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IMF Working Paper

Economic Benefits of Export Diversification in Small States

by Arnold McIntyre, Mike Xin Li, Ke Wang, and Hanlei Yun

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I N T E R N A T I O N A L M O N E T A R Y F U N D

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Economic Benefits of Export Diversification in Small States

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Authorized for distribution by Trevor S Alleyne

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Abstract

The paper considers concepts of economic diversification with respect to exports (including service sectors) for small states. We assessed the economic performance of different groups of 34 small states over the period of 1990-2015 and found those more diversified experienced lower output volatility and higher average growth than most other small states. Our findings are consistent with conventional economic theories but we found that export diversification has a more significant impact on reducing output volatility than improving long run growth in small states. Diversification requires fundamental changes and should be contemplated in the context of a cohesive development strategy.

JEL Classification Numbers: 024.

Keywords: small states, export diversification, economic growth, growth volatility, tourism

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I. INTRODUCTION

Small states face unique challenges stemming from their small landmass and lack of resources.² They typically do not have a large enough domestic market or necessary resources to produce a large variety of goods. They are forced to specialize in production (in a very limited range of goods, e.g. primary and agricultural products and tourism) based on their comparative advantages to compete effectively in international markets.

Openness to trade provides small states chances to overcome the limitations of size, through the access to larger markets and opportunities to achieve economies of scale in production. Moreover, openness to foreign investment generally promotes long run growth through knowledge and technology transfers from foreign to domestic firms. On the other hand, the high level of trade openness and specialization could amplify external vulnerability through volatility of terms of trade and fluctuations in foreign demand. The volatility of output and export earnings also have a non-trivial impact on long-run GDP growth and development outcomes by introducing uncertainties which discourage investment. Particularly, natural disasters are important sources of external vulnerability for small states as they tend to impact a large part of production and population.

Literature suggests that to strengthen resilience to shocks and achieve a higher sustainable rate of growth small states should pursue policies to diversify their economies and reduce their dependence on a narrow range of exports (IMF 2014). Diversification helps countries to hedge against adverse terms of trade shocks by stabilizing export earnings and domestic output (“portfolio effect”). Diversification also provides a great learning opportunity through introduction of new products to the export and production basket, which usually embodies productivity improvement (“dynamic effect”), leading to higher long run growth. This is especially true in countries with limited indigenous sources of productivity growth. For these reasons, many countries have pursued export diversification as a deliberate growth strategy. However, most small states face numerous inherent constraints in seeking to diversify their exports, including scarce resources, inadequate economic infrastructure, acute skills shortage, and high transportation costs due to geographical isolation from main trading partners.

Because diversification essentially requires that resources be channeled away from sectors that already have a comparative advantage, a clear assessment of costs and benefits is warranted. The paper considers concepts of economic diversification with respect to exports (including tourism) for a sample of 33 small states. The relationship between diversification and economic growth is empirically investigated. Following Hausmann and others we seek to test the proposition whether more diversified small states tend to have higher GDP per capita growth and lower volatility. Alternatively, is export concentration in small states less beneficial for growth and does it matter whether countries are commodity intensive or tourism intensive? Finally, we examine the implications of our results for economic policy

² Small states are sovereign countries with a population of 1.5 million people or fewer. In line with IMF Policy Paper “Macroeconomic Issues in Small States and Implications for Fund Engagement”, the sample is narrowed to exclude those defined as advanced market economies or high-income oil exporting countries. The list of the 33 countries included as small states is provided in Annex I.

including whether activist development policies to promote diversification are justifiable in small states.

The rest of the paper is organized as follows. Section II briefly overviews the theoretical and empirical literature of export diversification's impact on growth and volatility. Sections III compares small states to their larger peers in their diversification patterns through stylized facts. Section IV summarizes findings from an empirical analysis. Finally, conclusions and policy implications are presented in Section V.

II. LITERATURE REVIEW

The obvious question to be posed is: what are the theoretical reasons for the proposition that export diversification is conducive to higher and more stable per capita income growth? Per structural models of economic development, countries should diversify from primary exports into manufactured exports to achieve sustainable growth (Chenery, H. 1979; Syrquin, 1989). Commodity products typically suffer from volatile market prices; therefore, commodity export dependent countries face export earnings instability. Export diversification could help to stabilize export earnings in the long run (Ghosh and Ostry, 1994; Bleaney and Greenaway, 2001; McMillan, Rodrik and Verduzco-Gallo, 2014), which is particularly relevant for countries vulnerable to terms-of-trade (ToT) shocks.

On policy implications, in a series of papers, Hausmann et al (2003) raised a new concept that economic growth is not driven by comparative advantage but by countries' diversification of their investments into new activities and an essential role is played by the entrepreneurial cost-discovery process. Per this perspective, governments can play an important role in structural transformation and industrial expansion by promoting entrepreneurship and creating the right incentives for entrepreneurs to invest in a new range of activities.

These theoretical reasons have been supported by several empirical studies (including Love, 1986) which showed evidence of export diversification contributing to higher per capita income growth). Al-Marhubi (2000) added various measures of export concentration to the conventional cross-sectional country growth regression and found that export diversification promotes robust economic growth under different model specifications. Agosin (2007) found that export diversification has a stronger effect on per capita income growth when a country's exports grow faster by using a similar cross-sectional regression. Lerderman and Maloney (2007) in a dynamic cross-country panel model also found evidence in support of diversification-led growth. Feestra and Lee (2004) found that a 10 percent boost in export diversification in all industries would result in a 1.3 percentage point increase in a country's productivity growth, using a sample of 34 countries for the period 1984-1997. Research on Latin American countries by Gutierrez de Pineres and Ferrantino (2000) found a positive interplay between export diversification and economic growth performance for Chile, Colombia, El Salvador, Paraguay, and Uruguay.

However, the positive relationship between export diversification and growth is not always revealed in the literature. Michaely (1977), for example, found a positive and significant link between export diversification and economic growth only among the more-developed

countries. A similar relationship was not found in the case of the least-developed economies. A possible explanation is the non-linearity between export diversification and economic growth, which Di Salvo (2015) explored using a dynamic panel regression on a dataset from 1995-2010.

