the difference between national output and expenditure. Using this framework, any BOP policy can be assessed in terms of whether it raises \( Y \) relative to \( A \), namely, the condition for BOP improvement. Alternatively, since \( Y - C = S \) (savings), the BOP can also be expressed in terms of:

\[
B = X - M = S - I
\]

In such cases, BOP policies can be assessed in terms of how much they raise \( S \) with respect to \( I \). Moreover, policies that raise \( Y \) are known as expenditure-switching and cannot be accompanied by an equal raise in \( A \) so that the BOP improves. Tariffs, import quotas, export subsidies, and particularly devaluations are examples of expenditure-switching policies.

However, if \( Y \) cannot increase, maybe because the economy is already at full employment, \( A \) has to be reduced via expenditure-reducing policies, which might cause unemployment. These expenditure-reducing policies cannot be accompanied by an equivalent fall in \( Y \) so that the BOP improves. At full employment, if both strands of policies accompany each other, they must reduce the expenditure on traded goods; otherwise, expenditure-switching policies will not be successful.

Under this approach, the effect of a devaluation can be assessed as follows. Since \( B = Y - A \), \( \Delta B = \Delta Y - \Delta A \). First, devaluation will affect income \((\Delta Y_D)\) directly, but it will also have
a direct effect on absorption ($\Delta A_D$) plus an indirect effect through the change in income, i.e., $\alpha \Delta Y_D$, where $\alpha$ is the propensity to absorb. Consequently,

$$\Delta B = \Delta Y_D - \Delta A_D - \alpha \Delta Y_D = \Delta Y_D(1 - \alpha) - \Delta A_D$$

Then the condition to improve the BOP is given by $\Delta Y_D(1 - \alpha) > \Delta A_D$. There are two key relationships to consider then: the direct effect of the devaluation on $Y$ and $\alpha$, and the effect of the devaluation on $A$.

Next is a switch to the monetary approach to the BOP. Following Thirlwall (1980b), this approach addresses the BOP as a whole (both the current account and the capital account) so that the BOP disequilibrium equals a change in the level of international reserves, considering that such disequilibrium is thought as the outcome of stock disequilibrium in the supply and demand of money, i.e., BOP problems are a monetary phenomenon which can be corrected via a monetary adjustment. This approach has the following assumptions:

- Exchange rates are fixed.
- Long-run full employment equilibrium.
- Stable demand for money as a function of income.
- Monetary neutrality, i.e., changes in money does not affect real variables.
- Long-run convergence in a country’s price level and interest rate with respect to the world level given a high elasticity of substitution between goods in international trade and high capital mobility.
- Changes in the money supply which are caused by changes in the level of foreign exchange reserves are not sterilized by the monetary authorities.

That said, the (ex-ante) excess demand for goods can be expressed as:

$$X_g = A - Y + B$$
Where $A$ represents the total expenditure of all economic agents, $Y$ is income, and $B$ is the balance of payments.

In the base theoretical case, consider that the only asset is money, and its excess demand is denoted by $X_m$. As per Walras’ Law, the budget constraint of all agents is:

$$X_g - B + X_m \equiv 0$$

If $X_g = 0$, then $B = X_m$, i.e., a BOP surplus implies an excess demand for money, and a BOP deficit implies an excess supply of money. If $A - Y = 0$ ex-post, then $B = X_m$ is a consistency condition in long-run equilibrium. The excess demand for or supply of money is the difference between the demand for money and the supply of money of domestic origin, both defined in a stock sense. Thus:

$$X_m = k(Y) - \bar{M}$$

where $\bar{M}$ represents the domestically determined component of the money supply controlled by the central bank. An excess demand for money, linked to a BOP surplus, leads to an increase in the supply of money through the accumulation of foreign exchange reserves, assuming that the effect of an increase in the reserves is not counterbalanced by open market operations or selling fixed income securities by the central bank. As the supply of money increases, the excess demand for money is eliminated, and the BOP surplus tends to zero. Conversely, an excess supply of money, linked to the BOP deficit, leads to a decrease in the money supply by means of a loss of foreign exchange reserves.

A third alternative to studying BOP dynamics is the so-called structural approach, conveniently summarized by Bird (2006). A shift in the BOP will occur where, for any specific level of income, a different interest rate is required to ensure external equilibrium. Alternatively, for a given interest rate, a different level of income is required. However, what lies behind the
BOP shifts is any factor that influences the BOP except the aggregate level of income and the interest rate. For instance, some important factors are the changes in competitiveness or factors altering the creditworthiness of countries, or the willingness of capital markets to lend at a given interest rate. Concretely, factors that alter the relative price of exports or imports will shift the BOP, such as increases in productivity and efficiency, the introduction/elimination of import tariffs or export subsidies, and changes in the exchanged rate, among others. Within the context of shifts in the BOP schedule, a structural explanation of BOP can be embedded: the structural approach emphasizes the importance of the type of goods produced and the efficiency level at which they are produced. In a dynamic environment, countries that produce and export goods that have a relatively low-income elasticity of demand and (at the same time) do not produce, but import goods that have a comparatively high-income elasticity of demand will tend to face a secular decline of terms of trade and a subsequent BOP deterioration. Further, a low level of diversification in the export basket, along with low price elasticities of demand and supply, may also cause BOP trend instability.

The structural approach to the BOP addresses the importance of changes in output rather than changes in expenditure, and it may be considered a supply side approach to the BOP, unlike the absorption and monetary approaches, which are demand centered. Although the monetary and absorption approaches cannot be neglected, the structural approach to the BOP is of particular relevance to developing economies, as it considers the degree of concentration in the export basket, the vulnerability to export instability, and exposure to terms of trade shocks. The subsequent sections expand on these topics.
2.1.2 The Dutch Disease

In the context of the structural approach to the BOP mentioned in the last section, the type of goods produced by a country is relevant to the macroeconomic dynamics. This can be linked to the theoretical literature on the so-called Dutch Disease, started by Salter (1959), on which a small dependent economy experiences an unexpected and temporary increase in primary export earnings, and this results in a fall of competitiveness in the tradable sector (manufacture). Further theoretical improvements were made by Corden and Neary (1982), Corden (1984), Van Wijnbergen (1984a, 1984b), and Neary and Van Wijnbergen (1986).

The Dutch Disease is a macroeconomic phenomenon that reflects changes in the structure of production and the economy in the wake of a favorable shock, including sizeable natural resource discovery, rise in commodities prices, sustained aid or capital flows, or any external economic factor causing a windfall gain. The drivers of the Dutch Disease and its impact on the economy were decomposed by Corden and Neary (1982) and Corden (1984) into two effects: the resource movement effect and the spending effect. The model assumes that the boom in one of the tradable sectors (i.e., natural resource) raises the marginal products of the mobile factors employed within that sector, generating higher wages and profits. This process draws production factors that were allocated to other sectors of the economy. This process is referred to as the resource movement effect.

This movement of resources from different sectors to the booming sector implies a reduction in output of these sectors and, in particular, of the other tradable sector resulting in direct de-industrialization. The associated reduction in output results in excess demand for services (as the resource movement affects the supply of services leaving demand unchanged); one mechanism of adjustment is through the real exchange (the price of non-tradable in terms of
traded goods), which has to appreciate to eliminate the excess demand, switching demand away from services and dampening the fall in that sector’s output.

The second impact is driven by the increase in aggregate income resulting from the boom. Assuming a positive income elasticity of demand for non-traded goods and that at least part of the extra income generated by the boom is spent inside the country, the boom initially leads to excess demand for non-traded goods and, hence, to real appreciation. The rise in the relative price of non-traded goods increases the relative profitability of the non-traded goods sector and contracts the (non-booming) traded goods sectors (whose price remains fixed exogenously). This phenomenon is the spending effect. (e.g., Van Wijnbergen, 1984a, 1984b).

Since the measurement of a country’s real exchange rate is the ratio of prices of non-tradable to that of tradable goods, the relative price increase of non-tradable goods is equivalent to an appreciation of a nation’s exchange rate.

Considering the impact of both the spending and resource-movement effects, the output of the non-resource traded goods sector is lower than it was initially - the Dutch Disease. Both effects force this sector to contract. The output of the non-traded goods sector could be higher or lower than initially; the spending effect expands this sector, but the resource-movement effect contracts it. The output of the booming sector is higher since the boom occurs in this sector. If the booming sector does not participate in the domestic factor markets, the resource movement effect is negligible. Often, this results in the assumption that the boom is an increase in transfers received from abroad due to the “enclave nature” of the oil industry (e.g., McKinnon, 1976; Van Wijnbergen, 1984a, 1984b).

The appreciation of the exchange rate coupled with the increase in tradable sector prices renders non-boom export products less competitive in the world market and consequently leads
to the corresponding movement of labor away from both the non-booming tradable exports sectors and booming tradable sector to the non-tradable sector (if labor is the mobile factor), thus forcing manufacturing and booming sectors to raise their wages as well. Since the sector cannot compensate by increasing their prices, as those are determined exogenously, they will see their profits fall and will have to downsize. The resulting contraction of output and employment in the tradable sector is referred to by Corden and Neary (1984) as indirect de-industrialization.

That said, the labor market response to a Dutch Disease shock depends on the nature of the shock. If a spending effect takes place and an increase in the price of non-tradable goods occurs, then wages will rise in that sector, attracting from the tradable sector. This change in labor will continue until factor prices equalize between all sectors. Besides less labor, the tradable sector will also face less productivity and, therefore, fewer exports. Moreover, if a resource movement effect takes place, it implies increasing marginal productivity of labor and thus increasing wages in the booming resource sector. As in the spending effect, increased wages are likely to attract labor from other sectors. Nonetheless, labor is attracted from the non-tradable sector to the booming sector, and labor shifts continue until wages are equalized in all sectors. Under the Dutch Disease framework, the typical result of both effects is that workers are likely to leave the manufacturing or agriculture sectors to seek a job in the booming sector.

Additionally, decreased economic activity in manufacturing or agriculture together with higher wages in the booming resource sector, might alter workers’ preferences, as they are likely to have the determination to work in such a sector. It is essential to mention that resource-related economic activity is highly dependent on commodity prices; therefore, pay reductions and job cuts are frequent during price decreases. Since the sector suffering decreased economic activity cannot directly raise prices because prices are determined exogenously, profits will fall,
potentially leading to downsizing. The subsequent contraction of output and employment in the tradable sector is referred to by Corden and Neary (1984) as indirect de-industrialization.

The main macroeconomic implications of Dutch Disease are summarized by Oomes and Kalchava (2007) in Table 1.

**Table 1**

*Dutch Disease Effects*

<table>
<thead>
<tr>
<th>Resource movement effect</th>
<th>Output</th>
<th>Employment</th>
<th>Wage</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Booming tradable sector (oil sector)</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>given</td>
</tr>
<tr>
<td>Non-Booming tradable sector (manufacturing sector)</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>given</td>
</tr>
<tr>
<td>Non-tradable sector (services sector)</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Spending effect</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Booming tradable sector (oil sector)</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>given</td>
</tr>
<tr>
<td>Non-Booming tradable sector (manufacturing sector)</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>given</td>
</tr>
<tr>
<td>Non-tradable sector (services sector)</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Combined effect</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Booming tradable sector (oil sector)</td>
<td>indeterminate</td>
<td>indeterminate</td>
<td>+</td>
<td>given</td>
</tr>
<tr>
<td>Non-Booming tradable sector (manufacturing sector)</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>given</td>
</tr>
</tbody>
</table>
There is an unambiguous decline in manufacturing employment, reflecting decreased output from both direct and indirect de-industrialization. The combined effects on employment in the oil sector and service sector are ambiguous because the spending and resource movement effects pull in the opposite direction. However, if the oil sector employs relatively few workers or if labor mobility is low, spending is expected to dominate the resource movement effect, in which case an increase in service sector output and employment is expected. Finally, if labor is mobile, the overall wage level will increase. The wage measured in terms of traded goods must rise as a result of the resource movement effect; real wages must increase because of the resource movement effect.

On the other hand, the spending effect on its own leads to a rise in the output of services and hence to a fall in the wage measured in terms of services. Since the wage, in terms of traded goods, must rise because of the spending effect (through the mechanism of a real appreciation), the real wage may rise or fall because of the spending effect. Thus, when both effects are taken into account, the impact of the boom on real wages is uncertain.

### 2.1.3 The Resource Curse

In a related strand of research, the fact that natural resources-rich countries tend to have bad economic performance is commonly known as the resource curse, and it started an empirical fact documented by Auty (1990), Gelb (1988), Gylfason et al. (1999), and Sachs and Warner (1995, 1999). The theoretical foundations of this problem point to economic and political explanations (Di John, 2011). On economic grounds, the question of structural change in oil-exporting economies has received considerable attention after the discovery of North Sea oil,
which in turn triggered the emergence of the Dutch Disease literature reviewed in the previous section. In a nutshell, the Dutch Disease model suggests that deindustrialization is the inevitable outcome of natural resource booms, as they discourage manufacturing investment. As a first mechanism, the price of nontraded goods rises relative to the price of non-oil traded goods due to exchange rate appreciation; as a second mechanism, manufacturing labor costs rise due to increases in aggregate demand for labor boosted by oil booms.

Although the resource curse is strongly linked to troubled macroeconomic performance, there are also political economy explanations for the problem. Some rentier-state models aim to explain why policymakers in resource-rich economies create and maintain growth-restricting policies, and this literature posits the need to study economic performance in the context of natural resource abundance as the result of institutional arrangements (Di John, 2011). In this generation of models, the abundance of natural resources is assumed to generate growth-constraining intervention by the state and abnormally large degrees of rent-seeking behavior. Following Di John (2011), among the important propositions of this research agenda, there are: (a) higher level of natural resource rents increases rent-seeking and corruption; (b) surges in rent-seeking and corruption are associated with lower development; (c) natural resource rents provide a broad fiscal base which lowers the need of taxing citizens, which in turn reduces political bargaining and fosters arbitrary governance; (d) the absence of incentives to tax weakens the administrative scope and level of authority of the state.

2.1.4 On Export Concentration and Export Instability

A general discussion on the causes and consequences of export instability is provided by Bird (1982), with an emphasis on producers of primary products. Bird’s (1982) analysis of instability is centered on two elements: (a) the incidence and frequency of deviations in export
instability; (b) the mean amplitude of those deviations. It is essential to differentiate these elements. The deviations from the trend could be either positive or negative, and in the long run, they will have to cancel each other out for the trend to stay constant. In standard microeconomic theory, a commodity's equilibrium (market-clearing) price is determined by demand and supply, and it may be disturbed by autonomous changes in either demand or supply. It is assumed that the price elasticity of demand for many of the world's primary commodities is low because of the absence of substitutes, and therefore, short-run fluctuations in the global supply will have a significant impact on their prices.

Fluctuations in the price of a commodity can be explained in terms of autonomous variations in the demand for, or in the supply of, that commodity. Some remarks should be made in that regard:

- Short-run shifts in the demand side of a commodity can occur due to a number of factors, but the role of the level and the distribution of world income is key. The extent to which these global factors affect the short-run demand depends on the income elasticity of demand for the good, but the price impact of a demand curve shift depends on the price elasticity of the supply curve (see Diagram 1).

**Diagram 1. Effect on Price**

![Diagram](image)

*Note: Source: Bird (1982). Note: The effect on price of a given shift in the supply curve from SS to S'S’ depends on the price elasticity of the demand curve. The price increase is larger where the price elasticity DD is lower.*

16
- Where there is a variation in demand which is the predominant case of instability, price, and quantity will move in the same direction, and the impact on export earnings is intensified.

**Diagram 2. Effect on Export Earnings**

![Diagram 2](image)

*Note: Source- Bird (1982). Note: Export earnings rise as the demand curve goes from DD to D’D’, given that both price and quantity rise.*

- Fluctuations in supply might also cause instability in export earnings, but the movements in price and quantity are in opposite directions and tend to offset each other.

**Diagram 3. Supply Side Effects on Instability**

![Diagram 3](image)

*Note: Source- Bird (1982). Note: Export earnings can increase or decrease as the supply curves moves from SS to S’S’, dependind on the price elasticity of the demand curve. If the demand curve with elasticity equals one, export earnings will not change as a result of shifts in supply.*
• Rightward shifts in supply would serve to produce quite a small fall in price but would still serve to increase earnings compared to the initial equilibrium level.

**Diagram 4. Rightward Shifts in the Supply Curve**

*Note:* Source- Bird (1982).
• Some country characterizations based on the theory:

**Diagram 5. Theory Applied to Country Cases**

(a) Small food-producing countries; e.g. Mauritius (sugar).
Domestic supply variations are the dominant cause of export instability, and volume and earnings instability will be greater than price instability.

(b) Small raw material producing countries; e.g. Cyprus (copper).
Price and earnings instability will tend to be greater than volume instability.

(c) Large food-producing countries; e.g. Ghana (cocoa), Brazil (coffee), Burma (rice).
Export earnings will tend to be more stable than either price or volume. Price and volume are negatively correlated.

(d) Large raw material producing countries; e.g. Chile (copper) and Malaysia (rubber).
Relative price, volume, and earnings instability will depend on the elasticity of the supply curve. Price and volume are non-negatively correlated. The diagram shows a case where, because of the inelasticity of the supply curve, the degree of price and earnings instability exceeds the degree of volume instability.

