The Relationship between Export Diversification & Economic Growth: A Comparative Analysis with a Focus on Small Island States

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***Abstract*—This paper examines the relationship between export diversification and economic growth in Small Island Developing States (SIDS), an area for which theory has conflicting views and virtually no empirical research has been undertaken. Empirical evidence shows a significant gap in the export diversification and economic growth experience of SIDS generally, although several small nation states have managed to close the gap with respect to key indicators and successfully evolve from developing to advanced economy status, suggesting that there may be a path by which SIDS can become economically advanced. Utilizing data from 1995 to 2007 for 69 economies segmented by country classification and geography, the empirical results find a non-linear, U-shaped relationship between export concentration and economic growth. This finding is consistent with previous research and robust to different specifications of the growth equation. Further, the study finds that the U-shaped relationship is moderated by the size of the population whereby small nation states, inclusive of small island states, seem to benefit more from export diversification as compared to mid-size and large economies. The findings have noteworthy policy implications for SIDS policymakers seeking to strengthen and improve the diversification, stability and economic growth trajectory of their economies.**

***Index Terms*—Export concentration, export diversification, economic growth, developing economies, advanced economies, Small Island Developing States (SIDS), Small Advanced States (SAS).**

I. Introduction

This paper uses panel data for 69 economies across a timespan from 1995 to 2007 to examine the relationship between export diversification and economic growth, with a focus on Small Island Developing States (SIDS). Based on the literature, there have been remarkably few systematic empirical investigations into the implied links between export diversification and long-term economic growth [1], whether focused on a broad cross-section of economies globally, or SIDS in particular. Whether and how export diversification impacts economic growth in SIDs cannot be inferred from existing evidence since, in addition to the challenges experienced by developing countries generally, diversification is particularly challenging for small island states because in many cases they possess a narrow resource base and are prone to unique vulnerabilities which constrain their ability to nurture, finance and develop multiple industries. In this regard, a 2002 UN report found that in addition to the problems faced by developing countries generally, SIDS experience specific problems that arise from the interplay of a number of special factors [2]. Among these are their smallness, remoteness, geographical dispersion (Appendix A), vulnerability to natural disasters, the fragility of their ecosystems, constraints on transportation and communication, isolation from markets, lack of natural resources, limited fresh water supplies, heavy dependence on imports and limited commodities, depletion of non-renewable resources, migration (particularly of personnel with high-level skill) and their limited ability to reap the benefits of economies of scale [2]. Yet there are several small islands that have successfully evolved from developing to developed (or advanced) status, suggesting that there may be a path by which SIDS can become economically advanced (see Appendix B).

Following World War II (WWII), many former colonies located in Africa, Latin America, the Caribbean, and Asia attained independence during the early 1960s and 1970s and began their quest for advanced development status inclusive of higher standards of living, job creation and wealth generation. However, almost 60 years later, less than 10% (i.e., 16) of the world's 193 economies have successfully transitioned from developing to advanced status with the number of advanced economies increasing from approximately 20 in 1960 to 36 at present. Conversely, the number of developing economies (157) remain disproportionately high. As these figures suggest, the transition period for a country to move from developing to advanced status can be protracted and elusive with an overwhelming number of countries stuck in transition. Furthermore, it is noteworthy that not one advanced sovereign state is located in Africa, Latin America or the Caribbean regions (Appendix B). The 36 advanced economies are all geographically centralized in Europe, North America ,and to a lesser extent, Asia (Appendix C) while developing economies are overwhelmingly located in Africa, Latin America, the Caribbean, and Asia. Based on the literature, within the last century there have only been two instances of rapid and sustained economic growth generally across countries. The first occurred with several European countries

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in the immediate post-WWII period, and the second occurred with a group of East and Southeast Asian countries which grew at an unprecedented and sustained average rate of over 5.5% per year (in per capita terms) over the 30-year period between 1965 and 1995 [3]. While the U.S.-led Marshall Plan is largely credited with the growth that the European countries experienced in the immediate post-WWII period, there is growing consensus in the literature that export-led growth policies, inclusive of export development and diversification, served as the primary catalyst for the growth experienced in East and Southeast Asian countries [4].

Despite the major paradigm shift toward export-led growth policies, virtually no research has been undertaken to (1) assess the degree to which the export structures of developing countries in regions such as Latin American and the Caribbean have, in fact, diversified [5] and (2) determine the associated impact on their economic growth experience. Thus, a study of the export diversification and growth experience of SIDS relative to advanced and emerging economies is informative for SIDS policymakers seeking to understand and improve the development trajectory of their economies.

The empirical literature on the link between export diversification and per capita income is very small [1], [6], [7]. Several studies touch upon the relationship and lament the lack of empirical evidence that export diversification is associated with faster growth and that the relationship is economically meaningful [1], [6], [8]-[11]. However, theoretical and empirical uncertainties still exist on the precise nature of the relationship [12], [13]. For instance, Imbs and Wacziarg [14], in a seminal study, find a U-shaped pattern whereby countries in the early stages of their development diversify production and specialize at higher income levels. Several economists, following up on the work of Imbs and Wacziarg [14], examined the pattern of the relationship between export diversification and economic growth and reported similar findings in that the effect of export concentration on economic growth is potentially nonlinear (U-shaped) with poorer countries benefiting from diversifying their exports in contrast to richer countries that perform better with export specialization [6], [7]. However, other researchers poignantly note that such studies simply present a pattern between development and diversification, while leaving aside questions of causality [13].