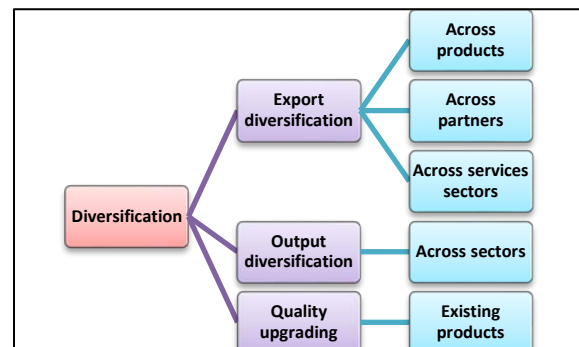
In an open economy with narrow and undiversified production and export bases, export diversification is critical to improving growth and mitigating instability. Empirical work on small states has been limited but Sannasse, Seetanah and Lamport (2014) have found a positive relationship between export diversification and growth in a case study of Mauritius.

Analytical work on the role that diversification plays in small states remains sparse and this paper tries to fill in some of these gaps. This paper will also focus on export diversification and output volatility. The relevant literature has typically found that export concentration in terms of product basket appears to affect income volatility through its effect on terms of trade volatility by focusing on a cross-section of economies (Malik and Temple, 2006, Jansen, 2004). Mona Haddad et al. (2012) indicate that trade openness lowers output volatility in sufficiently diversified economies, while it increases volatility in those with more concentrated export baskets.

III. STYLIZED FACTS

All but one (Comoros) small states covered by our study have reached at least middle-income status after commendable economic development over the past couple of decades. In fact, roughly half of them are categorized as upper-middle or high-income economies, with a relatively high level of economic development despite their small sizes. Infrastructure investment, integration to international markets, and progress in upgrading institutional framework for doing business are among the factors that contributed to this phenomenal development in most small states. There have also been several successful cases for diversification toward a broader range of exporting goods or services.

Diversification can occur across products, sectors, or trading partners, and often involves the shift to a more varied production structure, through the introduction of new products or expansion and upgrading of existing products (text chart). Due to high production costs and the lack of economies of scale in most small states, the introduction of new products (extensive export diversification) is difficult. Export diversification, therefore, happens mostly through the intensive margin in small states, i.e. through a more evenly balanced mix of existing export products or trading partners (Annex II).³



³ The paper considers diversification in both exports and output, but focuses more on the former given the high level of trade openness in small states.

Box 1. Diversification in Trinidad and Tobago

Trinidad and Tobago are a good example for diversification at the intensive margin. During the 1970s and 1980s, almost all the country's oil revenues came from the export of crude oil. Since the mid-1980s, however, Trinidad and Tobago have diversified its petroleum industry into oil and gas refining, liquid natural gas production, and further to petrochemicals. At the same time, the country has also sought to diversify its energy exporting markets and nowadays have a much broader group of trading partners.

Trinidad and Tobago have benefited from the vertical diversification by entering higher value-added industries and building resilience to commodity prices. However, export earnings remained volatile as the dominant oil sector is subject to large international commodity price fluctuations during recent periods (discussed later). The non-energy sector in Trinidad and Tobago is less "developed" although more diversified compared to the oil sector, as the "Dutch Disease" constrained the development of other tradable sectors in the country.

Figure 1. Diversification: Energy and Non-Energy Products

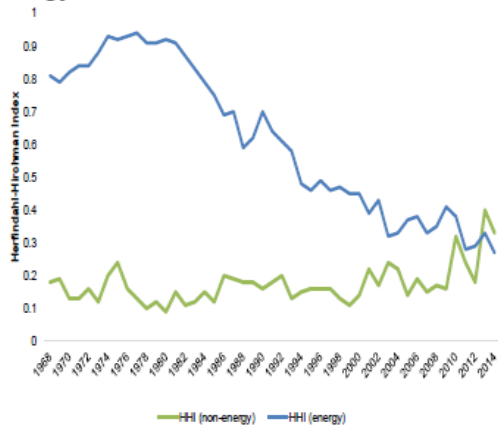
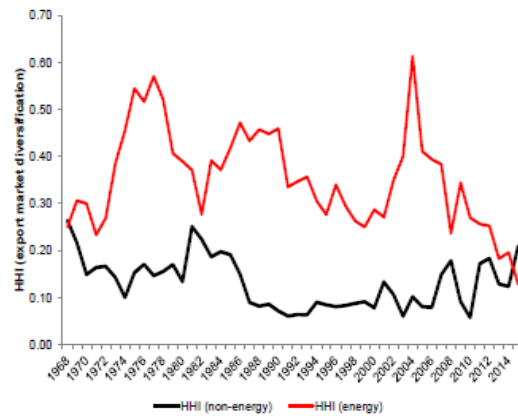
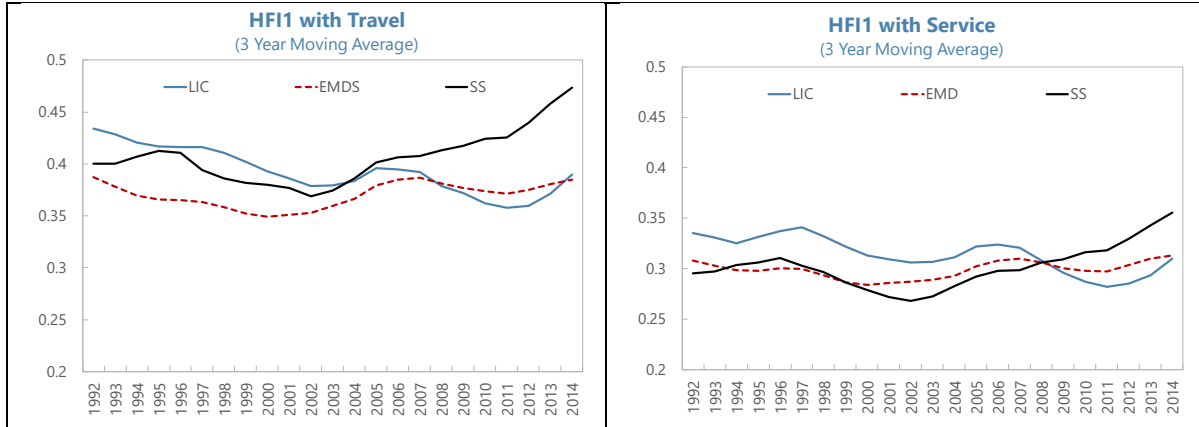