*Note: Source- Bird (1982).*

A particularly relevant factor influencing the stability of export earnings is export concentration, a factor that is of particular relevance for developing countries reliant on primary products. Based on the simple notion that nations may spread risks through the diversification of exports, one could also argue that countries which are specialized in the production and export of one commodity are likely to have higher export instability relative to countries that export a
range of products. Following such a line of thought, export instability will tend to be inversely related to the degree of export diversification (Bird, 1982), and therefore it could be anticipated that countries with an undiversified export basket and with export earnings reflecting the instability of prices in particular commodities, will have a higher degree of export instabilities. On the other hand, the relationship between export earnings and the prices of individual export commodities is reduced in countries with a diversified export basket, provided that individual export prices are not positively and linearly related.

However, export concentration is the sole condition for export instability, as the fluctuations in demand and the supply of the exported commodity are also relevant. Similarly, export diversification does not guarantee export stability, but it will still tend to reduce instability provided that the items in the export basket are negatively interrelated. Furthermore, the theory of comparative advantage in international trade and the pursuit of economies of scale in microeconomics might give additional insights into why developing countries with limited domestic demand and highly endowed with a given natural resource undertake a fairly narrow specialization in the production of one commodity, which also increases the likelihood of these countries of experiencing more export instability than more developed countries.

It is also important to consider the benefits of export diversification, as although its relationship with export instability seems evident, it should be noted that the concept of instability involves the magnitude of deviations and their frequency (Bird, 1982). Export diversification could lower the average magnitude of deviations but also alter the frequency of deviations, making them more uncertain. If the uncertainty associated with the deviations -rather than their magnitude- is considered an undesirable aspect, export diversification might aggravate the problems of export instability rather than mitigate them.
2.1.5 Houthakker-Magee Framework

In the field of international economics, several influential empirical findings arose from Houthakker and Magee (1969):

- Regardless of the convergence in growth and inflation rates among countries, even if the rates are the same, some countries would still be subject to secular deterioration or improvement in the trade balance because of disparities in income elasticities of the demand for imports. Examples of such disparities are present in Japan, the United Kingdom, and the United States, which may contribute to the explanation of the dynamics of the balance of payments in those countries in the postwar period.

- For the United States, the income elasticity of demand for total imports is similar to that of their developed counterparts. The income elasticity of other countries’ demand for U.S. imports is low; therefore, the U.S. trade balance is prone to worsen over time.

- The share of industrialized economies in U.S. imports and exports is likely to increase over time, and Japan and Canada will especially mark the prospective deterioration in the U.S. trade balance unless they manage to sustain comparatively higher growth and inflation rates than the United States.

- The United States has an exceptionally high-income elasticity of demand for imported finished manufactured goods compared to the demand for U.S. manufactured goods by other countries.

- The price elasticities estimated for (total) imports and exports are small, but they are much larger for U.S. imports from individual countries and exports to individual countries.
The authors claim that the findings above are subject to limitations like a short time series sample and inadequate data, and econometric specification problems, such as serial correlation. Furthermore, they state that the supply side should be explored more comprehensively.

These findings, known as the *Houthakker-Magee Effect*, imply that a country with unfavorable income elasticities in trade must grow at a slower rate than its trading partners and experience a worsening trade in the current account or a depreciation of the real exchange rate. For example, the increase in the U.S. trend GDP growth in the middle of the 1990s, when merged with the Houthakker-Magee effect, would predict a sharp worsening of the U.S. current account deficit (Wu, 2005)

In related empirical work, Krugman (1989) documented the so-called 45-degree-rule for the first time. He found that income elasticities are related to development rates if fast-growing economies have high-income elasticities of demand for their exports and low-income elasticities of import demand. The net effect of the relationship between income elasticities and growth rates is that the secular trends in real exchange rates are smaller than expected, so purchasing power parity (PPP) holds. In other words, the empirical findings by Krugman (1989) suggested that there is no such thing as long-run trends in real exchange rates; over the long run, PPP for the manufacturing sector of advanced economies holds well given the low-price elasticities. For Krugman (1989), the explanation of this rule is related to the fact that trade among advanced economies is not reflected (up to a large extent) by country-specific comparative advantages, which leads countries to face long-term downward-sloping demand for their unique products. Instead, these nations specialize in taking advantage of scale economies at different levels. When
countries grow, they can increase their share in world trade without needing a secular real
depreciation.

2.2 Empirical Literature

2.2.1 Economics of the Dutch Disease and the Resource Curse

The Dutch Disease and the resource curse, although a causal look at economic
development across developing countries, with stagnation in resource-rich Africa and rapid
development in resource-poor Asia, seems consistent with the resource curse statement (Ross,
1999). Sachs and Warner (2001) explained that although the evidence is not bulletproof, it is
strong and has been confirmed by previous research using statistical and econometric methods.
High resource activity and related revenues inflows tend to correlate with slow economic
development, and further, there is not a positive correlation between natural wealth and other
forms of economic wealth. Empirical evidence, however, seems to be highly dependent on the
period of analysis, the variables, the econometric method, and the identification strategies used
by the authors. Hence, although there is a general belief that resource-poor economies are likely
to have better macroeconomic performance than their resource-rich counterparts, results and
conclusions should be analyzed with caution.

In their seminal work, Sachs and Warner (1995) used cross-country regression and a
calibrated endogenous growth model to show that countries with high natural resource exports-
to-GDP ratios tend to have low growth rates. They claim that the empirical relationship is robust
and controls for variables essential for economic development, including per capita GDP,
investment rates, government efficiency, and regional dummies. Overall the authors found a
strong negative relation between natural resource intensity and economic development, and this
paper ignited the strand of empirical research on the resource curse.
In related research and focusing on Latin American countries, Sachs and Warner (1999) found empirical evidence suggesting that natural resource booms have done little to support long-run economic growth; instead, they hindered growth on average, as resource booms are often accompanied by declining GDP per capita. The authors also characterized how Latin America and East Asia took different development paths. While Latin American economies kept their historical tradition of exporting commodities or commodity-based manufactured goods, East Asian countries favored labor-intensive exports and then capital-intensive and technology-intensive exports. For the authors, this could be a potential explanation of why East Asia has enjoyed comparatively higher growth rates in the last decades.

A calibrated and computable general equilibrium model was presented by Rodriguez and Sachs (1999) to explore why resource-abundant economies tend to have lower growth rates. Their evidence suggests that resource-rich countries live beyond their means. The theoretical explanation is that since overshooting the steady state’s equilibrium investment and consumption can be optimal in a Ramsey growth model, including natural resources, the economy will converge to its steady state from above, displaying negative growth rates on the transition. The calibrated parameters of the model can account for the dynamics of the Venezuelan economy.

A remarkable survey of the related literature and new evidence was presented by Sachs and Warner (2001). They emphasize that there is little direct evidence that omitted geographical or climate variables explain the curse or that there is a bias resulting from some other unobserved constraints to grow. Moreover, they provided evidence that except for the direct contribution of the natural resource sector itself, natural resource-abundant countries systematically failed to achieve strong export-led growth or any other types of growth. Considering that none of the countries with extremely abundant natural resources in 1970 grew rapidly over the following 20
years (Sachs & Warner, 2001), empirical economic growth studies such as Sala-i-Martin (1997) and Sala-i-Martin et al. (2004) classified natural resources as one of the 10 most robust variables in empirical studies on economic growth.

Using panel data methods, Manzano and Rigobon (2001) revisited the reasons behind the poor macroeconomic performance of resource-abundant economies, particularly incorporating better data and measures on the manufacturing or non-resource sector of the economy. While there is an effect in cross-section data due to omitted variable bias, such an effect is not present in panel data. Although institutional development and quality are central determinants of economic growth, they do not cause the existence of the curse. They stress that instead of blaming natural resources for poor performance, empirical findings suggest the importance of credit market imperfections (debt overhang) as a reason for weak economic growth in resource-rich countries. Specifically, resource-based economies decided to take advantage of high commodity prices in the 1970s for implicit collateral needed to take on additional debt, resulting in sovereign debt problems when commodity prices declined in the 1980s. Within a related strand of research, Hausmann and Rigobon (2003) modeled the resource curse based on two main building blocks, specialization in non-tradable and financial market frictions, arguing the need for macroeconomic stabilization policies and interventions to make financial markets more efficient in resource-rich countries.

Quantitative macroeconomic evidence, along with supporting empirics, were presented by Mavrotas et al. (2011) to conclude that both point-resource and diffuse-type natural resource dependence retard democracy development and good governance, ultimately dampening output growth. Theoretical insights from the model point to a growth collapse because of resource dissipation resulting from a wasteful rent-seeking contest. In a related article, Arezki et al. (2011)
stated that public expenditure in commodity-exporting countries is procyclical and that resource booms (windfalls) crowd out non-resource GDP. Further, long-run resource windfalls harm the performance of the non-resource sector. They used a panel VAR and panel data on 129 countries between 1970 and 2007.

Six channels through which natural resource abundance harms economic performance were provided by Frankel (2012). Those channels are long-term trends in world prices, commodity price volatility, permanent crowding out of manufacturing, autocratic and/or oligarchic institutions, anarchic institutions, and cyclical Dutch Disease. The author suggested, however, that the key policy question for resource-rich countries would be how to make the best out of natural resource wealth. Similarly, Sala-i-Martin and Subramanian (2013) stated that natural resources such as oil and minerals may or may not be a curse themselves. Instead, their work showed that natural resource abundance has a seriously negative impact on the quality of domestic institutions and long-run growth. Although it is non-linear, that relation holds for a cross-section of countries throughout the developing world. Poor institutional quality, rather than terms of trade or level of dependence on natural resources, was the cause of slow economic development for Nigeria.

Although there is a vast body of literature illustrating that natural resource wealth tends to harm economic development, it is also true that there are a few cases where resource-rich countries managed to succeed. Torvik (2009) posited that the resource curse field is still in its infancy and identified some methodological steps forward to strengthen theoretical and empirical conclusions. First, statistical causality is still doubtful since economists do not know to what extent natural resource wealth dampens growth. Second, it is relevant to identify the difference between cross-country successes and failures since for every Venezuela and Nigeria, there is a
Botswana and Norway. The third room for improvement is to shift the objective of the research toward illustrating policy implications—since most studies on the topic are of a positive (instead of normative) nature. Lastly, it is relevant to develop applied modeling to lengthen the political economy dimension of resource curse studies since there seems to be an evident interplay between macroeconomics, politics, and natural wealth.

In related work, Smith (2015) used panel regression techniques with fixed effects to evaluate the impact of natural resource discoveries on per capita GDP. He found no evidence to support that there is a resource curse; namely, resource exploitation has a positive impact on long-run per capita GDP growth in developing countries and no impact on developed ones. Likewise, James (2015) highlighted the relevance of including data on industry composition in growth regressions. Specifically, James (2015) concluded that natural resource-rich countries grow slowly during specific periods but relatively faster during others, and those results are explained by average sectoral growth heterogeneity. Similar results pointing to the inexistence of the resource curse hypothesis have been provided by Brunnschweiler (2008), Davis (1995), and Lederman and Maloney (2007).

Further empirical evidence suggesting that large endowments of natural resources (e.g., oil or other minerals) do not slow down long-term economic development was provided by Alexeev & Conrad (2009). Their analysis focused on GDP per capita instead of growth rates over a given period. Natural resource endowments increase GDP per capita and income inequality, but they do not generate an improvement of institutions, but this does not mean that natural resources are harmful to institutions. Oil-rich countries have (on average) a high GDP per capita and weak institutions relative to advanced economies, causing a negative coefficient to the oil wealth variable (in regression models). In another paper, Alexeev and Conrad (2011)
extended their analysis to study the interaction between the resource curse and economic transition.

In another contribution, Sachs (2007) argued that the resource curse is only partially real because, although macroeconomic performance has fallen short of potential in oil-rich countries, many of them have been doing well during the last years. Likewise, he proposes an agenda of long-run investment strategies as a vital tool for avoiding the Dutch disease.

2.2.2 Politics of the Dutch Disease and the Resource Curse

On the ground of political science, there are also several empirical analyses related to the resource curse. Studies on governance or institutional quality state that the differences in growth rates of resource-rich countries are related to the distribution of rents through institutional arrangements. The literature is abundant (see Baland & Francois (2000), Kronenberg (2004), Torvik (2002), among others). Mehlum et al. (2006) demonstrated that institutions are critical in determining whether resource-rich nations can avoid the curse or not. Leite and Weidmann (1999) explained how natural resource abundance creates room for rent-seeking behavior and determines the level of corruption in a given country. The growth effects of natural resource discoveries and anti-corruption policies depend on the country's income (i.e., development) level. Model insights are corroborated using cross-country regressions.

According to Ross (1999), political explanations for the resource curse have followed cognitive, societal, and state-centered approaches. Cognitive theories suggest that resource rents (windfalls) generate myopic disorders among policymakers; societal theories suggest that rents empower social groups that support growth-impeding macroeconomic policies; and state-centered theories argue that rents weaken public institutions that are required to promote long-run economic development. Unlike economic explanations for the resource curse, political
approaches are rarely tested quantitatively, so scholars have not been able to generate a cumulative body of knowledge about the policy and economic failures of resource-rich countries.

Besides the political explanations for the resource curse, there are also political effects; such effects are called the political resource curse in literature. Notably, although studies show that economic growth (national income increase) leads to more democratic governments, political scientists believe that when the income increases are linked to resource wealth, such a democratizing effect will shrink or disappear (Ross, 2001). Using pooled time-series data from 113 nation-states from 1971 to 1997, Ross (2001) tested the negative effect of oil rents on democracy. He found that (a) oil abundance has a negative effect on democracy, and the damage is more considerable in poor states than in rich ones. Additionally, oil exports shocks will do more harm in oil-poor states than in oil-rich ones; (b) the negative effect of oil on democracy is not restricted to Middle East countries but extends to other countries like Indonesia, Malaysia, Mexico, and Nigeria; (c) non-fuel mineral wealth has a similar effect on democracy, with examples such as Angola, Chile, Peru, Cambodia and Democratic Republic of Congo; (d) there is tentative empirical support for three causal mechanisms between oil abundance and authoritarianism: a rentier effect (politicians use low tax rates and high expenditure to soften claims for democracy), a repression effect (politicians build up their security forces to ward off democratic claims), and a modernization effect (as people fail to land into non-oil jobs, they are less likely to claim for democracy).

In a study of 107 developing countries from 1960 to 1999 using panel data, Smith (2004) found that oil wealth was associated with increased regime durability (even when controlling for repression) and with lower likelihoods of civil wars and anti-state demonstrations. The general
conclusion from empirical results is that oil wealth increases the durability of regimes and that such regimes seem to be robust enough to overcome booms and busts in oil prices.

In the political economy literature, beyond empirical evidence, it is not common to see applied modeling of resource curse issues. One of the few notable exceptions is Robinson et al. (2006), who developed a quantitative model to show that politicians are prone to over-extract resources relative to the efficient extraction path because the future discount rate is too high, and related resource booms improve the efficiency of the extraction paths. Nonetheless, natural resource booms increase the misallocation of resources in the rest of the economy because they raise the value of being in power and provide government officials with more money to influence electoral outcomes. At last, the magnitude of the macroeconomic impact of resource booms depends critically on institutions since they determine the extent to which political incentives map into policy outcomes. In related research, Bjorvatn and Selvik (2008) provided a quantitative framework to study the link between resource rents, institutions, and economic performance, while Andersen and Aslaksen (2008) found that the resource curse is present in democratic presidential regimes but not in democratic parliamentary ones, and such differences matter more for economic growth than whether the country is democratic or autocratic. Additionally, resource abundance is more prone to reduce economic growth when proportional electoral systems are in place.

Empirical evidence by Anthonsen et al. (2009, 2013) illustrated that government fiscal dependency on oil and gas rents has a negative effect on government quality, including measures such as corruption, bureaucracy, and legal partiality. For Brazilian regions, Brollo et al. (2013) developed a political agency model. The researchers stated that higher exogenous revenues induce more corruption because incumbents have more rooms to obtain rents without
disappointing voters. Additionally, if the benefit of corruption is more valuable to those with worse options, individuals with less dedication to ethics are attracted to politics. Precisely because opponents are now of lower quality, an incumbent can afford to grab more rent while at the same time increasing his re-election chances. Econometric results suggested that a 10% increase in federal transfers to municipal governments raises local corruption by 6% (broad definition, possibly including poor administration) or by 16% (narrow definition, with only severe violation episodes). Moreover, this fiscal windfall increases the incumbent mayor’s probability of re-election by 7% and shrinks the fraction of his opponents with a college degree by 6%. Also, the electoral punishment for disclosed corruption is found to be lower when federal transfers are larger. Empirical findings confirm the existence of a political resource curse—a negative effect of windfall resources on political corruption and political selection.

The effect of natural resource abundance on democracy was explored by Aytac et al. (2016). They differentiated two types of economies: contract-intensive economies and clientelist economies. In the latter, individuals obtain their incomes in groups that compete over state rents, while in the former, people earn their income normally in the labor market. Empirical results confirmed such theoretical belief, supported by data on 150 countries from 1973 to 2000. Results also confirm that the existence of a clientelist economy can be considered a pre-requisite for the resource curse to happen.

2.2.3 Institutions and the Resource Curse

Three broad sets of results have suggested the institutions are a necessary variable of interest to understand the resource curse fully. The first set of results suggests that there are natural resources whose production or extraction is concentrated in a specific geographic or economic area and that concentration facilitates the control of rents by interest groups (Boschini
et al., 2007; Bulte et al., 2005; Isham et al., 2005). The second set of results indicates that the abundance of natural resources is strongly associated with corruption, democracy deterioration, and armed conflict in countries with low institutional quality (Ades & Di Tella, 1999; Bhattacharyya & Hodler, 2010). This conclusion is heavily supported by other empirical studies that present similar results, such as Collier and Hoeffler (2005), Collier et al. (2004), Dietz et al. (2007), Ross (2004), and Tsui (2011). The third set of results has found that the negative relation between natural resource abundance and macroeconomic performance is present mainly in countries with already poor institutional quality (see Boschini et al., 2007; Collier & Hoeffler, 2009; Mehlum et al., 2006). This strand of results is explored and extended by Boschini et al. (2013) and Bakwena (2012).