If export diversification promotes the economic growth of SIDS, this would certainly be of importance to policymakers in many developing countries, because their economies are generally characterized by the lack thereof [15]. The lack of research focused on SIDs is surprising since SIDS represent an aggregate (domestic) population of 67 million with a combined GDP of $605 billion and are often located in geographic areas that are particularly prone to weather or other natural events that may significantly impact their growth and long-term survival.

Using data for 69 countries, including 14 SIDS, over the period 1995 to 2007, we estimate panel models with country fixed effects of GDP per capita on export concentration and a set of control variables that is standard in the literature. Consistent with previous research and robust to changes in the econometric specification used and corrections for heteroscedasticity, we find a non-linear, U-shaped relationship between export concentration and economic growth whereby export concentration, or conversely export diversification, is an important determinant of economic growth across all economies. Throughout the study, a differential effect of export concentration on economic growth was observed between SIDS and non-SIDS economies with a total population having a moderating effect on the relationship. The study finds that small countries, that is island states, benefit more from export diversification, compared to mid-size and large countries suggesting that export diversification is an effective mechanism to drive economic growth in islands.

This study contributes to the literature on economic growth by focusing on the SIDS. Specifically, we add to the literature that examines the relationship between export diversification and growth and document a non-linear and economically important relation between export diversification and economic growth among SIDS. We show that although SIDS are among the smallest countries in the world with unique challenges that could derail any effort to achieve growth through diversification, it appears that they benefit more from diversified exports than their non-SIDS counterparts. This paper also contributes to policymaking in that the results suggest that export diversification is a sound policy for SIDS to drive economic growth. However, the findings also suggest that there are limits as to how much SIDS can diversify their exports given a natural constraint imposed by their limited resources base, which, if fragmented too extensively in a quest to further increase export diversification will adversely affect potential economies of scale, erode unique factor endowments (land, human capital, financial capital, etc.) or crowd out funding for activities for which the SIDS has an absolute or comparative advantage.

The remainder of the paper is as follows: a discussion of the relevant theory and hypotheses; brief discussion of data and methodology; the results; discussion and conclusion; and appendices.

II. Theory and Hypothesis

A. Theory

There is tremendous tension in the literature regarding the factors that drive economic growth. Inasmuch as there is some consensus in the growth literature that trade and economic factors, inclusive of export diversification, are associated with faster growth and that the relationship between export diversification and growth is economically large, there are other perspectives that also hold prominence in the empirical literature. In this regard, a second perspective is that location and climate have large effects on income levels and income growth through their effects on transportation costs, disease burden, and agricultural productivity among other channels [3], [16]. A third perspective is that the quality of institutions in a country (inclusive of rule of law and bureaucratic corruption) are also important determinants of growth which matter more than both the trade and economic factors and the geographic factors [13], [17], [18]. Finally, there are other economists who take a more moderate approach in arguing that differing factors matter depending upon a country's level

of income or development [19]-[21].

The literature suggests that the current level of income and development observed in developing countries was greatly influenced by the economic theories and development strategies that prevailed at a given time. In this regard, as former colonies located throughout Africa, Latin America, the Caribbean, and Asia struggled to develop their economies during the early 1960s and 1970s, Europe and the other developed countries commissioned economists to formulate strategies, analogous to the Marshall Plan, to facilitate growth and development of their backward and poverty-stricken former colonies [22]. It was against this backdrop that various economic growth and development theories gained prominence beginning with Linear Stages of Growth theory (1950s) followed by Structuralism and Dependency theories (1950s–1970s), Neoclassical theory (1960s–1980s) and most recently, New Growth theories (Endogenous and Exogenous) in the 1990s. Based on these theories, various development strategies emerged which directly impacted upon the export diversification and growth experiences of many developing countries.

For instance, prior to WWII, the prevailing development strategy in many developing countries and particularly in Latin America, Africa, and South Asia was free trade, premised on Adam Smith and David Ricardo's classical trade theories of comparative advantage, specialization, and international labor division [4]. Following WWII, and heavily influenced by the 1950 Prebisch-Singer hypothesis, the development strategy shifted in favor of import substitution (premised on structuralism and dependency theories) coupled with extensive use of restrictive trade policies to drive development [4]. However, by the mid-1980s, in light of the dismal economic performance of many developing countries that implemented import substitution and restrictive trade policies in the 1960s and 1970s, in contrast to the success story of high-performing East Asian economies that adopted export-led growth policies, the primary development paradigm again undertook a major shift from import substitution-led growth to that of export-led growth and openness to international markets [4], [5]. Despite the major paradigm shift toward export-led growth policies, virtually no research has been undertaken to assess the degree to which the export structures of developing countries in regions such as Latin American and the Caribbean have, in fact, diversified [5].