Figure 2. Diversification of Export markets for Non Energy Products



Due to a lack of comparative advantage, most small states have been heavily dependent on a narrow range of traditional products and markets for the bulk of their export earnings. The export basket of small states is generally more concentrated compared with other developing and low-income countries and has become increasingly concentrated over the past decade (text charts). Yet, compared to others, the service sector plays a more important role in diversifying exports in small states.



Source: WITS; Loungani, Mishra, Papageorgiou, and Wang (2017); IMF staff calculation.

Box 2. Measurement of Diversification

The diversification measure is calculated by the Herfindahl index for country-level export flows in products at SITC1 and SITC4 digit level from World Integrated Trade Solution(WITS) database and travel and service exports data from IMF BOP database. The Herfindahl index is calculated as the sum of squared market shares for each country and year:

$$HFI = \sum s_i^2; i=1,2,\dots,n$$

The index varies between 0 and 1, and has larger values for more concentrated export structure and lower values for more diversified export structure. Four different indices are calculated with different export coverages:

- ▶ *HFI1*: goods only (at SITC1 digit level), 1990-2014
- ▶ *HFI4*: goods only (at SITC4 digit level), 1962-2014
- ▶ *HFI1 with travel*: goods + travel, 1990-2014
- ▶ *HFI_m*: export markets (at country level), 1988-2014
- ▶ *HFI1 with service*: goods + service (at BPM6 classification 1 digit level), 1990-2014

For the study, we rank the 33 small states included in the sample by their dominant industry (defined as export share larger than 50 percent of total) for two different time periods (1990-2004 and 2005-15).⁴ They are further categorized into eight different groupings based on their dominant industries in the two different periods: 1. traditionally tourism dependent economies; 2. traditionally primary commodity exporters; 3. traditionally manufacturing economies; 4. traditionally diversified economies; 5. traditionally other services dominant economies; and those experienced a transformation: 6. from diversified to tourism; 7. from diversified to manufacturing; and 8. from primary to diversified economies between the two different periods.⁵

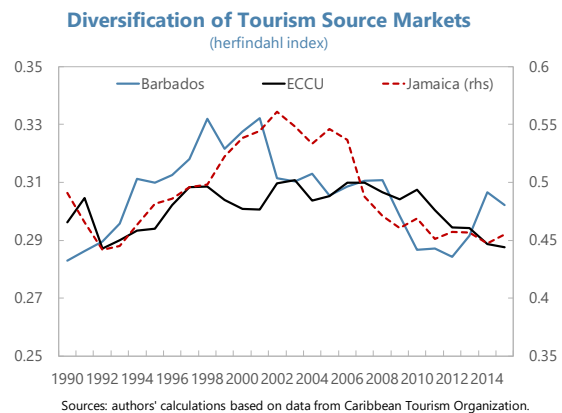
⁴ For the purposes of this study, a country is defined as “diversified” if no dominant industry exists.

⁵ The stylized facts section will focus on the “traditionally tourism”, “traditionally primary”, “traditionally diversified”, and “diversified to tourism” small states, as these economies together constitute more than three quarters of all small states. Services data are from the paper of Loungani, Mishra, Papageorgiou, and Wang (2017).

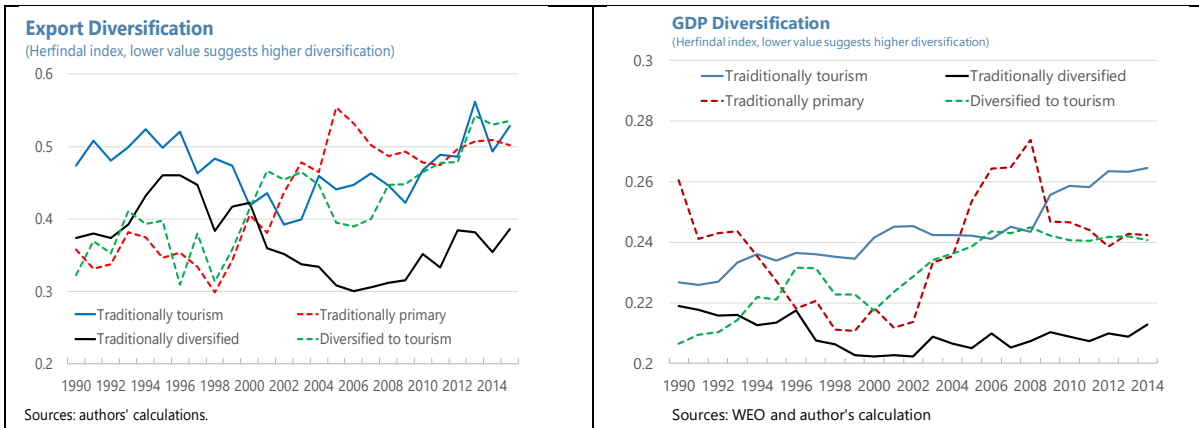
Country Grouping Based on Export Diversification Index			
Traditionally tourism	Traditionally diversified	Traditionally primary	Diversified to tourism
Antigua and Barbuda	Belize	Solomon Islands	Cabo Verde
Bahamas	Fiji	Trinidad and Tobago	Comoros
Barbados	Mauritius		Dominica
Grenada	Seychelles		Jamaica
Maldives	Tonga		Kiribati
Samoa			Palau
São Tomé and Príncipe			St. Vincent and the Grenadines
St. Kitts and Nevis			Vanuatu
St. Lucia			
Tuvalu			
Primary to diversified	Diversified to manufacture	Traditionally manufacture	Traditionally other services
Guyana	Marshall Islands	Bhutan	Djibouti
	Swaziland		

Note: Micronesia, Montenegro, and Timor-Leste are not included, as the data are inadequate for the analysis.