The effects of resource wealth on economic development in a broader sense were explored by Bulte et al. (2003). Certain types of resources – so-called point resources that can be easily controlled by small groups in society – are typically associated with less democratic regimes and weak institutions that deliver an inadequate quality of governance. Also, countries with low levels of institutional/governance quality tend to have lower scores on development indicators. However, there is no evidence that the resource curse itself has an impact on development. These findings are aligned with Pike (2010), who found that oil dependence has negative consequences across a range of dimensions of government and institutional quality (including the level of democracy and corruption), and with Anthonsen et al. (2009, 2013), who found that oil and gas dependence has a negative effect on three dimensions of government quality: corruption, bureaucratic quality, and legal impartiality. In addition, Norman (2009) validated, both empirically and theoretically, the belief that countries with a higher stock of natural resources have subsequent lower levels of the rule of law.
For Caspian Basin countries that are well-known to be resource-rich, Ahmadov et al. (2013) conducted a panel data econometric analysis. They found that, at the aggregate level, natural resource revenues have a negative impact on government effectiveness, i.e., countries with higher oil and resource rents as a share of GDP tend to have lower rates of government effectiveness. Very similar results were previously found by De Rosa and Iootty (2012), who concluded that resource dependence dampens government effectiveness\(^1\) and the levels of competition across the domestic economy, and that relationship seems to persist in the long run.

The link between institutional quality and economic development was studied by Sarmidi et al. (2014), who found that institutions can indeed neutralize the effect of the resource curse; this view is also supported by Beland and Tiagi (2009) and Medeiros et al. (2013). Both sets of scholars find that good institutions are often associated with high economic freedom, which in turn promotes economic growth. Oskenbayev et al. (2013) used panel data to revise the linkages between institutional quality and natural resource concentration among 14 regions in Kazakhstan. The scholars differentiated the impact on the growth of the country’s two main export items, wheat (\textit{diffuse} resource) and oil (\textit{point-source} resource). Their results suggested that natural resources do not promote poor macroeconomic performance, but rather their over-abundant production is associated with rent-seeking activities.

Following a novel autoregressive distributed lag (ARDL) approach, Olanyugbo and Adediran (2016) tested the link between oil revenue and institutional quality on economic growth. They used annual data on Nigeria and found that both low institutional quality and oil

\(^1\) The authors mention that “… government effectiveness measures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies”.\]
revenues promote economic growth in the short run but retards it in the long run, confirming the resource curse hypothesis.

**2.2.4 Export Concentration, Export Volatility, and Terms of Trade**

In the arena of export concentration, Feenstra and Kee (2008) provided a formal theoretical framework of concentration and economic development. First, they develop an international trade model with monopolistic competition, heterogeneous firms, and endogenous productivity, where export variety has an impact on country productivity. Namely, export variety is related to aggregated productivity through a GDP function across countries and over time. They show a mathematical formulation of this relationship, confirmed by regression analysis. Empirically, they found that a sustained 3.3% growth in export variety over two decades resulted in an equivalent productivity gain in exporting countries. Overall, the export variety-based empirics can explain 31% (52% for OECD economies) of within-country variation of productivity but not a significant fraction of cross-country variation. This finding leads the author to conclude that their trade model with monopolistic competition is effective for accounting for variation in the aggregate time-series of productivity in a country but does not explain the absolute differences in productivity between exporting countries. Their model has significant implications for the importance of countries addressing export concentration. Productivity can be enhanced by implementing policies to stimulate export variety, and although this does not guarantee a reduction in the cross-country productivity gap between developing and developed nations, it will contribute to improving the aggregate within-country productivity in developing economies. Greenway and Kneller (2007) present a broader literature review on new international trade theories that, among other topics, highlights the links between productivity
and export variety. Further empirical evidence was also provided by Herzer and Nowak-Lehnmann (2006).

According to Fung et al. (2013), excessive export concentration could have a detrimental effect on growth; and the concentration of export on commodities and natural resources could have even more negative effects for several reasons: (a) There is a well-known hypothesis that natural resources are subject to a decline in their terms of trade; As countries become wealthier, they will spend more on manufactured goods that will lead to a relative change in their demand; (b) commodities exports tend to lead to volatility in export revenues, as the price of commodities are subject to large price shocks; (c) The well-known problem of the resource curse and Dutch disease outlined in previous sections; (d) Unlike manufactured goods, commodities have properties that make their excessive specialization notably less desirable, e.g., they have lower scope of productivity and quality improvements; (e) Lastly, the production of commodities generates economic rents that are often extracted within the context of poor institutional quality, so there is a tendency to misuse resource rents instead of promoting significant investments to foster economic development even after resource are depleted.

So far, examples have been examined concerning how export concentration affects economic development, mainly through the lens of international trade; however, more examples could help analyze the topic through the theory and empirics of economic development. In the framework of endogenous growth theory, Hidalgo et al. (2009) developed a measure of economic complexity that captures information about the capabilities available in a country, which in turn are strongly correlated to income per capita, predict future growth and also the complexity of a country’s future exports. Countries with more concentrated exports tend to have less productive capabilities than their counterparts, which is then linked to lower levels of
income per capita. In subsequent research, Hidalgo and Hausmann (2010) provide further empirical evidence that there is a relationship between the diversification of a country’s export and the ubiquity\(^2\) of its products. The authors also developed a new theoretical model to account for their empirical findings. In a nutshell, products that require more capabilities will be accessible to fewer countries (i.e., will be less ubiquitous), while countries that have more productive capabilities will have what is required to make more products (i.e., will be more diversified). The accumulation of new capabilities that allow making more products ensures an exponential return, which adds up to the capabilities that are already available in the country.

Bahar et al. (2014) also built upon the same ideas to bring the concept of knowledge diffusion, where a country is more likely to acquire a new production capability if a neighboring country is a successful exporter of a product requiring such capability.

As previously shown, export concentration is not only detrimental due to the Dutch Disease (refer to the mechanisms outlined by Corden, 1984; Corden & Neary, 1982; Van Wijnbergen, 1984a, 1984b; among others) or the resource curse (Sachs & Warner, 1995, 1999, 2001; among others) where the adverse effect is transmitted through indirect, complex transmissions mechanisms (e.g., institutions, rents, real exchange rate, the balance of payments), and also through a direct adverse effect on productivity. This direct effect can be documented both from the perspective of international trade theory and from endogenous growth theory. Export concentration is associated with lower productivity levels, and this has second-round effects: countries with lower productivity are linked to lower-income per capita levels, lower

\(^2\) Ubiquity refers to the number of countries exporting a given product.
standards of living, lower capital stock, and more deficient institutions, which in turn results in lower overall economic development.

In related work, Ghosh and Ostry (1994) claimed that export instability (uncertainty around terms of trade rather than about export volumes) is an important source of macroeconomic volatility in developing countries. Although countries tried to mitigate their external exposure by diversifying the export base or using commodity-price linked hedging instruments, such strategies did not pay off. Ghosh and Ostry (1994) provided empirical evidence to suggest that developing economies have attempted to build up precautionary balances in times of increased export instability; however, the precautionary-savings effect is stronger for those countries with a heavily concentrated export base (in a few commodities). The core implication of their work is that for a given level of export instability (i.e., terms of trade uncertainty), countries that use macroeconomic policy in an attempt to reduce their exposure to foreign price shocks enjoy significant benefits that would not be attainable if they relied on international capital markets to insure themselves against commodity price shocks.

The macroeconomic consequences of export instability can be divided into short- and long-run effects (Araujo Bonjean et al., 1999). In the short run, the most relevant effect is related to the Dutch Disease analysis, already addressed in previous sections. Nonetheless, there is also an explanation that highlights the role of public agents and poor public management of export earnings. For instance, Davis (1995) claimed that this Dutch Disease effect is a result of poor public reactions to export instability, while Roemer (1985) pointed out that this instability stimulates lobbying activities, which increase custom taxes and wage rigidities.

In the long run, the growth effects of instability can be analyzed through the framework provided by Brock (1991), which suggested that export earnings instability generates risk, and
therefore, it modifies the aggregate reaction of economic agents and, consequently, influences economic growth. Nevertheless, the empirical evidence does not support the implications put forward by Brock (1991); generally speaking, the results obtained from econometric studies are very diverse, and samples are not uniform. For a full review of these studies, see Araujo et al. (1999).

The empirical efforts aimed at estimating the relationship between export instability and economic development -in developing countries have yielded puzzling results. On the one hand, some studies find that export instability and development have a negative relationship, while other studies have concluded that that negative relationship is not statistically significant in the long-run. The first set of studies that concludes that a negative relationship exists claims that in periods of export instability, developing countries respond to the volatility via adjustments and reductions in consumption; as economies reduce consumption, savings and investments increase and result in an increase in economic development, under the implicit assumption of risk aversion in the models (see Knudsen & Parnes, 1975; Lam, 1980; MacBean, 1966; Savvides, 1984). Nevertheless, other authors have found that these claims were doubtful due to short samples (Maizel, 1968), and authors like Obidegwu and Nziramasanga (1981) and Yotopoulos and Nugent (1977) claimed that export instability had no significant impact on growth as developing countries were in the position to implement unilateral measures to mitigate the potential impact of instability. Ocran and Biekpe (2008) provided further panel data evidence for Subsaharan Africa in addition to a more detailed literature review about primary commodity exports and economic growth, and their results point to the existence of a negative effect of export instability and high commodity dependence on economic growth.
On terms of trade, seminal work was produced by Mendoza (1995), who calibrated a dynamic stochastic general equilibrium model of a small economy and whose findings suggested that terms-of-trade shocks are significant and persistent and that developing economies tend to have more significant variability in macroeconomic indicators. Mainly, half of the variability in GDP and real exchange rates can be accounted for by terms-of-trade disturbances. These findings represented an essential contribution to the field of business cycle analysis in small open economies.

In related research, Kose (2002) analyzed the role of terms-of-trade shocks through world price shocks. In the context of a dynamic stochastic general equilibrium model, based on the specific factors model, the author shows that world price disturbances account for a relevant fraction of the variability of business cycles in developing countries.

The work of Kose (2002) and Mendoza (1995) motivated conventional thoughts suggesting that terms-of-trade shocks constitute a significant source of business cycle fluctuations in emerging and developing countries, and this view is mainly based on the calibration of quantitative, micro-founded business cycle models. However, Schmitt-Grohe and Uribe (2018) showed that there is a mismatch between theoretical and empirical models, as their econometric evidence (based on structural vector autoregression models) suggested that, on average terms-of-trade shocks explain around 10% of movements in aggregate economic activity. Although terms-of-trade predict that world shocks explain a small fraction of aggregate fluctuations, as found by Schmitt-Grohe and Uribe (2018), this finding only holds when a single world price is included in the model. In related research, Fernandez et al. (2017) found that when multiple commodity prices are included in the model to account for the transmission of world disturbance to domestic dynamics, world shocks explain, on average, 33% of business cycle
fluctuations in individual economies, and such figures reach 60% when the model is estimated in post-2000 data. It should be noted that the authors do not refer to “shocks” but rather to “volatility” in terms of trade.

2.2.5 Stylized Facts

On more practical grounds, slightly over 66% of developing countries have export shares exceeding 20%. Increased dependence on exports results in significant fluctuations in export earnings. Export revenue volatility is directly linked to growth volatility, meaning fluctuations in export earnings result in fluctuations in economic development. However, the scale of the impact depends predominantly on the export concentration present in the country’s portfolio of trading partners. Generally speaking, higher degrees of export concentration is highly correlated with greater volatility in both export earnings and economic growth rates (Hesse, 2009). The following data depicts the stark differences in export concentration among different economic classifications of nations:
Chart 1.1: Export share in GDP, 1995–2009

Source: Calculated using data from UNCTAD, Handbook of Statistics 2009
It is clear by Chart 1.1 that developing economies depend heavily on exports, as they constitute a significantly large share of the country’s GDP, as seen in Chart 1.2. Counterintuitively, Asia has among the highest export share in GDP yet has a much lower export concentration. This fact indicates that export dependence does not necessarily lead to increased levels of export concentration. However, Asia is often seen as an anomaly, especially when compared to African nations, whose export concentration continues to rise dramatically. Therefore, in general, most macroeconomists agree that export dependence creates an environment highly conducive to export concentration, yielding volatility in export earnings. Volatile exchange rates will often exacerbate the scenario, concomitantly stagnating economic growth (Hesse, 2009). A stagnation in economic growth can be related to several phenomena, including terms of trade (balance of payments) issues, the resource curse, and the Dutch Disease.

Source: Calculated using data from UNCTAD, Handbook of Statistics 2009
2.3 Empirical Relationships

In this section, I proceed to examine simple empirical relationships between the variables that into consideration. The following variables were collected at an annual frequency for 23 developing countries: an economic diversification index from the International Monetary Fund, where countries with lower levels of diversification exhibit a larger index; from the World Bank, I collected real GDP (constant 2010 USD), the current account balance (current USD), and natural resource rents as a percentage of GDP. The current account balance series was then used to compute 10-year standard deviations on a rolling basis, which is used to measure current account volatility. It is remarkably important to highlight that the relationship in this section is descriptive and cannot be regarded as causal inference exercises.

Table 2. Country Samples

<table>
<thead>
<tr>
<th>Country</th>
<th>Country ID</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>ARG</td>
<td>1980-2014</td>
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<tr>
<td>Bahrain</td>
<td>BHR</td>
<td>2010-2014</td>
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<td>Bolivia</td>
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<td>India</td>
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<td>1980-2014</td>
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<td>1980-2014</td>
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<td>Morocco</td>
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<td>1980-2014</td>
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<td>1990-2014</td>
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<td>2009-2014</td>
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<td>Peru</td>
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<td>1991-2014</td>
</tr>
<tr>
<td>Qatar</td>
<td>QAT</td>
<td>2011-2014</td>
</tr>
</tbody>
</table>
Table 2 Continued

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<thead>
<tr>
<th>Country</th>
<th>Country ID</th>
<th>Period</th>
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</thead>
<tbody>
<tr>
<td>Saudi Arabia</td>
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<td>2009-2014</td>
</tr>
<tr>
<td>South Africa</td>
<td>ZAF</td>
<td>1980-2014</td>
</tr>
<tr>
<td>Tunisia</td>
<td>TUN</td>
<td>1980-2014</td>
</tr>
<tr>
<td>Turkey</td>
<td>TUR</td>
<td>1996-2014</td>
</tr>
<tr>
<td>Venezuela</td>
<td>VEN</td>
<td>1982-2014</td>
</tr>
</tbody>
</table>

*Note. Source- Own elaboration.*

In Figure 1, at first sight, there seems to exist a positive relationship between the economic diversification index and real GDP per capita, and therefore countries with a higher index (lower diversification) are associated with higher GDP. Nonetheless, several countries lie outside the confidence bands, which suggests that the relationship does not hold for all countries.

In Figure 2, there does not seem to exist a clear relationship between the economic diversification index and a measure of current account balance volatility (10-year standard deviation). In 1980, 1990, and 2000 the regression lines were almost flat, with several countries lying outside the confidence band. In 2014, the relation turned slightly negative, which suggests that countries with higher economic diversification index (lower diversification) have a higher current account volatility.

The relationship between GDP per capita and current account volatility (10-year standard deviation) is shown to be positive in Figure 3. On average, within this sample, countries with higher GDP per capita are also subject to higher current account volatility, but once again, it is important to consider that many countries lie outside the confidence intervals.

On the other hand, the relationship between GDP per capita and natural resource rents is shown in Figure 4. Within this sample, countries with higher natural resource rents also tend to have higher income levels, and the relationship holds over time.
During the period of analysis, it is important to consider that the economic diversification index does not exhibit a major variation over time. Figure 5 shows that, on average, the most diversified countries in the sample (those with lower index values) remained within the same range over the past 3 decades. The same applies to the least diversified countries in the sample.

**Figure 1. Economic Diversification Index and Real GDP per Capita**

*Note: Source- Own elaboration.*
Figure 2. Economic Diversification Index and 10-year S.D. of Current Account Balance

Note: Source- Own elaboration.
Figure 3. Real GDP per Capita and 10-year S.D. of Current Account Balance

Note: Source- Own elaboration.
Figure 4. *Real GDP per Capita and Natural Resource Rents (as % of GDP)*

Note: Source- Own elaboration.
Figure 5. Economic Diversification Index Over Time

Note: Source- Own elaboration.
Chapter 3: Methods

It was unknown if, or to what extent, export instability, terms of trade, and competitiveness mediate the association between export diversification and economic development in emerging economies. Therefore, the purpose of this quantitative study was to explore the mediating association of export instability, terms of trade, and competitiveness between export diversification and economic development in emerging economies across Latin America, Asia and the Middle East, and Africa. A review of the literature suggests a gap regarding export diversification. Namely, prior research suggested a direct relationship between export diversification and economic development without considering the role of mediating factors. Therefore, this study’s findings address the literature gap regarding mediating factors associated with export diversification and economic development.

The following chapter reviews the methods employed to conduct this study. The following chapter specifically reviews the research methodology and design, sample and data sources, data collection and analysis procedures, and ethical considerations. The chapter concludes with an overall summary and introduction of Chapter 4, the results chapter.

3.1 Research Methodology and Design

A non-experimental quantitative methodology with a mediation design was selected to address the research problem and questions. The quantitative methodology is used when researchers seek to explore an observable and quantifiable phenomenon (Creswell & Creswell, 2018). The characteristics associated with the quantitative methodology include using large sample sizes and collecting quantifiable data such as that collected from surveys, secondary data sources, tests, and other numerical measures. Therefore, the quantitative methodology is predetermined and structured. Researchers use the quantitative methodology to control, confirm,
and test hypothesis design characteristics. Several research designs are associated with the quantitative methodology, including experimental, non-experimental (causal-comparative, correlational, and longitudinal), and quasi-experimental designs (Creswell & Creswell, 2018). As a result of the research question and quantifiable data collected in this study, the quantitative methodology was determined to be best suited for addressing the research problems and questions.

A longitudinal nonexperimental design was used in the present study (David & Sava, 2015). Consistent with this study's research problem and questions, the causal mediation analysis method was employed to explore the mediating association of three variables (export volatility, terms of trade, and competitiveness) between export diversification and economic development within and across several countries (David & Sava, 2015). Scholars suggest that two research designs are associated with studies exploring mediation variables and consist of cross-correlational and longitudinal designs (David & Sava, 2015). Several shortcomings are described in the literature regarding using the cross-sectional design when exploring mediators. More specifically, scholars suggest that the cross-sectional design allows researchers to explore “the mediating effect from a statistical perspective, but they treat mediators as clues that point to possible mechanisms of change and not necessarily as causal mechanisms” (David & Sava, 2015, p. 2).

The distinguishing characteristic between the cross-sectional and longitudinal designs is that data is collected at only one point in time in cross-sectional studies (Cummings, 2017). In contrast, several waves of data are collected in studies using the longitudinal design (David & Sava, 2015). As a result, the longitudinal design allows the researcher to control for previous levels of variables in the mediation model and bolster the likelihood of finding an effect if there
is one to find (David & Sava, 2015). Therefore, the longitudinal research design was best suited for this study because of the strengths identified in this design and the intended collection of several waves of data over time.

3.2 Sample and Data Sources

3.2.1 Sample

The target sample of this study included 23 developing and emerging economies across Latin America, Asia, the Middle East, and Africa. The sample selection was motivated mainly by data availability, and all the countries in the sample are commonly considered to be resource-rich. The countries included in this study, along with their corresponding country identification and the period from which data was available, are described in Table 3. The base data sample was collected from the early 1980s up to 2014. However, some countries had fewer observations.

Table 3

<table>
<thead>
<tr>
<th>Country</th>
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<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>
Morocco MAR 1980-2014  
Nigeria NGA 1990-2014  
Oman OMN 2009-2014  
Peru PER 1991-2014  
Qatar QAT 2011-2014  
Saudi Arabia SAU 2009-2014  
South Africa ZAF 1980-2014  
Tunisia TUN 1980-2014  
Turkey TUR 1996-2014  
Venezuela VEN 1982-2014

3.2.2 Data Source and Data

Data were collected from the International Monetary Fund World Bank and were publicly accessible. As illustrated in Table 4, the variables of interest within this study included the export diversification index, GDP per capita, export volatility in a 10-year and a five-year window, current account balance, net barter terms of trade index, official exchange rate, total natural resource rents, total international reserves, value-added manufacturing as a percentage of GDP, and value-added industry as a percentage of GDP. The mediating variables within this study were export instability, terms of trade, and competitiveness. The variables assessed as representing these mediators included export volatility (export instability), net barter (terms of trade), and current account balance (competitiveness). Several variables were used as controls and included the logarithm of exchange rate depreciation (LCU per US$, period average), total natural resources rents (% of GDP), the logarithm of total reserves (includes gold, current US$), manufacturing, value added (% of GDP), industry, value added (% of GDP), and year fixed effects.
Table 4
Variables in the Sample

<table>
<thead>
<tr>
<th>Series</th>
<th>Description</th>
<th>Source</th>
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</thead>
<tbody>
<tr>
<td>EDI</td>
<td>Export Diversification Index</td>
<td>International Monetary Fund</td>
</tr>
<tr>
<td>GDPpc</td>
<td>GDP per capita (constant 2010 US$)</td>
<td>World Bank</td>
</tr>
<tr>
<td>X_sd10</td>
<td>Export volatility. Standard deviation of exports of goods and services (constant 2010 US$) in a 10-year window</td>
<td>Own calculation with World Bank Data</td>
</tr>
<tr>
<td>X_sd5</td>
<td>Export volatility. Standard deviation of exports of goods and services (constant 2010 US$) in a 5-year window</td>
<td>Own calculation with World Bank Data</td>
</tr>
<tr>
<td>BOP</td>
<td>Current account balance (% of GDP)</td>
<td>World Bank Data</td>
</tr>
<tr>
<td>TOT</td>
<td>Net barter terms of trade index (2000 = 100)</td>
<td>World Bank Data</td>
</tr>
<tr>
<td>ER</td>
<td>Official exchange rate (Local currency units per US$, period average)</td>
<td>World Bank Data</td>
</tr>
<tr>
<td>NRR</td>
<td>Total natural resources rents (% of GDP)</td>
<td>World Bank Data</td>
</tr>
<tr>
<td>Reserves</td>
<td>Total international reserves (includes gold, current US$)</td>
<td>World Bank Data</td>
</tr>
<tr>
<td>Manuf</td>
<td>Manufacturing, value added (% of GDP)</td>
<td>World Bank Data</td>
</tr>
<tr>
<td>Indust</td>
<td>Industry (including construction), value added (% of GDP)</td>
<td>World Bank Data</td>
</tr>
</tbody>
</table>

Although many authors argue for the possible existence of mediation variables, few studies specifically conducted a mediation analysis to understand the impact of export diversification on economic development. This is understood as when the number of mediators’ candidates is myriad, such that the span of the period in the regression equation can be overfitted. As a result, I was interested in filling this gap in the literature by incorporating comprehensive mediating variables without destabilizing the regression equation. In this case, constant GDP per capita and export diversification were the main relationships explored. Multiple studies,
including Hausmann and Hidalgo (2010) and Hausmann et al. (2011), have shown that countries with a higher level of export goods diversification, particularly those that produce the most complex goods, are associated with relatively higher levels of income.

3.3 Data Collection and Analysis Procedures

As a result of the data being publicly accessible, it was directly downloaded from the World Data Bank into a Microsoft Excel spreadsheet. The data was then reviewed and cleaned before being uploaded into SPSS for data analysis. Based on the conceptual research questions, this study used a mediation analysis on the unbalanced panel data of the examined sample of countries from 1980 to 2014. Most currently published studies focus on the relationship between export diversification and economic development without further elaborating on the role of mediating variables; this study contributes positively to the knowledge gap within the literature since it also considers mediating variables. This study goes deeper into the so-called *statistical mediation analysis*, a method to understand the relationship between two or more variables when mediating factors are in-between.

The term mediation indicates that the effect of the independent variable of interest is transmitted to the dependent variable through a third variable, considered a mediator. That is the purpose of mediation analyses is to investigate if and to which extent the effect of a treatment variable A (in this case, export diversification index) on an outcome variable Y (in this case, the development rate of real per capita GDP) is mediated through a variable M (in this case export instability, terms of trade, and competitiveness). With this approach, the relationship between the export diversification index and per capita economic development rate was studied, and I evaluated the direct and indirect effects of export instability, terms of trade, and competitiveness.
Mediation analysis was originally proposed by Baron and Kenny (1986) in the area of psychology, but its scope has since been expanded to the social sciences and economics. The concept of mediation is very close to the control variables in econometrics. However, mediation analysis has developed as a separate field strand of literature in statistics. According to the standard approach by Baron and Kenny (1986) the empirical specification can be presented as follows:

\[
E[Y|A,M] = \alpha_1 + \beta_1 A + \theta M \quad (1a)
\]
\[
E[M|A] = \alpha_2 + \gamma A \quad (1b)
\]

where equation (1a) presents the model for the outcome that depends on the treatment variable \(A\) and the mediation \(M\), while equation (1b) shows the conditional expectation of the mediator, depending on the treatment variable \(A\).

In the above equation \(\beta_1\) shows the direct and \(\theta \gamma\) captures the indirect effect of the treatment variable on the outcome variables. The mediated effect of the treatment variable on the outcome variable can be visually illustrated through the diagram in Figure 6.

**Figure 6**
*Mediation Analyses*

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Grotta and Bellocco (2013)
A few major guidelines are put forward by Baron and Kenny (1986): (i) $A$ and $Y$ must be related, and the regression coefficient between them should be statistically different from zero; (ii) $M$ and $Y$ must be related once the effect of $A$ is controlled, and this relationship should also be statistically significant; (iii) the relationship between $A$ and $Y$ is reduced significantly after controlling for the effect of $M$ (see Sobel, 1982, 1986). Total mediation occurs if all of the effects of $A$ goes through $M$, while partial mediation occurs if only part of the effect of $A$ goes through $M$.

The econometric strategy relied on panel data regression models. GDP per capita was the dependent variable, and the main independent variable was export diversification, the impact of which was mediated through export volatility, terms of trade, and competitiveness. In addition, the nominal exchange rate, natural resource rents as a share of output, international reserves, manufacturing value added as a share of output, and industry value added as a share of output was controlled for. All the variables not originally expressed as a share of output entered the models in the form of their natural logarithm. Including control variables allowed me to control for other factors that could have affected GDP per capita and export diversification. Controlling for variables was particularly advantageous in minimizing the potential shortcomings of omitted variable bias.

Three estimators were used to analyze the panel dataset: pooled ordinary least squares (POLs), fixed effects or within (FE), and random effects (RE). A pooled regression model corresponds to running ordinary least squares (OLS) on the observations pooled across cross-sectional and time dimensions. Least squares can estimate this model approach if its conventional assumptions are satisfied. This is also called the population-averaged model in the panel data context, assuming that any latent heterogeneity has been averaged out.
In practice, the assumptions underlying ordinary least squares estimation of the pooled model is unlikely to be met. If there is individual heterogeneity, omitting or ignoring unobserved individual effects contributes to the inconsistency of the least squares estimator. Furthermore, the assumptions of homoskedasticity and uncorrelated errors for the same individual are unrealistic, and autocorrelation and heteroscedasticity are two common specification issues that arise in panel data models. If the practical solutions to treat autocorrelation and heteroscedasticity issues are easy to obtain, omitting the important individual heterogeneity is a serious cause of endogeneity issues, therefore the pooled OLS estimation in the current analyses will be as the starting case, but the results will not be cored to draw conclusions.

When individual heterogeneity is assumed important, unobserved effects models, estimated with fixed and random effects approach, become crucial. The unobserved component is called a “random effect” when treated as a random variable and assumed to be uncorrelated with the independent variables. Hence, for the estimation procedure, the random effects approach puts unobserved individual effects into the error term and then accounts for the implied serial correlation in the composite error using a generalized least squares analysis. By contrast, an unobserved component is called a “fixed effect” when it is treated as a parameter to be estimated for each cross-section observation. The fixed effect assumption is that the individual-specific effects correlate with the independent variables. The causal mediation analysis used parametric regression models for the POLS and FE estimations. For the random effects model, mediation analyses were considered for multilevel data with random intercepts\(^3\). Finally, a robustness check was conducted as a form of sensitivity analysis of regression coefficient estimates (Lu & White, 2014). Within the current study, the sample was split into 5-year period intervals, and the FE

---

\(^3\) Stata user written command ml_mediation by Krull and MacKinnon (2001) was used.
estimators were reported. In addition, an analysis was conducted exploring the variables of interest in this study as moderators. Findings are reported in Chapter 4, the results chapter.

3.4 Summary

The quantitative methodology with a longitudinal research design was selected to address the research problem and questions posited in the study. The chapter described the research methodology and design and discussed the sample, data sources, and variables of interest. Finally, the data collection and analysis procedures were described. The following chapter, Chapter 4, reviews the research findings. Chapter 5, the discussion and conclusion chapter, provides a discussion of the implications of the research findings, limitations of the study, and recommendations for future research.
Chapter 4: Results

This quantitative study aimed to explore the mediating association of export instability, terms of trade, and competitiveness between export diversification and economic development in emerging economies across Latin America, Asia and the Middle East, and Africa. This topic was selected to address a gap in the literature regarding identifying mediators associated with export diversification. More specifically, prior research predominantly assumed a direct association between export diversification and economic development without considering the role of mediation variables. The following chapter reviews the research findings regarding whether or not export instability, terms of trade, and competitiveness mediate the association between export diversification and economic development in emerging economies.

4.1 Research Questions

The research question addressed in this study was whether mediators affect the relationship between export diversification and economic development. In answering this question, the following hypotheses were formulated:

**H1a:** Export instability significantly mediates the relationship between export diversification and economic development.

**H2a:** Terms of trade significantly mediate the relationship between export diversification and economic development.

**H3a:** Competitiveness significantly mediates the relationship between export diversification and economic development.

Consequently, the following broad research question was proposed:
RQ: What is the role of export instability, terms of trade, and competitiveness in mediating the relationship between export diversification and economic development?

4.1 Descriptive Analysis

In Figures 7 to 10, I visually explored the relationship between export diversification and GDP per capita, export volatility, resource rents, and terms of trade. Such visual inspection suggests that the relationships of the variables are highly dependent on the year of analysis; both the magnitude and the sign of the relationship depend on the year that is selected, which the notable exception of the relationship between export diversification and natural resource rents, where a higher export diversification index (i.e., less diversification) is associated with a higher resource rent as a share of GDP.

Figure 7. Export Diversification and Income per Capita
Figure 8. Export Diversification and Export Volatility

Figure 9. Export Diversification and Natural Resource Rents
4.2 Empirical Analyses

The estimation results are summarized in Table 5. The following reports the direct effect, indirect effect, and marginal total effect of export diversification on per capita GDP development rate, mediated by export instability (measured at a 5-year window shown in Panel A, or at a 10-year window shown in panel B), terms of trade (net barter; shown in panel C), and competitiveness (current account balance; shown in panel D). Column (1) reports the estimation output with POLS approach, columns (2) and (3) report correspondingly the results of fixed and random effects estimators. In all the models, control variables (logarithm of exchange rate depreciation (LCU per US$, period average), total natural resources rents (% of GDP), logarithm of total reserves (includes gold, current US$), manufacturing, value added (% of GDP), industry, value added (% of GDP)), and year fixed effects were included. The need for the inclusion of
year-fixed effects is displayed in Figures 6-9, which reveal that the relationships of the examined variables are highly dependent on the year of analysis.

The preferred approach is fixed effects estimator, which were controlled for unobserved individual effects, which are allowed to be correlated with observed included regressors. The results reveal that export diversification has significant positive direct effect on economic development when considering the model with export volatility mediation. Particularly, 1 percentage point increase in export diversification increases per capita GDP development rate by about 0.0294 percentage points (for the model with export volatility measured at a 5-year window) or by about 0.0339 percentage points (for the model with export volatility measured at a 10-year window), holding all the other effects fixed. Indirect effect is also positive, yet not significant. When considering terms of trade or current account balance as the mediation factors, then the significance of positive effects for export diversification on per capita GDP development rate is lost.
Table 5
Summary of the Empirical Estimation

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Panel A: Mediation by export volatility (5-years window)</th>
<th>Panel B: Mediation by export volatility (10-years window)</th>
<th>Panel C: Mediation by net barter terms of trade index</th>
<th>Panel D: Mediation by current account balance (% of GDP)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(1)</td>
</tr>
<tr>
<td>POLS</td>
<td>FE</td>
<td>RE</td>
<td></td>
<td>FE</td>
</tr>
<tr>
<td>de</td>
<td>0.0119</td>
<td>0.0294*</td>
<td>0.0128</td>
<td>0.00844</td>
</tr>
<tr>
<td></td>
<td>(0.00825)</td>
<td>(0.0159)</td>
<td>(0.00962)</td>
<td>(0.00788)</td>
</tr>
<tr>
<td>ie</td>
<td>0.000630</td>
<td>3.17e-05</td>
<td>-0.000794</td>
<td>0.000342</td>
</tr>
<tr>
<td></td>
<td>(0.00115)</td>
<td>(0.00231)</td>
<td>(0.00114)</td>
<td>(0.000735)</td>
</tr>
<tr>
<td>te</td>
<td>0.0125</td>
<td>0.0295*</td>
<td>0.0121</td>
<td>0.00810</td>
</tr>
<tr>
<td></td>
<td>(0.00860)</td>
<td>(0.0163)</td>
<td>(0.00958)</td>
<td>(0.00788)</td>
</tr>
<tr>
<td>proportion of total effect mediated</td>
<td>0.0504</td>
<td>0.0111</td>
<td>-0.0656</td>
<td>-0.0422</td>
</tr>
</tbody>
</table>

*de*: direct effect,  
*ie*: indirect effect,  
*te*: marginal total effect.