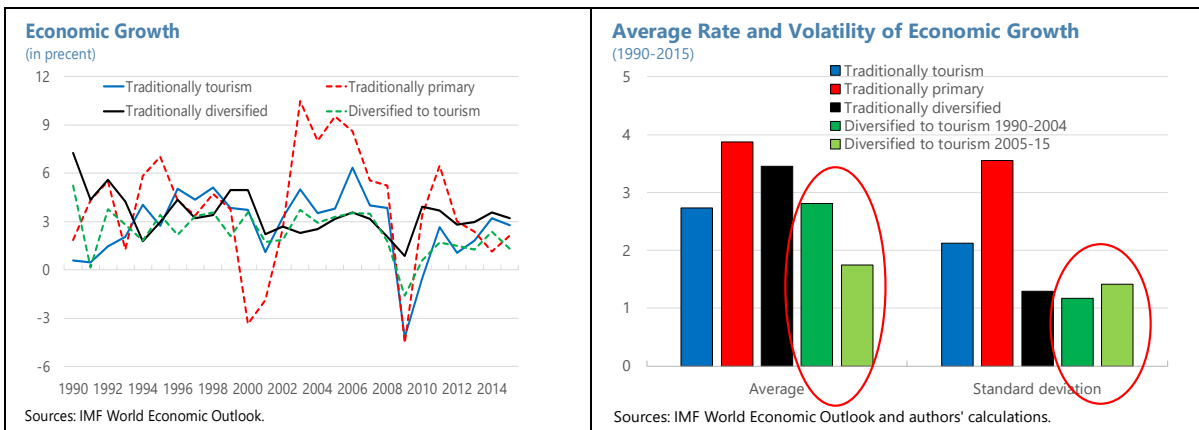
Across most small states, we observed a general trend toward diversification between 1995 and 2005 (even in the tourism dependent economies), which were later reversed especially during and after the 2007-09 global financial crisis.⁶ The sharp reversal could be partially attributed to “countercyclical” policy responses by the government (which typically have narrow mandates that focus on the leading economic sectors to revive economy and a retreat of foreign direct investment, which proves crucial for diversifying production in small states. These structural transformations also reflect a dynamic reallocation of resources from less productive to more productive sectors and activities (often associated with terms of trade movements), and the loss of preferential trade agreements (e.g. on sugar and bananas in the case of the Caribbean). It is worth noting that several tourism-dependent economies in the Caribbean have made commendable progress in diversifying their tourism source markets (text chart) since the early 2000s. Those transformed from diversified to tourism are nowadays as concentrated as those traditionally tourism dependent economies, despite being among the most diversified just a decade ago.



⁶ Primary-based economies experienced the most drastic change toward specialization since mid-90s alongside the commodity price boom.



The de-diversifying trend observed during and after the global financial crisis coincided with a slowdown in growth, which suggests a potential correlation. Economic growth has generally been lackluster and volatile among small states in the past few decades, due to deteriorated competitiveness, procyclical policies, and vulnerabilities to external shocks, among other factors. However, interestingly, these different groups of small states demonstrate different growth patterns. Tourism dependent economies tend to track the growth in Advanced Economies, and are most synchronized with global business cycle and most impacted by global recessions; primary commodity exporters are most exposed to international commodity price fluctuations; and diversified economies show the greatest resilience (least volatility and higher average growth rates) among all.⁷ The traditionally tourism countries and those transformed from diversified to tourism would have been better off (having lower output volatility and higher average growth rates) were they not specialized.

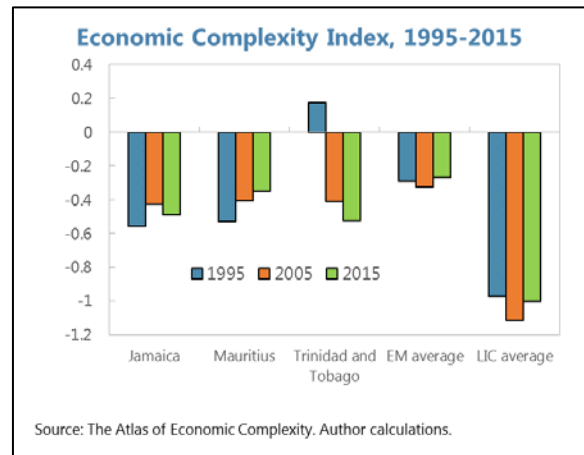


The economic complexity index (ECI) is another trending measure of development levels of countries, which counts for the knowledge in a society that gets translated into the products it

⁷ Traditionally primary commodity exporters have the highest average growth rate mostly attributed to the commodity super cycle between 2000 and 2014. Unsurprisingly, they also demonstrate the highest output volatility.

produces (The Atlas of Economic Complexity). To calculate the economic complexity of a country, the index measures the average ubiquity of the products it exports, then the average diversity of the countries that make those products. The following figure shows the ECI levels of three small states countries over the past twenty years with data availability in our small states sample. In general, the index is lower in small states compared to the Emerging Markets (EM) average and higher than the Low-Income Countries (LIC) average.

Mauritius has made some improvements in economic complexity. Meanwhile, more small states face real challenges to maintain competitiveness when measured by ECI, which may have economic consequences for growth performance. Jamaica has relatively static complexity levels. Trinidad and Tobago have declining complexity levels over the years. In sum, small states may need extra efforts not only to diversify their export products but also upgrade their export baskets toward more complex products.