The models were controlled for logarithm of exchange rate depreciation (LCU per US$, period average), total natural resources rents (% of GDP), logarithm of total reserves (includes gold, current US$), manufacturing, value added (% of GDP), industry, value added (% of GDP), as well year fixed effects.
Note: for random effects estimation with ml_mediation command, the original program does not provide standard errors or confidence intervals for coefficients, thus using bootstrapped standard errors and confidence intervals. Standard errors are in parenthesis. * p<0.1, ** p<0.05, *** p<0.01
Source: Author’s estimations

4.3. Robustness Check

As a robustness check, implementations were the first part of the analyses, by splitting the sample into 5-year period intervals. The results with the preferred approach - fixed effects estimator - are displayed in Table 6. Appendix B includes a report with the results of POLS and RE estimators. The significance of the positive direct effect of export diversification on per capita GDP development rate is mostly observed during the period 1995-2009. As before, there was no observance of the significance of the indirect effect, yet it is also predominantly positive, revealing the robustness of the estimated results.
Table 6
Robustness Check - by Period Analyses (FE)

<table>
<thead>
<tr>
<th>Period</th>
<th>de</th>
<th>ie</th>
<th>te</th>
<th>proportion of te mediated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Panel A: Mediation by export volatility (5-year window)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980-1984</td>
<td>-0.0432</td>
<td>0.190</td>
<td>-0.0269</td>
<td>0.0786</td>
</tr>
<tr>
<td>1985-1989</td>
<td>-0.00369</td>
<td>0.0960</td>
<td>0.0431</td>
<td>0.0662</td>
</tr>
<tr>
<td>1990-1994</td>
<td>0.253</td>
<td>0.184</td>
<td>0.0189</td>
<td>0.121</td>
</tr>
<tr>
<td>1995-1999</td>
<td>0.420***</td>
<td>0.161</td>
<td>0.0356</td>
<td>0.0952</td>
</tr>
<tr>
<td>2000-2004</td>
<td>0.227*</td>
<td>0.138</td>
<td>0.0548</td>
<td>0.0774</td>
</tr>
<tr>
<td>2005-2009</td>
<td>0.139</td>
<td>0.0894</td>
<td>0.00309</td>
<td>0.0303</td>
</tr>
<tr>
<td>2010-2014</td>
<td>-0.0417</td>
<td>0.0554</td>
<td>-0.0179</td>
<td>0.0315</td>
</tr>
</tbody>
</table>

| Panel B: Mediation by export volatility (10-year window) |
| 1980-1984  | 0.0653 | 0.290  | 0.00243| 0.262                     |
| 1985-1989  | -0.0483| 0.103  | -0.0262| 0.0768                   |
| 1990-1994  | 0.126  | 0.113  | -0.0806| 0.0644                   |
| 1995-1999  | 0.321**| 0.153  | -0.0694| 0.0863                   |
| 2000-2004  | 0.222  | 0.177  | 0.0416 | 0.0662                   |
| 2005-2009  | 0.160**| 0.0773 | 0.0125 | 0.0243                   |
| 2010-2014  | -0.0809| 0.106  | -0.116 | 0.0791                   |

| Panel C: Mediation by net barter terms of trade index |
| 1980-1984  | -0.106 | 0.179  | -0.00307| 0.0844                  |
| 1985-1989  | -0.188 | 0.188  | -0.353  | 0.243                   |
| 1990-1994  | 0.0211 | 0.141  | 0.0408  | 0.0982                  |
| 1995-1999  | 0.182  | 0.216  | -0.203  | 0.236                   |
| 2000-2004  | 0.139  | 0.130  | 0.0550  | 0.0811                  |
| 2005-2009  | 0.149* | 0.0877 | 0.0817  | 0.106                   |
| 2010-2014  | -0.0209| 0.0640 | -0.0181 | 0.0512                  |

| Panel D: Mediation by current account balance (% of GDP) |
| 1980-1984  | -0.0770| 0.182  | -0.00287| 0.0263                  |
| 1985-1989  | 0.00130| 0.0882 | 0.0250  | 0.0687                  |
| 1990-1994  | 0.306  | 0.193  | 0.393   | 0.246                   |
| 1995-1999  | 0.414***| 0.151  | 0.127   | 0.141                   |
| 2000-2004  | 0.244**| 0.124  | -0.00451| 0.0180                 |
| 2005-2009  | 0.118* | 0.0672 | 0.00714 | 0.0196                 |
| 2010-2014  | -0.00303| 0.0531 | -0.000872| 0.00105                |

* de:direct effect, ie:indirect effect, te:marginal total effect. The models were controlled for log of exchange rate depreciation (LCU per US$, period average), total natural resources rents (% of GDP), log of total reserves (includes gold, current US$), manufacturing, value added (% of GDP), industry, value added (% of GDP), as well year fixed effects.

Panel A: Mediation by export volatility (5-year window)
Panel B: Mediation by export volatility (10-year window)
Panel C: Mediation by net barter terms of trade index
Panel D: Mediation by current account balance (% of GDP)

Proportion of te mediated calculated by running POLS, FE, and RE models.

Finally, the moderation effects of the examined variables on the impact of the export diversification index on per capita GDP was estimated by running POLS, FE, and RE models.
which were regressed per capita GDP on EDI, moderator, and the interaction term of the two. All the models included the control variables and year-fixed effects. The results, displayed in Table 7, display that significance of direct and moderated impact of the export diversification index is only observed when the moderator is the current account balance (% of GDP). Particularly, a 1 pp increase in export diversification increases per capita GDP development rate by about 0.0296 pp. the impact increases with the increase in current account balance (% of GDP).
Table 7
Robustness Check – Moderation Effect

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>PANEL A: Moderation by export volatility (5-year window)</th>
<th>PANEL B: Moderation by export volatility (10-year window)</th>
<th>PANEL C: Moderation by net barter terms of trade index</th>
<th>PANEL D: Moderation by current account balance (% of GDP)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VARIABLES</td>
<td>PANEL A: Moderation by export volatility (5-year window)</td>
<td>PANEL B: Moderation by export volatility (10-year window)</td>
<td>PANEL C: Moderation by net barter terms of trade index</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>EDI</td>
<td>POLS</td>
<td>0.0651*</td>
<td>-0.00577</td>
<td>0.0515</td>
</tr>
<tr>
<td></td>
<td>FE</td>
<td>(0.0340)</td>
<td>(0.0441)</td>
<td>(0.0371)</td>
</tr>
<tr>
<td>Moderator</td>
<td>RE</td>
<td>0.00646</td>
<td>-0.000124</td>
<td>0.00613</td>
</tr>
<tr>
<td>EDI* Moderator</td>
<td></td>
<td>-6.71e-05*</td>
<td>4.16e-05</td>
<td>-4.84e-05</td>
</tr>
<tr>
<td>Observations</td>
<td></td>
<td>578</td>
<td>578</td>
<td>578</td>
</tr>
</tbody>
</table>

All models were controlled for logarithm of exchange rate depreciation (LCU per US$, period average), total natural resources rents (% of GDP), logarithm of total reserves (includes gold, current US$), manufacturing, value added (% of GDP), industry, value added (% of GDP), as well year fixed effects. Standard errors are in parenthesis. * p<0.1, ** p<0.05, *** p<0.01

Source: Author’s estimations
Robustness Check:

Comparing the Instrumental Variable approach with the mediation effects.

In an Ordinary Least Squares (OLS) regression model, we make a fundamental assumption that the predictors ($x$) are independent of the errors ($u$) in the model. Consequently, the impact of a predictor on the dependent variable ($y$) is purely direct. This concept can be effectively demonstrated using the following graphical representation:

![Diagram](attachment:image.png)

However, in practice, it is more frequently observed that there exists a correlation between predictors and errors. The error term encapsulates all the factors, apart from the specific regressor under consideration, that influence the variations in the dependent variable. In light of this, a more suitable path diagram can be represented as follows:

![Diagram](attachment:image.png)

As a result of the correlation between $x$ and $u$, the regressor of interest has both direct and indirect effects on the dependent variable through the error terms. When using the OLS approach, the estimation of the impact of $x$ on $y$ ($\beta$) combines these two effects, leading to biased and inconsistent results unless there is no association between $x$ and $u$. The inconsistency of OLS arises from the endogeneity of $x$, indicating that changes in $x$ are linked not only to changes in $y$ but also to changes in the error term $u$. To address this issue, the Instrumental Variable (IV) approach offers a method to generate exogenous variation in $x$ and estimate its impact on the
dependent variable. This is feasible if there exists an instrument z that demonstrates a relationship with x while remaining uncorrelated with u. The following path diagram illustrates this concept:

\[ z \rightarrow x \rightarrow y \]

Although there remains a correlation between z and y, it originates solely from the indirect path where z is correlated with x, which subsequently influences y. Two crucial assumptions must be met for z to serve as a valid instrument. The first assumption entails excluding z as a predictor in the model for y. If y were dependent on both x and z, and only regressed on x, z would be absorbed into the error term, resulting in a correlation between z and the error. The second assumption necessitates an association between the instrument (z) and the variable being instrumented (x).

In our specific context, the Instrumental Variable (IV) approach serves as a suitable alternative for estimating mediation effects and can also be utilized as a robustness check. The variable of primary interest in our analysis is the export diversification index (EDI), which is likely endogenous in the model where the dependent variable is the GDP per capita. There are compelling reasons for this endogeneity. Firstly, we might have omitted variables that are correlated with EDI and also have an impact on the outcome variables. Secondly, there is a potential for reverse causality, whereby the per capita GDP itself may influence export diversification. To address this endogeneity issue, we instrument the EDI using the mediation variables under consideration, assuming that they are uncorrelated with the error term but have an effect on EDI. The results of this IV analysis are presented in Table 8. In columns (1) – (4) we
consider only one of the instruments\textsuperscript{4}. In the column (5) we consider all the instruments. Our preferred model is the one in column (5). First, we can observe that we fail to reject the joint null hypothesis in Hansen test (pval = 0.1107) that the instruments are valid instruments, which validates our choice of instruments, especially $X_{sd10}$ and TOT, which has statistically significant impact on EDI. The conclusions on the impact of EDI on economic development is consistent with the results from mediation analyses, in terms of the sign and magnitude, but the significance is not observed in IV approach.

\textsuperscript{4} Therefore, Hansen test of overidentifying restrictions is not applicable.
Table 8

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1) GDP per capita</th>
<th>(2) GDP per capita</th>
<th>(3) GDP per capita</th>
<th>(4) GDP per capita</th>
<th>(5) GDP per capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDI</td>
<td>-0.289</td>
<td>-0.0205</td>
<td>0.0582</td>
<td>-0.635</td>
<td>0.0401</td>
</tr>
<tr>
<td></td>
<td>(0.293)</td>
<td>(0.0886)</td>
<td>(0.0428)</td>
<td>(0.663)</td>
<td>(0.0394)</td>
</tr>
<tr>
<td>Constant</td>
<td>27.63</td>
<td>-10.44</td>
<td>-21.58***</td>
<td>76.60</td>
<td>-17.99**</td>
</tr>
<tr>
<td></td>
<td>(41.85)</td>
<td>(13.99)</td>
<td>(9.037)</td>
<td>(95.23)</td>
<td>(8.685)</td>
</tr>
</tbody>
</table>

First stage results: dependent variable EDI

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X_sd5</td>
<td>-0.013</td>
<td>0.008</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-0.009)</td>
<td>(0.010)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X_sd10</td>
<td>-0.036***</td>
<td>-0.029**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
<td>(0.014)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOT</td>
<td>0.098***</td>
<td>0.095***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.010)</td>
<td>(0.011)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BOP</td>
<td>0.141</td>
<td>-0.079</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.126)</td>
<td>(0.113)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hansen J statistic (pval)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.1107</td>
</tr>
<tr>
<td>Observations</td>
<td>578</td>
<td>578</td>
<td>578</td>
<td>578</td>
<td>578</td>
</tr>
<tr>
<td>R-squared</td>
<td>-0.221</td>
<td>0.311</td>
<td>0.317</td>
<td>-2.072</td>
<td>0.316</td>
</tr>
</tbody>
</table>

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1
4.4 Case Study Analysis

This section presents the case study analysis of the association of export diversification with economic development --mediated by export instability, terms of trade, and trade competitiveness for each separate country. The focus is on the three cases applied for Indonesia, Saudi Arabia, and Qatar. Sections include an introduction to the case study, literature review, methodology, and results.

4.4.1 Case Study Introduction

Understanding the relationship between export diversification and economic development is important for many countries. For many nations, economic diversification through export growth can help reduce dependence on a narrow range of commodities or products, thereby increasing resilience to external economic shocks (Briguglio et al., 2006). Diversification can create new export opportunities, increase competitiveness, and drive economic development in the long term (Sepehrdoust et al., 2019). Many nations realize that export diversification can promote the development of domestic industries and help with transitioning from low-value-added exports to higher-value-added products, thereby increasing the economy's overall competitiveness. In addition, understanding the relationship between export diversification and economic development can help global leaders inform policy decisions to promote sustainable economic development, such as investment in infrastructure, education, and innovation (Yigitcanlar & Bulu, 2015). Overall, nations recognize that diversification significantly promotes economic development, reduces poverty, and increases social welfare in many countries. Therefore, understanding the factors that influence the relationship between export diversification and economic development is critical for policymakers and practitioners seeking to promote sustainable economic development.
Export diversification has played a crucial role in the economic development of many Middle Eastern nations, including Indonesia, Saudi Arabia, and Qatar. In Indonesia, the government has implemented policies to promote diversification, leading to a shift towards the manufacturing and services sectors, which have become increasingly important contributors to the economy (Goodman et al., 2022). Saudi Arabia, traditionally reliant on oil exports, has also implemented reforms to diversify the economy, focusing on non-oil sectors such as tourism, mining, and renewable energy (International Monetary Fund, 2016). Qatar, a small country with a significant reliance on natural gas exports, has implemented similar policies, focusing on developing the manufacturing, financial, and technology sectors (International Monetary Fund, 2016). While progress has been made, each country faces unique challenges in promoting export diversification and achieving sustained economic development.

The purpose of this case study analysis was to investigate the relationship between export diversification and economic development and the potential mediating role of export instability, terms of trade, and trade competitiveness. To achieve this, three countries were analyzed, examining how factors impact economic development in each case. By conducting this study, the aim was to provide insights into the importance of export diversification and its potential implications for sustainable economic development. By addressing this gap in the research, the case study aimed to provide insights into the factors that contribute to sustainable economic development in emerging economies.

The guiding research question for the case study analysis was: How have Indonesia, Saudi Arabia, and Qatar utilized export diversification to promote sustained economic development, and what factors have influenced the success or limitations of their efforts? This research question helped form the basis for investigating the relationship between export
diversification and economic development in these three countries and exploring the policies and strategies that have been implemented to promote diversification. The study also focused on identifying the factors that have contributed to the success or limitations of these efforts, providing insights into the challenges and opportunities faced by emerging economies seeking to diversify their exports and achieve sustained economic development.

The significance of this case study analysis is that the findings help fill a gap in the research on the relationship between export diversification and economic development in emerging economies, specifically in Indonesia, Saudi Arabia, and Qatar. The findings of this study can contribute to the understanding of the factors that promote or hinder export diversification and sustainable economic development, which can inform policymakers and key stakeholders that develop national strategies for economic development in these countries and others facing similar challenges. Furthermore, this case study analysis helps provide insights into the importance of export diversification for promoting long-term economic development.

4.4.2 Case Study Literature Review

This literature review examines the export diversification policies of three nations - Indonesia, Saudi Arabia, and Qatar - and their historical developments. The literature review section includes the theoretical foundations that helped with the case study analysis of export diversification policies, including the role of institutions, political economy, and industrial policy. In addition, this section explores how these countries have used export diversification policies to promote economic development and reduce their reliance on primary commodity exports. Overall, the literature review helped provide a comprehensive overview of the export diversification experiences of these countries and their implications for policy-makers in developing nations.
4.4.2.1 Theoretical Foundation

With a focus on export diversification and economic development, the structural change theory was identified as an appropriate foundation to use as a guide in conducting a case study analysis. The structural change theory suggests that as countries develop, their economies shift from traditional agriculture-based activities to modern industrial and service-based activities (Matthess & Kunkel, 2020). The structural transformation theory also emphasizes the importance of productivity growth and technological advancements in promoting sustained economic development in developing countries.

The Lewis model, also known as the surplus labor model, was a dominant theory in development economics during the 1960s and 1970s (Economics Online, 2020). This two-sector model emphasizes the need for countries to shift from low-productivity agricultural work to high-productivity industrial work to achieve economic development. The model presents the argument that by transferring workers from the under-employing agricultural sector to the industrial sector, the economy can start to accumulate capital and sustain further development. Structural change refers to the shift of labor from one economic sector to another, such as from agriculture to manufacturing and services. Studies show that in developed countries, agriculture initially provided a large portion of employment opportunities, followed by a rise in manufacturing employment before it eventually declined. At the same time, services continued to grow (Matthess & Kunkel, 2020). Having the structural change theory as a guide for the study helped highlight the importance of understanding the relationship between structural change, export diversification, and economic development in developing countries.
4.4.2.2 Literature for Indonesia

The Indonesian economy has undergone several changes over the past decades, with a shift from an extractive sector (i.e., this sector is a primary sector involving the extraction of natural resources, such as mining, forestry, and agriculture) to an import substitution policy and later an export-oriented policy (Zen, 2012). However, while the manufacturing sector grew during this period, Indonesia relied heavily on cheap labor and subsidized energy prices. In addition, the lack of infrastructure, poor competitiveness of production factors, and unhealthy institutional settings were identified as significant issues hindering the country's efforts to diversify the economy and decrease dependence on the extractive sector. As a result, despite some successes in increasing the role of the manufacturing industry and non-natural resource exports, the overall efforts have failed to transform Indonesia into a modern industrial country (Zen, 2012).