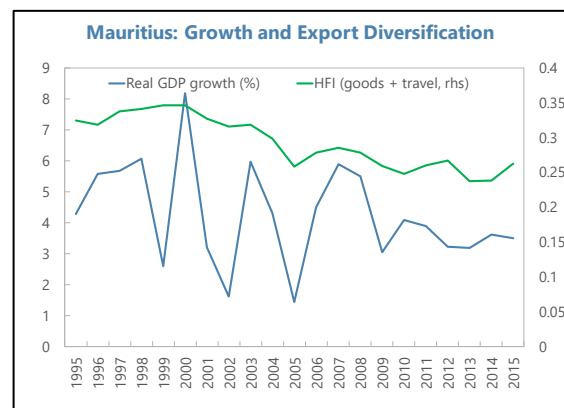


Box 3. Diversification in Mauritius

Mauritius is a good example for diversification at the extensive margin. The small country in the Indian Ocean with a population of a little over a million has experienced a commendable transformation of its economy. Under a trade-led development, its economic structure expanded from mainly agriculture (e.g. sugar) in 1970s to manufacturing (e.g. garment and jewelry) in 1990s and further to a broad range of service exports (e.g. tourism, finance, information technology, and business process outsourcing) since the early 2000s.

Its broad-based economy helped Mauritius avert recession during the 2007-09 global financial crisis (one of the only few small states that managed to do so) and maintain a relatively stable output growth. Despite a volatile external environment, Mauritius's growth volatility has in fact more than halved in 2006-15 compared to the previous decade (when the economy was less diversified). The average growth rate that Mauritius achieved in the past decade (around 4 percent) is also higher than most other small states.

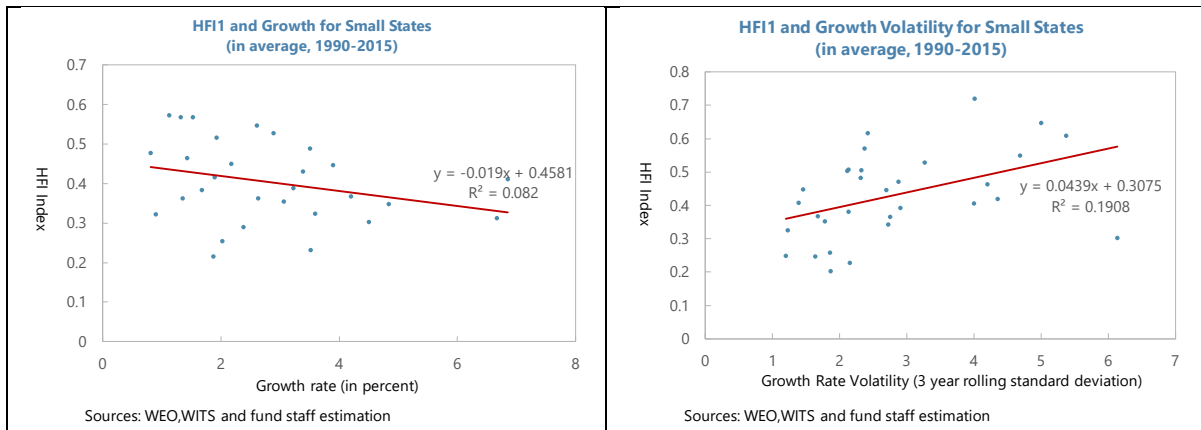
Mauritius managed to diversify its production and export structure by maintaining macro and financial stability, despite its vulnerability to natural disasters (Mauritius ranks as the 13th most vulnerable in the World Risk Index). A competitive business environment is critical to attracting investment which is key to create new comparative advantages and foster the development of new sectors. Mauritius ranks 49/190 in 2017 World Bank Doing Business Index (the highest rank among all small states) and 45/138 in World Economic Forum Global Competitiveness Index (also the highest among all states). Particularly,



competitive labor costs, which could be partly attributed to lower minimum wage requirements, made it possible for Mauritius to expand its manufacturing sector.

IV. EMPIRICAL ANALYSIS

As shown in the figures below, diversification (lower HFI) seems to be associated with higher growth and lower volatility in small states. We will further explore the relationships with regressions.



Our growth estimations are based on the Solow Growth Model, which is a standard neoclassical model of economic growth. The model assumes that labor, capital, and knowledge are three sources account for growth. Our key equation for the growth estimation is the following:

$$\text{Growth equation: } \Delta y_{i,t} = \alpha + \beta \text{Div}_{i,t-1} + \varphi X_{i,t} + \gamma_t + \epsilon_i + \epsilon_{i,t}$$

Where $\Delta y_{i,t}$ is the real GDP growth rate of country i at time t . $\text{Div}_{i,t-1}$ denotes our measures of diversification as introduced earlier (export goods diversification at different disaggregated levels, export of goods and services diversification, export markets diversification, and real sector diversification). We use the lagged diversification measures since diversification levels are predetermined for growth of each period. X_i is a set of control variables including population growth, shares of gross capital formation, trade openness, and FDI flows.⁸

⁸ We did not include education measures as a control variable here because poor data availability for small states. A natural disaster dummy was tested but did not improve the regression results, partly because time period was already controlled by year dummies.

(continued...)

We use a fixed effects model, which we control for country and time fixed effects. Our regression data covers the period of 1990-2014 due to data availability. We take the average for every 3 years to estimate the impacts of diversification on long-term growth.⁹

To understand the role of diversification on macroeconomic stability in small states, we estimate the effects of diversification on growth volatility using the following equation:

$$\text{Volatility equation: } Vol_{i,t} = \sigma Vol_{i,t-1} + \rho Div_{i,t-1} + \delta X_{i,t} + \gamma_t + \epsilon_i + \varepsilon_{i,t}$$

Where $Vol_{i,t}$ is the volatility of real GDP growth rate of country i at time t , which is calculated as the standard deviation of the real growth rate over each non-overlapping 3-year period. $Vol_{i,t-1}$ is the lagged volatility, which we include following the literature since volatility is a path dependent process. $Div_{i,t-1}$ denotes our diversification measures. X_i is a set of control variables including trade openness, inflation volatility, terms of trade volatility, and exchange rate volatility. We take averages of the diversification measures and the control variables for each 3-year period. Again, the number of control variables included here is limited by poor data availability for small states.