Indonesia's economic development can be divided into three periods, with the first period (1965-1975) focused on stabilizing the sociopolitical situation and attracting foreign capital, albeit with various restrictions. The second period (1975-1981) saw the government using oil profits to build the economy in a few important sectors, focusing on decreasing dependency on imported goods through an import-substitution policy (Zen, 2012). In addition, the government played a leading role in the economy and created several state-owned enterprises in essential industries. The third period of economic development in Indonesia began in 1984 when the government promoted export-oriented policies and lifted protections on domestic industries. This promotion increased foreign direct investment and higher diversification in manufacturing industries as organizations relocated their factories to Indonesia. As a result, the manufacturing
sector's contribution to Indonesian output was significant enough from 1984 to 1996 that its higher growth pulled GDP growth.

According to research, Indonesia faces three significant challenges. The first challenge is establishing a well-connected interregional network throughout the country to distribute development centers and reduce transportation costs. Second, the government needs to estimate energy needs and develop a strategy to fulfill them sustainably, making energy supply a growth engine. Finally, the government must have a workable plan to utilize potential resources such as alternative energy, human capital, and abandoned islands to reduce inequalities and provide jobs for people experiencing poverty (Zen, 2012).

4.4.2.3 Literature for Saudi Arabia

The Saudi Arabian economy has traditionally relied heavily on oil revenues, leading to economic booms when oil prices are high. However, the country's development plans have aimed to reduce dependence on oil as the main source of income and encourage sustainable economic development (Albassam, 2015). While economic development tends to follow the oil price, there have been exceptions, such as during the Iran-Iraq war when oil income was directed towards war spending instead of economic development. However, in recent years, the government has directed some oil income toward investments in foreign assets (Albassam, 2015).

With the agriculture sector being a primary focus from 1970 to 1995, the Saudi government has adopted various economic policies and strategies to diversify its economy (Albassam, 2015). However, these efforts were unsuccessful in building a strong and independent sector that contributes to long-term economic development. The government then targeted the service sector as a tool for diversification during the second development plan
(1975-1979). However, the lack of regulations and private sector dependence on government spending hindered success. Another development plan (1985-1989) was considered a model of success due to factors such as declining oil prices and the establishment of industrial cities. However, the following plans presented a decline in economic diversification, with challenges such as high unemployment rates in younger generations of workers. Finally, the Saudi government implemented various initiatives to achieve economic diversification, such as attracting foreign investors and supporting non-oil sectors like tourism and services. Still, these efforts have not successfully created jobs or diversified the economy. Overall, the commitment to economic diversification seems to fluctuate with oil prices (Albassam, 2015).

Years of export diversification and economic development have contributed to a market overview. Saudi Arabia has the largest economy in the Arab world and holds nearly 16% of the world's proven petroleum reserves (The International Trade Administration, 2020). Petroleum accounts for a significant portion of its budget revenues, GDP, and export earnings. To diversify its economy and create private-sector jobs, the Saudi Arabian government launched a reform plan called Vision 2030. This plan includes goals to expand natural gas and petrochemical production, build a renewable energy sector, attract foreign investment, and privatize government entities (The International Trade Administration, 2020). Despite not being on track to meet all the goals by 2030, Saudi Arabia is moving in a positive direction, as evidenced by its policies aimed at attracting foreign investments, such as the $20 billion investment deals signed at the Future Investment Initiative forum. The country is also a significant trading partner with the US, with U.S. goods exports totaling $3.6 billion in 2018 and major U.S. exports including transportation equipment, nuclear machinery, arms and ammunition, electric machinery, optic,
photo, medical instruments, chemicals, and cereals (The International Trade Administration, 2020).

4.4.2.4 Literature for Qatar

Qatar's economic development is a result of visionary and committed national leadership, robust and mutually rewarding relationships with international partners, and vigorous execution. The country's huge North Field gas resource was first discovered in 1971, but it took 20 years before its potential was unlocked (Ibrahim & Harrigan, 2012). In the early 1990s, Qatar focused on meeting its domestic needs, but given the vastness of the resource, Qatar was fully aware that successful exploitation would require exports. After overcoming hurdles, Qatar continued to create forward-looking priorities. Over the next 15 years, Qatar built a competitive Liquefied Natural Gas (LNG) value chain with a global reach (Ibrahim & Harrigan, 2012). This was a productive transition as LNG has become increasingly popular as a fuel source due to its lower carbon emissions compared to other fossil fuels like coal and oil.

In the late 1990s, Qatar turned its attention to opportunities to convert lean gas into clean-burning gas-to-liquid fuels (GTLs). Taking measured risks, Qatar broke new ground with its joint venture partners. Work on the $23 billion Pearl GTL plant, now the world's largest GTL facility, started in 2007 and swung into production in 2011 (Ibrahim & Harrigan, 2012). Qatar is now the world's largest exporter of LNG and GTLs, with a supply chain spanning the globe. The country's large financial dividends from its investments in oil and gas have led to impressive macroeconomic achievements. It has grown faster than any other economy since 2000 and now ranks among the top flight of countries in terms of its income per capita (Ibrahim & Harrigan, 2012). Understanding the risks of tying expenditure on essential services to volatile oil revenues,
Qatar established sizeable financial endowments early on to provide continuity and predictability of health and education services funding.

Qatar has been making significant efforts to diversify its economy and reduce its reliance on hydrocarbon exports (Ibrahim & Harrigan, 2012). The country has been focusing on developing industries such as manufacturing, tourism, and technology to achieve this goal. With a young and educated population, favorable government policies, and significant investment in infrastructure, Qatar is well-positioned to continue its efforts toward export diversification in the future. However, the nation may still face challenges in attracting foreign investment and developing a skilled workforce, particularly in non-hydrocarbon industries.

4.4.3 Methodology

4.4.3.1 Research Design (Case Study)

A case study analysis was selected as the research design and approach to investigate the relationship between export diversification and economic development and the potential mediating role of export instability, terms of trade, and trade competitiveness. This methodology used a comparative case study analysis approach. According to researchers, the analysis for a case study can be qualitative or quantitative (Dul & Hak, 2007). A comparative case study is a research method that compares and analyzes several small cases to gain a deeper understanding of a phenomenon. The benefits of a comparative case study include the ability to identify similarities and differences across cases, the potential to identify factors that contribute to variation in outcomes, and the potential to generate new insights or explanations that may not have been possible with a single case study. Additionally, comparative case studies can increase the generalizability of research findings beyond a single case (Dul & Hak, 2007).
The data collection process for this study involved gathering information from each of the three countries: Indonesia, Saudi Arabia, and Qatar. The dependent variable for studying the three countries in the case study analysis was economic development, measured by GDP per capita. The independent variables included export diversification, export instability, terms of trade, or trade competitiveness. These variables were examined to determine their associations with economic development.

4.4.3.2 Samples

For this case study, a purposive sampling approach was used. This approach involves selecting cases that are based on their relevance to the research or the specific phenomenon being studied. Purposive sampling ensures that the cases are representative of the phenomenon being studied, allowing for an in-depth analysis of similarities and differences among cases (Campbell et al., 2020).

4.4.3.3 Data Collection & Analysis

The data collection process involved gathering information on export diversification and economic development from publicly available reports for each of the three countries. No interviews were conducted as all the data was sourced from public reports, including government reports and statistical databases. The collected data was then analyzed to identify patterns and relationships between export diversification and economic development, mediated by factors such as export instability, terms of trade, and trade competitiveness.

Once data was collected from each of the three countries, a systematic review was conducted as the data analysis. A systematic review is a comprehensive approach to analyzing data, which involves a structured and objective search of relevant literature, critical appraisal of the studies, and synthesis of the findings. In this case study, the data collected from publicly
sourced reports on export diversification and economic development in Indonesia, Saudi Arabia, and Qatar were analyzed systematically. This involved categorizing and comparing the data to identify patterns and trends, as well as assessing the strengths and weaknesses of the information. Finally, the findings were synthesized to draw conclusions about the association between export diversification and economic development in each of the three countries. The following sections present the systematic review analysis of each country.

4.4.4 Case Study Analysis

In this section, we present the results of our case study analysis that explores the relationship between export diversification and economic development, taking into account the mediating factors of export instability, terms of trade, and trade competitiveness for three separate countries: Indonesia, Saudi Arabia, and Qatar. The estimation results are displayed in Figures 11-14, and we will discuss the findings for each country individually.

4.4.4.1 Indonesia

First, consider Indonesia (Zen, 2012). Over the past few decades, Indonesia's economy has undergone significant changes in its sectoral composition. In the 1970s, the country's economic development was heavily reliant on the extractive sector. The government then adopted an import substitution policy to promote industrialization, which was aided by windfall profits from the oil boom. However, the government overlooked foreign investment and focused on inward-looking policies until the 1980s, when falling oil prices prompted a shift towards an export-oriented policy. A series of liberalizations were implemented to support exports and attract foreign investment, resulting in significant growth in the manufacturing sectors. However, Indonesia's reliance on cheap labor and subsidized energy prices limited its competitiveness.
Despite the success of increasing the role of the manufacturing sector and non-natural resource exports, Indonesia's efforts to diversify and reduce its dependence on the extractive sector have failed to transform its economy and export into a modern industrial country. Yet the efforts in this direction are appealing and may contribute to economic development. However, according to the analysis, the positive impact of export diversification on per capita GDP development is only evident in models that account for the potential mediating effect of export instability, which is measured by export volatility over a 10-year period. In such models, the estimated total effect of export diversification on per capita GDP development is one to one per each percentage point increase in export diversification. However, in models that consider terms of trade and trade competitiveness as mediators, the positive impact is negligible (Zen, 2012). As a result, the conclusions are that export diversification can only contribute to economic development if there is export stability over a long period.

4.4.4.2 Saudi Arabia

Second, consider the case of Saudi Arabia\(^5\). Saudi Arabia's economy heavily relies on oil exports, accounting for 84% of exports and 42% of GDP. A significant increase in oil prices since 2003 led to a doubling of the country's GDP and created 1.7 million jobs for Saudi nationals over the past decade. However, oil prices fell sharply in 2016 to just 40% of their peak, which was last seen in 1981, leading to a deep and prolonged recession that lasted for nearly 3 decades. Consumption per capita only returned to its 1980 level during the recent oil price boom.

To overcome the upcoming economic crisis, in April 2016, Saudi officials announced *Vision 2030*, an ambitious plan aimed at diversifying the country's economy away from its dependence on oil. The success of this plan hinges on careful planning and sequencing of

\(^5\) Source: The Growth Lab at Harvard's Center for International Development (CID), available at https://growthlab.cid.harvard.edu/applied-research/saudi-arabia
reforms to transform the economic model towards a diversified, knowledge-based economy. The authorities aim to use this plan to prevent possible economic instabilities, enhance resilience to external shocks, and promote further economic development.

This analysis shows that export diversification has a positive impact on per capita GDP development only in models that consider the potential mediating effect of export instability. Export instability is measured as export volatility over a 10-year period. The total effect of export diversification on per capita GDP development is estimated to be about 2.5 percentage points per each percentage point increase in export diversification in these models. However, in models mediated by terms of trade and trade competitiveness, the positive impact is negligible. Therefore, the conclusion is that export diversification can contribute to economic development only if export stability over a long horizon exists.

4.4.4.3 Qatar

Finally, consider Qatar's case, which is similar to Saudi Arabia as both are oil-exporting countries and were impacted by the drop in oil prices in 2016 (Al-Ghorairi, 2017). Despite facing challenging times, Qatar has remained one of the most competitive and powerful economies in the region. While weaker oil prices have led to a contraction in hydrocarbon revenues, Qatar's non-hydrocarbon sector has experienced strong development, contributing to overall GDP growth of just under 3% in 2017 (Al-Ghorairi, 2017). This development rate is enviable compared to other parts of the world and is the highest forecast in the Gulf Cooperation Council (GCC). Qatar has also maintained its position at the top of the international table for GDP per capita.

Qatar's success can be attributed to the wise and far-sighted leadership of the country. The National Vision 2030, an ambitious and long-term development plan to diversify the
economy, has been instrumental in achieving economic development in times of weaker oil prices (Al-Ghorairi, 2017). The plan includes significant infrastructure spending in areas such as transport, education, sports, healthcare, telecommunication, and hospitality. In summary, Qatar's economic success in the face of weaker oil prices is a testament to the country's economic and export diversification strategy and the effectiveness of its development plan. However, when considering the mediation effects of export instability in terms of trade and trade competitiveness, export diversification does not have any economically significant effect on per capita GDP development.
Figure 11
Mediation by Export Volatility (10-Year Window)

Mediation by export volatility, (10-years window)

de: direct effect, ie: indirect effect, te: marginal total effect. The models were controlled for logarithm of exchange rate depreciation (LCU per US$, period average), total natural resources rents (% of GDP), logarithm of total reserves (includes gold, current US$), manufacturing, value added (% of GDP), industry, value added (% of GDP). Source: Author’s estimations.
Figure 12
Mediation by Export Volatility (5-Year Window)

de: direct effect, ie: indirect effect, te: marginal total effect. The models were controlled for logarithm of exchange rate depreciation (LCU per US$, period average), total natural resources rents (% of GDP), logarithm of total reserves (includes gold, current US$), manufacturing, value added (% of GDP), industry, value added (% of GDP). Source: Author’s estimations.
Mediation by Current Account Balance (% of GDP)

de: direct effect, ie: indirect effect, te: marginal total effect. The models were controlled for logarithm of exchange rate depreciation (LCU per US$, period average), total natural resources rents (% of GDP), logarithm of total reserves (includes gold, current US$), manufacturing, value added (% of GDP), industry, value added (% of GDP). Source: Author’s estimations.
**Figure 14**  
*Mediation by net Barter Terms of Trade Index*

Mediation by net barter terms of trade index

*de:* direct effect, *ie:* indirect effect, *te:* marginal total effect. The models were controlled for logarithm of exchange rate depreciation (LCU per US$, period average), total natural resources rents (% of GDP), logarithm of total reserves (includes gold, current US$), manufacturing, value added (% of GDP), industry, value added (% of GDP). Source: Author’s estimations.
4.4.5 Case Study Findings

The following findings compare the case study analysis findings with the findings from the primary research conducted in Chapter 1. A comparison is presented for each county. Findings from the case study analysis support many of the findings from the primary research on analyzing the role of mediators in the relationship between export diversification and economic development across countries.

4.4.5.1 Indonesia Summary

The information from the case study analysis with Indonesia supports the findings of the first study, which suggests that higher natural resource rents tend to have a positive impact on real GDP per capita (Dogan et al., 2021; Giri et al., 2019; Zen, 2012). Indonesia's heavy reliance on the extractive sector in the 1970s and the windfall profits from the oil boom resulted in significant development in its economy. However, the government's lack of focus on foreign investment and inward-looking policies limited Indonesia's competitiveness. Despite its efforts to diversify and reduce its dependence on the extractive sector, the positive impact of export diversification on per capita GDP development is only evident in models that account for the potential mediating effect of export instability. This finding is consistent with prior literature that has emphasized the importance of a stable export environment for economic development (Giri et al., 2019).

The case study information on Indonesia also highlights the importance of considering potential mediators and confounding variables that may influence the association between export diversification and economic development. The case study found that the positive impact of export diversification on per capita GDP development is negligible when considering terms of trade and trade competitiveness as mediators (Zen, 2012). This finding suggests that there are
other factors beyond export diversification that may be more influential in determining economic development. Overall, the findings from the Indonesia case study underscore the need for countries to adopt policies that support export stability, competitiveness, and diversification while also considering the potential mediating effects of other variables on the relationship between export diversification and economic development.

4.4.5.2 Saudi Arabia Summary

The case study analysis of Saudi Arabia supports the first research study findings on the importance of export diversification. Saudi Arabia heavily relies on oil exports, which account for a significant portion of its GDP. As seen during the oil price boom, high oil prices led to a doubling of the country’s GDP and created jobs (Albassam, 2015). However, the sharp fall in oil prices in 2016 led to a deep and prolonged recession, highlighting the vulnerability of a country that relies on a single commodity for its economic well-being. To address this vulnerability, Saudi officials announced Vision 2030, an ambitious plan aimed at diversifying the country's economy away from its dependence on oil. The success of this plan depends on the careful planning and sequencing of reforms to transform the economic model towards a diversified, knowledge-based economy (Albassam, 2015).

The analysis shows that export diversification has a positive impact on per capita GDP development in models that consider the potential mediating effect of export instability (Bird, 1982), measured as export volatility over a 10-year period. Saudi Arabia's heavy reliance on oil exports and its vulnerability to external shocks demonstrate export diversification's importance in promoting economic development and enhancing resilience to external shocks. Therefore, diversifying exports is critical for countries that rely on a single commodity for their economic development, such as Saudi Arabia.
4.4.5.3 Qatar Summary

The case study analysis of Qatar supports the primary research findings that export diversification alone may not be sufficient to promote economic development, as the country's economic success is attributed to its long-term development plan that includes significant infrastructure spending in various sectors. Qatar's National Vision 2030 has been instrumental in achieving economic development even during weaker oil prices by diversifying the economy and investing in non-hydrocarbon sectors. Qatar's GDP growth rate of just under 3% in 2017 is enviable compared to other parts of the world and is the highest forecast in the GCC (Al-Ghorairi, 2017). This shows that while export diversification can be a contributing factor to economic development, long-term development plans that include investment in various sectors are necessary for sustained economic development.

Furthermore, the case of Qatar also supports the finding that export instability can mediate the relationship between export diversification and per capita GDP growth. The analysis shows that when considering the mediation effects of export instability in terms of trade and trade competitiveness, export diversification does not have any economically significant effect on per capita GDP growth. Despite Qatar's success in diversifying its economy, the country's heavy reliance on oil exports means it is still vulnerable to external shocks, such as changes in oil prices. Therefore, export stability over a long period is crucial for export diversification to positively impact economic development.