Table X shows our growth regression results on small states. The coefficient on the diversification measure of 1-digit export goods (HFI) is negative and significant as expected. When HFI of 1-digit export goods decreases, growth rate increases, which suggests export diversification across products at the 1-digit level helps economic growth. Similarly, we found that the coefficient of HFI of 4-digit export goods is negative and significant. The coefficient of export markets diversification measure is insignificant. The coefficients of all the other diversification measures are negative but insignificant, which may due to our data availability issues and special characteristics of small states¹⁰.

**Table X. Growth Regressions on Small States
(Fixed Effects, 3-year average, 1990-2014)**

⁹ We discuss natural disasters' impact on growth and on explaining the forecast errors of the regression in Annex III.

¹⁰ Note growth regression results usually show significant effects of export market diversification and output diversification when tested on a larger sample of developing countries (see IMF 2014a).

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Growth						
Population growth	-1.825 (3.215)	0.528 (3.980)	-2.354 (4.667)	-2.175 (4.553)	-0.347 (4.198)	-0.530 (5.172)	-1.542 (4.160)
Gross capital formation	0.121*** (0.0402)	0.129*** (0.0410)	0.127*** (0.0452)	0.126*** (0.0457)	0.151*** (0.0442)	0.134*** (0.0494)	0.116*** (0.0429)
Trade openness	4.000*** (1.400)	2.343 (2.161)	3.010 (2.304)	2.996 (2.302)	2.027 (2.225)	3.119 (2.827)	3.317 (2.124)
FDI flows	-0.305 (0.309)	-0.585* (0.342)	-0.496 (0.374)	-0.492 (0.374)	-0.524 (0.354)	-0.516 (0.518)	-0.618* (0.349)
<i>HFI, 1 digit export goods</i>		-1.596* (0.853)					
<i>HFI, 1 digit export goods and travel</i>			-0.285 (1.113)				
<i>HFI, 1 digit export goods and services</i>				-0.230 (1.148)			
<i>HFI, 4 digit export goods</i>					-1.059** (0.495)		
<i>HFI, export markets</i>						0.120 (0.741)	
<i>HFI, real sector</i>							-1.198 (2.865)
Constant	-22.44*** (8.082)	-14.37 (12.63)	-18.57 (14.11)	-18.28 (13.99)	-14.17 (13.17)	-17.10 (16.88)	-21.03 (13.37)
Observations	170	154	147	147	148	125	154
Number of ifscode	22	22	22	22	22	22	22
R-squared	0.283	0.302	0.278	0.278	0.322	0.292	0.283

Standard errors in parentheses

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

Table X shows our regression results of volatility of output growth on small states. The coefficient on the diversification measure of 1-digit export goods (HFI) is positive and significant as expected. It suggests that export goods diversification at 1-digit level (lower HFI) decreases growth volatility. The effects of diversification on growth volatility are also significant when measured with HFI 1-digit export goods and travel, and HFI 1-digit export goods and services. The results suggest diversification across services sector also help to mitigate growth volatility. The coefficient on the diversification measure of export markets is positive and significant. It suggests that export markets diversification is another channel to help to maintain macro stability, potentially through mitigating negative growth shocks brought by certain trading partners.¹¹

¹¹ These findings are consistent with the regression results on volatility in IMF 2014a background paper. Note the IMF 2014a paper uses GMM regressions since they include all emerging and developing countries in their sample. We use fixed effects model in this paper instead of AB-estimator because of the small sample size of country observations.

**Table X. Volatility Regressions on Small States
(Fixed Effects, 3-year average, 1990-2014)**

VARIABLES	Volatility of Output Growth						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lagged volatility	-0.206 (0.138)	-0.180 (0.124)	-0.155 (0.128)	-0.171 (0.129)	-0.0990 (0.135)	-0.327 (0.202)	-0.163 (0.144)
Trade openness	-4.213** (1.859)	-1.837 (1.820)	-3.052* (1.746)	-3.135* (1.758)	-3.036* (1.775)	-5.186** (2.202)	-3.948** (1.876)
Inflation volatility	-0.173* (0.0877)	-0.135* (0.0794)	-0.160 (0.119)	-0.172 (0.120)	-0.199 (0.119)	-0.214* (0.118)	-0.163* (0.0883)
TOT volatility	-0 (1.36e-10)	0 (1.22e-10)	0 (1.27e-10)	0 (1.28e-10)	0 (1.26e-10)	0 (1.45e-10)	0 (1.37e-10)
Exchange rate volatility	7.608 (6.563)	5.851 (5.900)	1.671 (6.662)	2.775 (6.593)	6.591 (6.180)	12.06 (11.54)	9.519 (6.822)
<i>HFI, 1 digit export goods</i>		2.046** (0.634)					
<i>HFI, 1 digit export goods and travel</i>			1.680* (0.852)				
<i>HFI, 1 digit export goods and services</i>				1.368* (0.759)			
<i>HFI, 4 digit export goods</i>					0.595 (0.370)		
<i>HFI, export markets</i>						1.211* (0.616)	
<i>HFI, real sector</i>							-2.786 (2.733)
Constant	21.85** (8.504)	13.09 (8.081)	18.22** (7.870)	18.88** (7.921)	17.52** (7.989)	27.63** (9.939)	16.09 (10.20)
Observations	65	65	61	61	61	51	65
Number of ifscode	16	16	16	16	16	14	16
R-squared	0.410	0.540	0.534	0.526	0.535	0.527	0.426

Standard errors in parentheses

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

In sum, the supposed negative correlation between output volatility and diversification and positive correlation between long run growth and diversification are supported by the small states sample. Export diversification across goods and services matter for economic growth and stability.