4.4.6 Case Study Conclusion

The analysis of the three case studies of Indonesia, Saudi Arabia, and Qatar highlights the significance of export diversification as a means of reducing dependence on a single commodity and promoting economic development. The findings indicate that export diversification can
positively impact per capita GDP growth, but only if export instability over a long period is accounted for in the models. Indonesia's experience highlights the importance of carefully planning and sequencing economic reforms to achieve diversification goals. Meanwhile, Saudi Arabia and Qatar's divergent outcomes demonstrate the critical role of sound economic planning and effective implementation in diversification efforts. Qatar's success in maintaining economic development during weak oil prices is a testament to the effectiveness of its National Vision 2030 plan in promoting economic diversification, while Saudi Arabia's Vision 2030 plan is still in its early stages of implementation. However, the analysis also indicates that export diversification alone is not enough to drive economic development, and other factors, such as investment in human capital, infrastructure, and innovation, are essential to achieving sustainable economic development.

In conclusion, the findings suggest that countries can achieve economic development and stability by diversifying their economies and reducing dependence on a single commodity. However, the process of economic diversification is complex, and a comprehensive approach is required, including careful planning and implementation of reforms, investment in human capital and infrastructure, and an enabling business environment. Countries that have successfully diversified their economies, such as Qatar, have benefited from a long-term development plan and investment in non-oil sectors. In contrast, those that have struggled, such as Indonesia, have faced challenges due to the reliance on cheap labor and limited competitiveness. Thus, countries must take a tailored approach to diversification based on their unique circumstances and development objectives to achieve sustainable economic growth and development.
Chapter 5: Discussion and Conclusion

This research presented a comprehensive quantitative analysis that investigated the role of mediators in the relationship between export diversification and economic development across countries, examining the impact of export diversification on development while considering specific mediators, identifying significant mediating variables, and deriving policy implications from the findings, supplemented by a case study to enhance reliability. In addition to the quantitative analysis, a case study was used to examine the association between export diversification and economic development in three distinct countries: Indonesia, Saudi Arabia, and Qatar. The case study analysis examined the potential mediating factors of export instability, terms of trade, and trade competitiveness to provide a comprehensive understanding of the relationship. The data collection process involved gathering publicly available reports on export diversification and economic development for each country. Subsequently, a systematic review was conducted, and the collected data was analyzed to identify patterns and relationships.

5.1 Discussion of Case Study

In the analysis of Indonesia, findings revealed that the positive impact of export diversification on per capita GDP growth is contingent upon accounting for the potential mediating effect of export instability, measured by export volatility over a 10-year period. The estimated total effect of export diversification on per capita GDP growth is found to be one-to-one for each percentage point increase in export diversification. However, the positive impact becomes negligible when considering terms of trade and trade competitiveness as mediators. Consequently, the findings suggest that export diversification can only contribute to economic development if there is export stability over an extended duration.
In the case of Saudi Arabia, findings indicated that the total effect of export diversification on per capita GDP growth is estimated to be approximately 2.5 percentage points for every percentage point increase in export diversification. However, when examining the mediating roles of terms of trade and trade competitiveness, the positive impact diminishes. Hence, the conclusion aligns with that of Indonesia, emphasizing that export diversification can foster economic development solely in the presence of export stability over the long term.

The final case study analysis of Qatar demonstrated a similar pattern. The estimated total effect of export diversification on per capita GDP growth is approximately 2.5 percentage points for every percentage point increase in export diversification. Nevertheless, the positive impact becomes negligible when considering the mediating influence of terms of trade and trade competitiveness. Thus, the conclusion drawn for Qatar aligns with that of Indonesia and Saudi Arabia, stressing the significance of export stability as a precondition for export diversification to contribute to sustained economic development.

In summary, this case study highlighted the importance of export stability in the relationship between export diversification and economic development. The positive impacts observed in the three countries—Indonesia, Saudi Arabia, and Qatar—only materialized when export stability was present over a long time horizon. These findings underscore the need for policymakers to prioritize measures that promote export stability alongside diversification efforts, particularly in the context of economic development in developing countries.

5.2 Implications of the Findings

Consistent with prior research findings, countries with lower diversification levels had higher GDP per capita levels (Giri et al., 2019). In addition, the findings also support prior literature regarding the finding that countries with higher natural resource rents tend to have
higher real GDP per capita (Canh et al., 2020; Dogan et al., 2021; Giri et al., 2019). Expectedly, lower export diversification was associated with high resource rents (Canh et al., 2020; Dogan et al., 2021; Giri et al., 2019). More specifically, when visually inspecting the association between variables, the association between export diversification and natural resource rents appeared consistent over time. Therefore, the current research findings support prior works regarding the finding that a higher export diversification index (i.e., less diversification) is associated with a higher resource rent as a share of GDP (Canh et al., 2020; Dogan et al., 2021; Giri et al., 2019).

The research analysis explored the relationship between export diversification and economic development, considering mediating factors such as export instability, terms of trade, and trade competitiveness. By examining these factors, the findings support how the structure of an economy, as represented by its export diversification, can influence both the development trajectory and the volatility of a country's economy. These findings are reflective of other empirical studies. For example, Bacchetta et al. (2007) explained that export diversification is known to influence terms of trade volatility. Bacchetta et al. conducted an analysis of developing countries and industrialized countries. Given the established understanding that export diversification impacts terms of trade volatility, Bacchetta et al.'s (2007) findings indicated that the diversification of products within exports similarly affects income volatility. These outcomes align with the current study's findings and with recent literature.

It is important to note that prior research exploring the associations between export diversification, natural resource rents, and GDP per capita, found an association between these three variables and the population size of various countries (Giri et al., 2019). Namely, countries with small populations and high resource rents are predisposed to being less diversified and having a high GDP per capita (Giri et al., 2019). Although population size was not considered in
the current study, it is possible that the same trend could be identified in this data set, suggesting potential avenues for future research. The findings on volatility in economic development are also reflected in the study by Banchorndhevakul et al. (2015). In this study, researchers utilized annual data from Association of Southeast Asian Nations countries, specifically four emerging market economies, for the period 1981-2010. The findings indicated that in Indonesia, the level and volatility of net barter and income terms of trade had no significant effect on economic growth. Banchorndhevakul et al. (2015) noted that the impact of Indonesian terms of trade on real GDP growth was limited because international trade is not the primary driving force behind the country's economy.

The current study's findings contribute new knowledge to the field by presenting empirical findings associated with the mediating effects of competitiveness (current account volatility) on export diversification and economic development in emerging economies. More specifically, the current study found no strong relationship between economic diversification and current account volatility. Further, higher levels of GDP per capita were slightly associated with higher current account volatility. As a result, these findings suggest exploring other potential mediators and confounding variables influencing the association between current account volatility and higher GDP levels.

In addition, the case study findings indicate that countries can achieve economic development and stability by diversifying their economies and reducing dependence on a single commodity. Countries that have effectively diversified their economy, like Qatar, have benefited from a long-term development plan and investments in non-oil sectors. In contrast, nations that have struggled, like Indonesia, have had difficulties as a result of their reliance on inexpensive labor and low levels of competitiveness. To achieve sustainable economic growth and
development, nations must adopt a customized plan for diversification based on their particular conditions and development goals. The following section provides a review of the limitations associated with this study.

5.3 Limitations of the Study

Limitations are present in all studies and predominantly associated with the chosen research methodology and design (Creswell & Creswell, 2018). In the current study, a quantitative methodology, longitudinal design, and secondary data were used to address the research problem and questions posited in this study. An inherent limitation of using secondary data in research is that it is often outdated. The data points for the countries included in this study were collected between 1980 and 2014. Although the breadth of data collected within this study was adequate for identifying a potential effect, if one was found, the most recent data analyzed within this secondary data set was nine years old. As a result, exploring the mediating influence of export instability, terms of trade, and competitiveness between export diversification and economic development in emerging economies across Latin America, Asia and the Middle East, and Africa between 2015 and 2022 could not be assessed. In addition, due to the use of secondary data, I was limited in my exploration of mediators. Namely, I was limited to the data set available and, therefore, could not explore other potential mediators.

5.4 Recommendations for Future Research

Recommendations for future research are predominantly associated with limitations inherent in the present study's research methodology and design. Therefore, based on the limitations described in the previous section, it is recommended that future researchers explore more recent data regarding mediators associated with export diversification and economic development in developing countries. Of important note is that data was not analyzed associated
with the global outbreak of COVID-19. An exploration of the influence of the pandemic on mediators associated with export diversification and economic development would provide unique insights regarding the export and economic consequences associated with a global pandemic. It could also provide a baseline of findings associated with the economic downturn during that time and potentially offer insight to economists regarding factors that negatively influenced export diversification and economic development. In addition, other mediators could be examined in future studies. For example, social variables, including institutional quality, government effectiveness, political regimes, and corruption, could also be mediators associated with export diversification and economic development.

Future researchers should also explore other potential mediators associated with export diversification and economic development in emerging economies. For example, potential mediators for future research include trade openness based on the trade dependency ratio and financial openness based on an index of “restrictions on cross-border transactions” (Balavac & Geoff, 2014, p. 37). Finally, other variables should be considered when exploring the outcomes. Namely, prior research suggested an association between population size, resource rents, export diversification, and GDP per capita (Giri et al., 2019). Therefore, an exploration of the same data set used within this study, exploring any potential associations with the variables of interest in this study and population size, would provide additional insights into the potential trends associated with the influence of mediators on export diversification and economic development.

5.5 Conclusion

This study’s findings support prior research regarding the association between export diversification and GDP per capita. In addition, the findings provide new insights regarding the potential mediators associated with export diversification and economic development in
developing economies. The results of the quantitative analysis revealed that export
diversification has a significant positive direct effect on economic development when
considering the model with export volatility mediation. Particularly, a one percentage point
increase in export diversification increases per capita GDP growth rate by about 0.0294
percentage points (for the model with export volatility measured at a 5-year window) or by about
0.0339 percentage points (for the model with export volatility measured at a 10-year window),
holding all the other effects fixed. An indirect effect is also positive yet not significant. When
considering terms of trade or current account balance as the mediation factors, the significance of
the positive effects of export diversification on the per capita GDP growth rate is lost.

In addition to the quantitative conclusions, the case study analysis was conducted to
investigate the relationship between export diversification and economic development and the
potential mediating role of export instability, terms of trade, and trade competitiveness. Three
countries (Indonesia, Saudi Arabia, and Qatar) were analyzed, examining how factors impact
economic development in each case. The aim was to provide insights into the importance of
export diversification and its potential implications for sustainable economic development. The
findings from the case study analysis provide insights into the factors contributing to sustainable
economic development in emerging economies. Understanding the factors that influence the
relationship between export diversification and economic development is critical for
policymakers and practitioners seeking to promote sustainable economic development.
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### Appendix A

#### Table 1. Literature Overview

<table>
<thead>
<tr>
<th>Authors</th>
<th>Key Findings</th>
<th>Methodology</th>
<th>Time span</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sachs &amp; Warner (2001)</td>
<td>Overall, the authors found a strong negative relation between natural resource intensity and economic growth, and this paper ignited the strand of empirical research on the resource curse. High resource activity and related revenue inflows tend to correlate with slow economic growth. Further, there is not a positive correlation between natural wealth and other forms of economic wealth.</td>
<td>Regression</td>
<td>1970-1990</td>
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<tr>
<td>Sachs &amp; Warner (1995)</td>
<td>Sachs and Warner (1995) used cross-country regression and a calibrated endogenous growth model to show that countries with a high ratio of natural resource exports-to-GDP tend to have low growth rates. They claim that the empirical relationship is robust and controls for variables that are essential for economic growth, including per capita GDP, investment rates, government efficiency, and regional dummies.</td>
<td>Regression</td>
<td>1970-1989</td>
</tr>
<tr>
<td>Sachs &amp; Warner (1999)</td>
<td>Sachs and Warner (1999) found empirical evidence suggesting that natural resource booms have done little to support long-run economic growth; instead, hindered growth on average as resource booms are often accompanied by declining GDP per capita.</td>
<td>Macroeconomic model and regression</td>
<td>1965-1990</td>
</tr>
<tr>
<td>Authors</td>
<td>Key Findings</td>
<td>Methodology</td>
<td>Time span</td>
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<tr>
<td>Sala-i-Martin (1997) and Sala-i-Martin et al. (2004)</td>
<td>Sala-i-Martin (1997) and Sala-i-Martin et al. (2004) classified natural resources as one of the ten most robust variables in empirical studies on economic growth.</td>
<td>Regression and Bayesian Averaging of Classical Estimates (BACE)</td>
<td>1960-1992</td>
</tr>
<tr>
<td>Manzano &amp; Rigobon (2001)</td>
<td>Manzano and Rigobon (2001) stressed that instead of blaming natural resources for poor performance, empirical findings suggest the importance of credit market imperfections (debt overhang) as a reason for weak economic growth in resource-rich countries. Although institutional development and quality are central determinants of economic growth, they do not cause the curse.</td>
<td>Regression</td>
<td>1970-1990</td>
</tr>
<tr>
<td>Hausmann &amp; Rigobon (2003)</td>
<td>Hausmann and Rigobon (2003) modelled the resource curse based on two main building blocks, specialization in non-tradable and financial market frictions, arguing the need for macroeconomic stabilization policies and interventions to make financial markets more efficient in resource-rich countries.</td>
<td>Macroeconomic model</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Arezki et al. (2011)</td>
<td>Arezki et al. (2011) stated that public expenditure in commodity-exporting countries is procyclical, and that resource booms (windfalls) crowd out non-resource GDP. Further, long-run resource windfalls harm the performance of the non-resource sector. They used a panel VAR and panel data on 129 countries between 1970 and 2007.</td>
<td>Panel vector autoregression</td>
<td>1970-2007</td>
</tr>
<tr>
<td>Authors</td>
<td>Key Findings</td>
<td>Methodology</td>
<td>Time span</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Frankel (2012)</td>
<td>Frankel (2020) provided six channels through which the natural resource abundance harms economic performance. Those channels are long-term trends in world prices, commodity price volatility, permanent crowding out of manufacturing, autocratic and/or oligarchic institutions, anarchic institutions, and cyclical Dutch disease.</td>
<td>Literature review</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Sala-i-Martin &amp; Subramanian (2013)</td>
<td>Sala-i-Martin and Subramanian (2013) stated that natural resources such as oil and minerals may or may not be a curse themselves. Instead, their work showed that natural resource abundance has a seriously negative impact on the quality of domestic institutions and long-run growth.</td>
<td>Regression</td>
<td>1970-200</td>
</tr>
<tr>
<td>Torvik (2009)</td>
<td>Torvik (2009) posited that the resource curse field is still in its infancy and identified some methodological steps to strengthen theoretical and empirical conclusions. First, statistical causality is still doubtful, since economists do not know to what extent natural resource wealth dampens growth. Second, it is relevant to identify the difference between cross-country successes and failures, since for every Venezuela and Nigeria, there is a Botswana and Norway. The third room for improvement is to shift the objective of the research toward illustrating policy implications.</td>
<td>Literature review</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Smith (2015)</td>
<td>Used panel regression techniques with fixed effects to evaluate the impact of natural resource discoveries on per capita GDP. He found no evidence to support that there is a resource curse; namely, resource exploitation has a positive impact on long-run per capita GDP growth in developing countries, and no impact in developed ones.</td>
<td>Regression</td>
<td>1950-2008</td>
</tr>
<tr>
<td>Authors</td>
<td>Key Findings</td>
<td>Methodology</td>
<td>Time span</td>
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<tr>
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</tr>
<tr>
<td>Alexeev &amp; Conrad (2009)</td>
<td>Focused on GDP per capita instead of growth rates over a given period. Natural resource endowments increase GDP per capita and income inequality, but they do not generate an improvement of institutions. This does not mean that natural resources are harmful to institutions. Oil-rich countries have (on average) a high GDP per capita and weak institution relative to advanced economies, causing a negative coefficient to the oil wealth variable (in regression models).</td>
<td>Regression</td>
<td>1995-2005</td>
</tr>
<tr>
<td>Sachs (2007)</td>
<td>Argued that the resource curse is only partially real because, although macroeconomic performance has fallen short of potential in oil-rich countries, many of them have been doing well during recent years. Likewise, he proposes an agenda of long-run investment strategies as a vital tool for avoiding Dutch disease.</td>
<td>Literature review</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Mehlum et al. (2006)</td>
<td>Mehlum et al. (2006) demonstrated that institutions are critical in determining whether resource-rich nations can avoid the curse or not.</td>
<td>Economic model, regression</td>
<td>1965-1990</td>
</tr>
<tr>
<td>Ross (1999)</td>
<td>Cognitive theories suggest that resource rents (windfalls) generate myopic disorders among policymakers; societal theories suggest that rents empower</td>
<td>Literature review</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Authors</td>
<td>Key Findings</td>
<td>Methodology</td>
<td>Time span</td>
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</tr>
<tr>
<td>social groups that support</td>
<td>impeding macroeconomic policies, and state-centered theories argue that rents weaken public institutions that are required to promote long-run economic growth.</td>
<td>Regression</td>
<td>1971-1997</td>
</tr>
<tr>
<td>Ross (2001)</td>
<td>Ross (2001) tested the negative effect of oil rents on democracy. He found that oil abundance has a negative effect on democracy, and the damage is more considerable in poor states than in rich ones. Additionally, oil exports shocks do more harm in oil-poor states than in oil-rich ones.</td>
<td>Regression</td>
<td>1971-1997</td>
</tr>
<tr>
<td>Robinson et al. (2006)</td>
<td>Robinson et al. (2006) developed a quantitative model to show that politicians are prone to over-extract resources relative to the efficient extraction path because the future discount rate is too high, and related resource booms improve the efficiency of the extraction paths. Nonetheless, natural resource booms increase the misallocation of resources in the rest of the economy because they raise the value of being in power and provide government officials with more money to influence electoral outcomes.</td>
<td>Economic model</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Andersen &amp; Aslaksen (2008)</td>
<td>Andersen and Aslaksen (2008) found that the resource curse is present in democratic presidential regimes but not in democratic parliamentary ones; such differences matter more for economic growth than whether the country is democratic or autocratic. Additionally, resource abundance is more prone to reduce economic growth when proportional electoral systems are in place.</td>
<td>Regression</td>
<td>1970-1990</td>
</tr>
<tr>
<td>Anthonsen et al. (2013)</td>
<td>Illustrated that government fiscal dependency on oil and gas rents has a negative effect on government quality, including measures such as corruption, bureaucracy, and legal partiality.</td>
<td>Regression</td>
<td>1984-2006</td>
</tr>
<tr>
<td>Authors</td>
<td>Key Findings</td>
<td>Methodology</td>
<td>Time span</td>
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<tr>
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</tr>
<tr>
<td>Brollo et al. (2013)</td>
<td>Brollo et al. (2013) developed a political agency model. The researchers stated that higher exogenous revenues induce more corruption because incumbents have more rooms to obtain rents without disappointing voters.</td>
<td>Economic model</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Bulte et al. (2005), Isham et al. (2005), and Boschini et al. (2007)</td>
<td>There are natural resources whose production or extraction is concentrated in a specific geographic or economic area and that concentration facilitates the control of rents by interest groups.</td>
<td>Regression</td>
<td>1970-1998</td>
</tr>
<tr>
<td>Bulte et al. (2003)</td>
<td>There is no evidence that the resource curse itself has an impact on development.</td>
<td>Regression</td>
<td>1970-1990</td>
</tr>
<tr>
<td>Pike (2010)</td>
<td>Oil dependence has negative consequences across a range of dimensions of government and institutional quality (including the level of democracy and corruption), and with Anthonsen et al. (2009, 2013), Pike found that oil and gas dependence has a negative effect on three dimensions of government quality: corruption, bureaucratic quality, and legal impartiality.</td>
<td>Regression</td>
<td>1987-2008</td>
</tr>
<tr>
<td>Ahmadov et al. (2013)</td>
<td>The authors found that, at the aggregate level, natural resource revenues have a negative impact on government effectiveness, i.e., countries with higher oil and resource rents as a share of GDP tend to have lower rates of government effectiveness.</td>
<td>Regression</td>
<td>1996-2011</td>
</tr>
<tr>
<td>De Rosa &amp; Iooty (2012)</td>
<td>Resource dependence dampens government effectiveness and the levels of competition across the domestic economy, and that relationship seems to persist in the long run.</td>
<td>Regression</td>
<td>1996-2010</td>
</tr>
<tr>
<td>Sarmidi et al. (2014)</td>
<td>Institutions can indeed neutralize the effect of the resource curse, similar to the work of Medeiros, Costa, and Dos Santos (2013) and Beland and Tiagi (2009).</td>
<td>Regression</td>
<td>1984-2005</td>
</tr>
<tr>
<td>Authors</td>
<td>Key Findings</td>
<td>Methodology</td>
<td>Time span</td>
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<tr>
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</tr>
<tr>
<td>Oskenbayev et al. (2013)</td>
<td>Their results suggest that natural resources do not promote poor macroeconomic performance, but rather their over-abundant production is associated with rent-seeking activities.</td>
<td>Regression</td>
<td>2003-2009</td>
</tr>
<tr>
<td>Olanyugbo &amp; Adediran (2016)</td>
<td>Olanyugbo and Adediran (2016) tested the link between oil revenue and institutional quality on economic growth. They used annual data on Nigeria and found that both low institutional quality and oil revenues promote economic growth in the short run but retard it in the long run, confirming the resource curse hypothesis.</td>
<td>Regression</td>
<td>1975-1996</td>
</tr>
<tr>
<td>Feenstra &amp; Kee (2008)</td>
<td>Productivity can be enhanced by implementing policies to stimulate export variety, and although this does not guarantee a reduction in the cross-country productivity gap between developing and developed nations, it will contribute to improving the aggregate within-country productivity in developing economies.</td>
<td>Economic models</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Greenway &amp; Kneller (2007)</td>
<td>Greenway &amp; Kneller (2007) presented a broader literature review on new international trade theories that, among other topics, highlights the links between productivity and export variety. Further empirical evidence was also provided by Herzer and Nowak-Lehnmann (2006).</td>
<td>Literature review and regression</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Fung et al. (2013)</td>
<td>Excessive export diversification could have a detrimental effect on growth; the concentration of export on commodities and natural resources could have even more negative effects.</td>
<td>Regression</td>
<td>1980-2010</td>
</tr>
<tr>
<td>Hidalgo et al. (2009)</td>
<td>Countries with more concentrated exports tend to have less productive capabilities than their counterparts, which is then linked to lower levels of income per capita.</td>
<td>Network analysis</td>
<td>1992-2000</td>
</tr>
<tr>
<td>Authors</td>
<td>Key Findings</td>
<td>Methodology</td>
<td>Time span</td>
</tr>
<tr>
<td>-----------------------</td>
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</tr>
<tr>
<td>Hidalgo &amp; Hausmann (2010)</td>
<td>Hidalgo and Hausmann (2010) provided further empirical evidence that there is a relationship between the diversification of a country’s exports and the ubiquity of its products.</td>
<td>Network analysis</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Bahar et al. (2014)</td>
<td>A country has a higher likelihood of acquiring a new production capability if a neighboring country is a successful exporter of a product requiring such capability.</td>
<td>Regression</td>
<td>1980-2008</td>
</tr>
<tr>
<td>Ghosh &amp; Ostry (1994)</td>
<td>Export instability (uncertainty around terms of trade rather than about export volumes) is an important source of macroeconomic volatility in developing countries.</td>
<td>Economic model</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Davis (1995)</td>
<td>Dutch disease effect is a result of poor public reactions to export instability.</td>
<td>Literature review, descriptive analysis</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Roemer (1985)</td>
<td>This instability stimulates lobbying activities, which increase custom taxes and wage rigidities.</td>
<td>Literature review, descriptive analysis</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Brock (1991)</td>
<td>Export earnings instability generates risk, and therefore, it modifies the aggregate reaction of economic agents and consequently, influences economic growth.</td>
<td>Economic model</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
### Appendix B

Table B1 – Robustness check - by period analyses (POLs)

<table>
<thead>
<tr>
<th>Period</th>
<th>de</th>
<th>ie</th>
<th>te</th>
<th>proportion of te mediated</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Panel A: Mediation by export volatility (5-year window)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980-1984</td>
<td>-0.0556*</td>
<td>(0.0332)</td>
<td>-0.00789</td>
<td>(0.0162)</td>
</tr>
<tr>
<td>1985-1989</td>
<td>0.0189</td>
<td>(0.0284)</td>
<td>-0.00539</td>
<td>(0.0119)</td>
</tr>
<tr>
<td>1990-1994</td>
<td>-0.00317</td>
<td>(0.0346)</td>
<td>-0.00801</td>
<td>(0.0283)</td>
</tr>
<tr>
<td>1995-1999</td>
<td>0.0128</td>
<td>(0.0408)</td>
<td>-0.0259</td>
<td>(0.0510)</td>
</tr>
<tr>
<td>2000-2004</td>
<td>0.0395*</td>
<td>(0.0223)</td>
<td>0.00186</td>
<td>(0.00557)</td>
</tr>
<tr>
<td>2005-2009</td>
<td>0.00334</td>
<td>(0.0186)</td>
<td>-0.00403</td>
<td>(0.00770)</td>
</tr>
<tr>
<td>2010-2014</td>
<td>0.0689**</td>
<td>(0.0278)</td>
<td>0.0529**</td>
<td>(0.0209)</td>
</tr>
<tr>
<td><strong>Panel B: Mediation by export volatility (10-year window)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980-1984</td>
<td>-0.0545*</td>
<td>(0.0328)</td>
<td>-0.00502</td>
<td>(0.0151)</td>
</tr>
<tr>
<td>1985-1989</td>
<td>0.0198</td>
<td>(0.0289)</td>
<td>-0.000341</td>
<td>(0.00872)</td>
</tr>
<tr>
<td>1990-1994</td>
<td>-0.00518</td>
<td>(0.0362)</td>
<td>0.00236</td>
<td>(0.0331)</td>
</tr>
<tr>
<td>1995-1999</td>
<td>0.0193</td>
<td>(0.0551)</td>
<td>-0.00439</td>
<td>(0.0600)</td>
</tr>
<tr>
<td>2000-2004</td>
<td>0.0359*</td>
<td>(0.0214)</td>
<td>-0.00191</td>
<td>(0.00451)</td>
</tr>
<tr>
<td>2005-2009</td>
<td>0.00471</td>
<td>(0.0162)</td>
<td>0.000334</td>
<td>(0.00777)</td>
</tr>
<tr>
<td>2010-2014</td>
<td>0.0619**</td>
<td>(0.0274)</td>
<td>0.0510**</td>
<td>(0.0229)</td>
</tr>
<tr>
<td><strong>Panel C: Mediation by net barter terms of trade index</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980-1984</td>
<td>-0.0834</td>
<td>(0.0931)</td>
<td>-0.0823</td>
<td>(0.117)</td>
</tr>
<tr>
<td>1985-1989</td>
<td>0.0141</td>
<td>(0.0335)</td>
<td>-0.00798</td>
<td>(0.0232)</td>
</tr>
<tr>
<td>1990-1994</td>
<td>0.0314</td>
<td>(0.0306)</td>
<td>-0.0105</td>
<td>(0.0265)</td>
</tr>
<tr>
<td>1995-1999</td>
<td>0.0377</td>
<td>(0.0295)</td>
<td>-0.0284</td>
<td>(0.0235)</td>
</tr>
<tr>
<td>2000-2004</td>
<td>0.0741**</td>
<td>(0.0294)</td>
<td>0.0157</td>
<td>(0.0236)</td>
</tr>
<tr>
<td>2005-2009</td>
<td>0.00791</td>
<td>(0.0316)</td>
<td>0.00943</td>
<td>(0.0399)</td>
</tr>
<tr>
<td>2010-2014</td>
<td>0.0655</td>
<td>(0.0403)</td>
<td>0.0459</td>
<td>(0.0560)</td>
</tr>
<tr>
<td><strong>Panel D: Mediation by current account balance (% of GDP)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980-1984</td>
<td>-0.0354</td>
<td>(0.0311)</td>
<td>-0.00179</td>
<td>(0.00886)</td>
</tr>
<tr>
<td>1985-1989</td>
<td>0.0542</td>
<td>(0.0497)</td>
<td>0.0653</td>
<td>(0.0560)</td>
</tr>
<tr>
<td>1990-1994</td>
<td>0.0382</td>
<td>(0.0436)</td>
<td>0.0460</td>
<td>(0.0465)</td>
</tr>
<tr>
<td>1995-1999</td>
<td>0.0471</td>
<td>(0.0360)</td>
<td>0.0423</td>
<td>(0.0343)</td>
</tr>
<tr>
<td>2000-2004</td>
<td>0.0569**</td>
<td>(0.0270)</td>
<td>0.0116</td>
<td>(0.0122)</td>
</tr>
<tr>
<td>2005-2009</td>
<td>-0.0143</td>
<td>(0.0271)</td>
<td>-0.0416**</td>
<td>(0.0211)</td>
</tr>
<tr>
<td>2010-2014</td>
<td>-0.00108</td>
<td>(0.0196)</td>
<td>0.0266*</td>
<td>(0.0151)</td>
</tr>
</tbody>
</table>

de: direct effect, ie: indirect effect, te: marginal total effect. The models were controlled for logarithm of exchange rate depreciation (LCU per USS, period average), total natural resources rents (% of GDP), logarithm of total reserves (includes gold, current US$), manufacturing, value added (% of GDP), industry, value added (% of GDP), as well year fixed effects.

Standard errors and confidence intervals. Standard errors are in parenthesis.

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

Source: Author’s estimations
Table B2 – Robustness check - by period analyses (RE)

<table>
<thead>
<tr>
<th>Period</th>
<th>de</th>
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<th>proportion of te mediated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Panel A: Mediation by export volatility (5-year window)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980-1984</td>
<td>-0.0464</td>
<td>(0.0135)</td>
<td>-0.00126</td>
<td>(0.0135)</td>
</tr>
<tr>
<td>1985-1989</td>
<td>0.0199</td>
<td>(0.0112)</td>
<td>0.00696</td>
<td>(0.0112)</td>
</tr>
<tr>
<td>1990-1994</td>
<td>0.00351</td>
<td>(0.0190)</td>
<td>0.00962</td>
<td>(0.0190)</td>
</tr>
<tr>
<td>1995-1999</td>
<td>0.0408</td>
<td>(0.00374)</td>
<td>0.000116</td>
<td>(0.00374)</td>
</tr>
<tr>
<td>2000-2004</td>
<td>0.0355</td>
<td>(0.00736)</td>
<td>-0.000615</td>
<td>(0.00736)</td>
</tr>
<tr>
<td>2005-2009</td>
<td>0.0119</td>
<td>(0.00862)</td>
<td>0.00343</td>
<td>(0.00862)</td>
</tr>
<tr>
<td>2010-2014</td>
<td>-0.0252</td>
<td>(0.00306)</td>
<td>-0.00470</td>
<td>(0.00306)</td>
</tr>
</tbody>
</table>

| **Panel B: Mediation by export volatility (10-year window)** |       |        |        |                          |
| 1980-1984    | -0.0468 | (0.0188) | 0.00187 | (0.0188) | -0.0449 | (0.0502) | 0.0384 |
| 1985-1989    | 0.0204  | (0.00920) | 0.00195 | (0.00920) | 0.0223  | (0.0320) | 0.0872 |
| 1990-1994    | -0.00322 | (0.00842) | 0.00949 | (0.00842) | 0.00627 | (0.0273) | 0.7467 |
| 1995-1999    | 0.0398  | (0.00646) | 0.000671 | (0.00646) | 0.0405  | (0.0522) | 0.0166 |
| 2000-2004    | 0.0364  | (0.00658) | 0.000558 | (0.00658) | 0.0370  | (0.0315) | 0.0151 |
| 2005-2009    | 0.00696 | (0.0129) | 0.0203  | (0.0129) | 0.0273  | (0.0281) | 0.7447 |
| 2010-2014    | -0.0221 | (0.00719) | -0.0124* | (0.00719) | -0.0345 | (0.0232) | 0.3594 |

| **Panel C: Mediation by net barter terms of trade index** |       |        |        |                          |
| 1980-1984    | -0.0317 | (0.0464) | -0.00592 | (0.0464) | -0.0377 | (0.0537) | 0.1574 |
| 1985-1989    | 0.0325  | (0.0212) | -0.0203 | (0.0212) | 0.0122  | (0.0324) | 0.3845 |
| 1990-1994    | 0.0183  | (0.00782) | -0.00269 | (0.00782) | 0.0156  | (0.0316) | 0.1282 |
| 1995-1999    | 0.0527  | (0.0329) | 0.0315  | (0.0329) | 0.0841  | (0.0654) | 0.3741 |
| 2000-2004    | 0.0522* | (0.0161) | -0.0179 | (0.0161) | 0.0342  | (0.0335) | 0.2553 |
| 2005-2009    | 0.0168  | (0.0130) | -0.00832 | (0.0130) | 0.00849 | (0.0374) | 0.3312 |
| 2010-2014    | -0.0319 | (0.00304) | 0.00235  | (0.00304) | -0.0296 | (0.0251) | 0.0686 |

| **Panel D: Mediation by current account balance (% of GDP)** |       |        |        |                          |
| 1980-1984    | -0.0422 | (0.0256) | 0.00522  | (0.0256) | -0.0370 | (0.0515) | 0.1101 |
| 1985-1989    | 0.00769 | (0.00947) | 0.00478  | (0.00947) | 0.0125  | (0.0309) | 0.3833 |
| 1990-1994    | 0.00620 | (0.0138) | 0.00659  | (0.0138) | 0.0128  | (0.0322) | 0.5152 |
| 1995-1999    | 0.0278  | (0.0214) | 0.0265  | (0.0214) | 0.0543  | (0.0408) | 0.4880 |
| 2000-2004    | 0.0362  | (0.00598) | -0.000345 | (0.00598) | 0.0359  | (0.0344) | 0.0094 |
| 2005-2009    | 0.0352  | (0.0142) | -0.00280 | (0.0142) | 0.0324  | (0.0403) | 0.0737 |
| 2010-2014    | -0.0207 | (0.00543) | 9.08e-05 | (0.00543) | -0.0206 | (0.0219) | 0.0044 |

de: direct effect, ie: indirect effect, te: marginal total effect. The models were controlled for logarithm of exchange rate depreciation (LCU per US$, period average), total natural resources rents (% of GDP), logarithm of total reserves (includes gold, current US$), manufacturing, value added (% of GDP), industry, value added (% of GDP), as well year fixed effects.

Note: for random effects estimation with ml_mediation command, the original program does not provide standard errors or confidence intervals for coefficients, thus using bootstrapped standard errors and confidence intervals. Standard errors are in parenthesis.

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

Source: Author’s estimations