V. CONCLUSIONS AND POLICY IMPLICATIONS

Small states are prone to exogenous shocks (e.g. from natural disaster, global business cycle, international commodity price fluctuation, etc.) given the small size of their economies and a high degree of trade openness. Their output and export earnings are therefore also inevitably more volatile as these shocks tend to cause severe damage to small states which specialize in production of a narrow range of goods and/or services based on their limited comparative advantage. Facing increasing vulnerability to the ever-changing external environment, many small states have sought to diversify their economies and export baskets.

The study confirms the potential economic benefits of export diversification in reducing growth volatility and promoting economic development in small states. We assessed the economic performance of different groups of small states over the period of 1990-2015 and

found those more diversified experienced the lowest output volatility and a higher average growth rate than most other small states. We further tested the empirical relationship between diversification and output volatility and long run growth rate based on a sample of small states. Our findings are consistent with conventional economic theories but we found that export diversification has a more significant impact on reducing output volatility than improving the long run growth rate in small states.

However, in practice, the quest for diversification has proven difficult and only successful in a small number of small states. A general diversifying trend observed in the late 1990s and early 2000s was short-lived and quickly reversed during and after the 2007-09 global financial crisis. Efforts to diversify were deprioritized in the authorities' policy agenda as more attention was given to policies designed to revive key industries facing significant economic challenges.

Importantly, the relationship between growth and diversification also reflects fundamental and underlying determinants, e.g. policy and institutional factors. For this reason, diversification should be considered and contemplated in the context of a cohesive development strategy. Particularly, macroeconomic policy stability and a supportive business environment (quality of infrastructure, human capital, and essential business services) have proven important for attracting investment and in turn fostering new economic sectors. These policies are also more cost-effective compared to activist development policies and compensative tax incentives (given limited fiscal space in most small states).

Finally, while it is beyond the scope of this paper, we believe that there is a scope for further strengthening risk-pooling arrangements, i.e. with economic integration as a substitute for diversification, given the prevalence of country specific shocks (e.g. natural disasters) among small states.

ANNEX I: List of Small States by Income Category

Upper middle-income	Lower-middle and low-income
Antigua and Barbuda	Belize
Bahamas	Bhutan
Barbados	Cape Verde
Dominica	Comoros
Grenada	Djibouti
Maldives	Fiji
Mauritius	Guyana
Montenegro	Kiribati
Palau	Marshall Islands
Seychelles	Micronesia
St. Kitts and Nevis	Samoa
St. Lucia	São Tomé and Príncipe
St. Vincent and the Grenadines	Solomon Islands
Suriname	Swaziland
Tonga	Timor Leste
Trinidad and Tobago	Vanuatu
Tuvalu	

ANNEX II. Export Shares of Small States

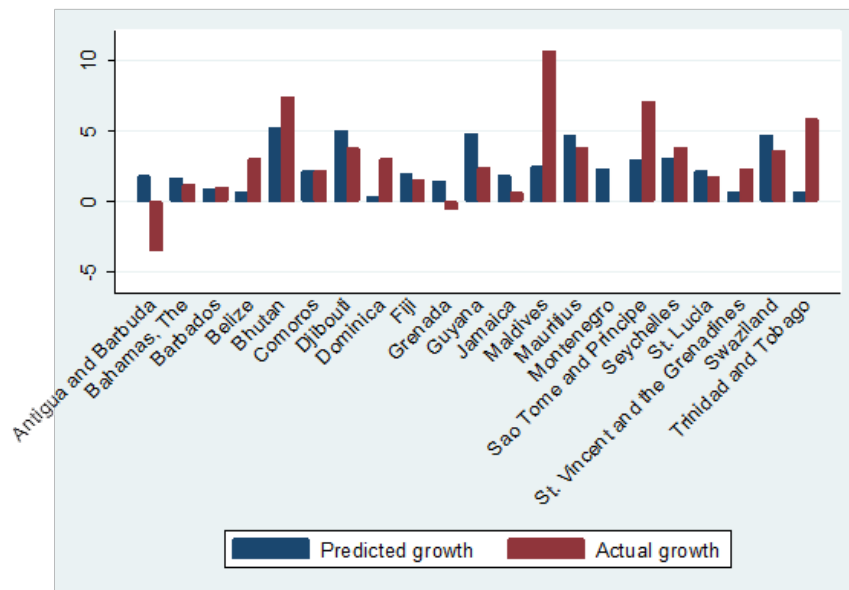
COUNTRY	YEAR	GOODS				SERVICE	
		PRIMARY	MANUFACTURE	FUEL	TOTAL	TOURISM	OTHER
ANTIGUA AND BARBUDA	1990-2004	1.21	8.71	0.96	10.88	69.18	19.9
ANTIGUA AND BARBUDA	2005-2015	4.20	6.33	0.38	11.13	66.15	22.7
BAHAMAS	1990-2004	4.87	8.36	3.18	16.41	84.80	-1.2
BAHAMAS	2005-2015	2.28	12.17	9.13	22.82	70.70	6.5
BARBADOS	1990-2004	5.21	10.90	4.53	20.63	63.08	16.3
BARBADOS	2005-2015	8.05	18.15	4.10	30.30	63.27	6.4
BELIZE	1990-2004	46.18	11.05	1.22	58.45	33.22	8.3
BELIZE	2005-2015	24.89	24.29	5.92	55.09	35.54	9.4
BHUTAN	1990-2004	19.08	62.50	1.96	83.54	0.00	0.0
BHUTAN	2005-2015	18.22	66.01	2.21	86.44	16.62	-3.1
CABO VERDE	1990-2004	3.02	11.95	1.84	16.80	49.96	33.2
CABO VERDE	2005-2015	12.71	7.64	0.27	20.62	58.85	20.5
COMOROS	1990-2004	26.07	10.71	0.13	36.91	49.89	13.2
COMOROS	2005-2015	11.60	9.15	0.00	20.75	66.59	12.7
DJIBOUTI	1990-2004	8.24	11.35	1.57	21.17	4.96	73.9
DJIBOUTI	2005-2015	10.01	8.32	2.95	21.28	5.67	73.0
DOMINICA	1990-2004	15.50	26.70	0.41	42.60	40.44	17.0
DOMINICA	2005-2015	6.88	13.21	2.66	22.75	94.58	-17.3
FIJI	1990-2004	28.78	25.01	0.47	54.26	32.59	13.1
FIJI	2005-2015	32.31	12.72	1.21	46.23	34.36	19.4
GRENADA	1990-2004	12.54	11.79	0.51	24.84	52.94	22.2
GRENADA	2005-2015	11.49	5.45	0.98	17.91	92.47	-10.4
GUYANA	1990-2004	50.26	26.55	0.01	76.82	17.04	6.1
GUYANA	2005-2015	42.88	39.28	0.12	81.02	8.91	10.1
JAMAICA	1990-2004	31.42	15.62	0.55	45.70	41.40	12.9
JAMAICA	2005-2015	29.85	7.12	0.11	39.03	51.86	9.1
KIRIBATI	1990-2004	39.08	9.85	0.02	48.95	33.89	17.2
KIRIBATI	2005-2015	38.34	2.93	0.11	41.38	61.48	-2.9
MALDIVES	1990-2004	11.09	14.75	0.01	25.85	77.77	-3.6
MALDIVES	2005-2015	10.98	1.03	0.31	12.32	81.04	6.6
MARSHALL ISLANDS	1990-2004	14.49	42.52	4.37	61.38	0.00	0.0
MARSHALL ISLANDS	2005-2015	8.92	61.18	1.83	71.93	24.98	3.1
MAURITIUS	1990-2004	15.05	36.34	0.02	52.85	21.51	25.6
MAURITIUS	2005-2015	16.01	30.50	0.71	48.81	30.50	20.7
PALAU	1990-2004	13.81	6.40	0.03	20.24	0.00	0.0
PALAU	2005-2015	9.93	0.90	0.01	10.84	94.46	-5.3
SAMOA	1990-2004	4.20	12.59	0.06	16.85	52.57	30.6

SAMOA	2005-2015	1.60	8.36	0.00	9.96	68.45	21.6
SÃO TOMÉ AND PRÍNCIPE	1990-2004	23.64	11.88	4.15	39.68	56.20	4.1
SÃO TOMÉ AND PRÍNCIPE	2005-2015	16.04	13.87	0.15	30.05	98.78	-28.8
SEYCHELLES	1990-2004	29.72	3.30	1.10	34.12	42.31	23.6
SEYCHELLES	2005-2015	36.74	6.31	1.69	44.75	33.51	21.7
SOLOMON ISLANDS	1990-2004	71.06	2.60	0.16	73.82	17.41	8.8
SOLOMON ISLANDS	2005-2015	71.91	5.42	0.08	77.42	23.65	-1.1
ST. KITTS AND NEVIS	1990-2004	8.53	23.20	0.63	32.36	54.57	13.1
ST. KITTS AND NEVIS	2005-2015	1.11	21.88	0.16	23.15	54.64	22.2
ST. LUCIA	1990-2004	16.44	7.87	0.89	25.20	72.04	2.8
ST. LUCIA	2005-2015	7.23	6.40	16.74	30.37	64.32	5.3
ST. VINCENT AND THE GRENADINES	1990-2004	17.37	17.72	0.18	35.27	47.96	16.8
ST. VINCENT AND THE GRENADINES	2005-2015	3.97	20.61	0.77	25.34	58.85	15.8
SWAZILAND	1990-2004	41.75	46.40	0.30	88.44	7.10	4.5
SWAZILAND	2005-2015	30.67	55.12	2.48	86.25	5.06	8.7
TONGA	1990-2004	32.80	7.44	0.01	40.25	32.73	27.0
TONGA	2005-2015	17.51	4.73	0.05	22.29	44.04	33.7
TRINIDAD AND TOBAGO	1990-2004	7.23	32.59	45.13	85.24	7.75	7.0
TRINIDAD AND TOBAGO	2005-2015	2.65	32.59	58.20	93.12	3.98	2.9
TUVALU	1990-2004	1.07	10.10	2.28	13.45	231.66	-145.1
TUVALU	2005-2015	42.15	28.68	0.40	71.23	70.94	-42.2
VANUATU	1990-2004	13.01	8.33	0.25	21.59	46.23	32.2
VANUATU	2005-2015	9.26	6.50	0.05	15.82	71.69	12.5

ANNEX III. NATURAL DISASTERS AND GROWTH

Small states are disproportionately vulnerable to natural disasters, which reflects a higher frequency of disasters (adjusted for land area) and greater vulnerability to severe disasters (IMF, 2016). Natural disasters also tend to impact a large part of production and population in small states. There is a substantial literature documenting the macroeconomic impact of natural disasters. Raddatz (2007), Noy (2009) and Acevedo (2014) find clear evidence of natural disasters impacting short term growth as damage to capital stocks leads to foregone production in the immediate aftermath of the disaster. While post-disaster reconstruction could potentially have a temporary positive impact on growth, when large public spending outruns damages caused by the disaster (Loayza et al, 2012). Evidence on natural disasters' long-run growth impact is more mixed, but Hochrainer (2009) and Cavallo et al (2010) find a significant negative medium-term impact on growth for severe disasters.

While it is beyond the scope of this paper to explore the granularity of the impact of natural disasters on growth and volatility, we are interested in knowing if natural disasters could help explain in part the forecast errors of the growth regression discussed in section IV.¹² In this regard, we compared the averages of actual growth rates of disaster years with the predicted values for the same years from the regression and noted large differences in many countries (text chart). We found the potential impact of natural disasters on growth ranging from greatly negative (Antigua and Barbuda) to greatly positive (Maldives) and depending largely on the magnitude and timing of the disaster. There are of course other country-specific factors at play.



¹² Data on disaster damages in small states are scarce and not always reliable, which essentially does not allow an easy separation between severe and non-severe disasters. However, given their distinct impacts on growth as studied in the literature, the data limitation prevents us from running a full-fledged empirical analysis in this paper.

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