Meanwhile, more recent theories suggest that countries pursue diversification premised on innovation as opposed to comparative advantage [23], [24]. However, there is the recognition that while positive outcomes lead to quick adoption in the marketplace, loss outcomes are personalized to the entrepreneur which tend to dissuade/discourage risk-taking, thereby retarding industry expansion and diversification [23]. These theories thusly suggest that government has a critical role to play in supporting export diversification and innovation by supporting research and development, thereby offsetting the losses experienced at the individual level.

Another prominent theory that impacts this study is the Imbs and Wacziarg [14] hypothesis which postulates that countries grow through stages of diversification which follows a U-shaped pattern. At low-income levels, countries specialize; then, as they move along the development continuum and their incomes increase, they diversify their economic base. Further, these countries tend to stay in the diversifying stage until their income reaches a threshold level, which according to the Imbs and Wacziarg [14] study is at around $9K. At this income threshold, economies tend to return to a pattern of re-specialization as they focus on producing higher-level products.

Further, a factor-endowment theory of trade as exemplified by insights from the theory of comparative advantage and Hecksher-Ohlin theory of trade [25], [26] would suggest that for SIDS, the relationship between export diversification and economic growth would be positive as SIDS would export those products and services in which it has potentially a comparative advantage, based on specific factor endowments. However, SIDS naturally have some physical and resource limitations that, if further fragmented due to diversification policies, would diminish or even crowd out the effectiveness of unique factor endowments and as a consequence, this will come to hurt trade and therefore economic growth.

Finally, as this study is focused on the export diversification-economic growth nexus within the context of SIDS, a literature review on the effect of demographic changes on economic growth was conducted which found that country size, as a determinant of economic growth has received limited attention. One reason offered for the limited attention is that the traditional measures of country size (population or land area) used alone in growth regressions, generally do not have much explanatory power [27]. While theoretical studies generally agree that the size of larger countries is economically advantageous for growth, there is no consensus in the empirical literature. For instance, in a highly cited study, Rose [28], using panel data for 200 countries over forty years, finds no evidence that country size matters for economic outcomes. Conversely, Alouini and Hubert [29], using multiple measures for country size (including population, GDP and arable land) contradicted Rose [28], finding a significant negative conditional correlation between country size and GDP growth for all countries. Similarly, Alesina *et al.* [27], while not indicating the direction of impact, also find that size matters for economic performance. The lack of consensus on the effect of size extends to small states. While some researchers find no empirical evidence of a systematic negative relationship between small size and growth despite a priori expectation [30], [31], others find no consensus in the empirical studies on the effects of country size on economic growth for small states [32].

B. Hypotheses

Based on the conceptual arguments presented above, we hypothesize the following:

H_1 Export diversification has a positive effect on economic growth.

H_2 SIDS are generally less diversified than non-SIDS countries and the export concentration observed in SIDS negatively affects (hinders) their economic growth.

H_3 Country size positively affects the export diversification and economic growth experience of countries.

III. Data and Methodology

A. Data

In this section, we briefly describe the data used in the paper. We use annual data on 100 countries inclusive of 32 SIDS, 10 Small Advanced States (SAS), 29 Other Advanced States (OAS) and 29 Other Developing States (ODS) (see Appendix B) spanning the 46-year period from 1970 to 2015. Although our sample data spans 1970 to 2015, which is reflected in the descriptive statistics, due to the unavailability of data on some variables required for the empirical models, only data on 69 countries inclusive of 14 SIDS, five (5) SAS, 27 OAS and 23 ODS from 1995 to 2007 are utilized in the econometric models. In addition, some countries have gaps in the data available throughout the sample. Unfortunately, this is a consequence of including many developing countries inclusive of small island states in the sample. Our final sample consists of an unbalanced panel of 69 countries with between 1 and 12 years of complete data responses for each country with a total of 652 country-year observations. The fact that the panel is unbalanced does not cause any issues in the estimation.

1) Dependent variable

Based on the literature review, the natural log of GDP per capita (in GDP per capita) is used as the dependent variable. The source for this data is UNCTAD [33].

2) Independent variables

Our key independent variable of interest is export diversification or the variable used in the empirical analysis, export concentration. This variable is the Theil index, a concentration index used to measure changes in a country's export structure, to assess the extent of export diversification [34]. The index is inversely related to the degree of diversification: it is zero if exports are equally distributed among n export lines (i.e., perfect diversification) and it achieves its maximum value, $ln(n)$, if all exports are concentrated in a single export line, while the export in other lines is equal to 0 (i.e., perfect concentration). Based on the literature, increases in export concentration generally retards economic growth. The source for this data is the IMF database.

3) Control variables

Based on empirical evidence, other variables that promote economic growth include rule of law, investment, favorable movements in the terms of trade, higher education, increased life expectancy and increased international openness while the factors that inhibit economic growth are government consumption to GDP, national debt to GDP, and excessive exchange rate volatility and overvaluation. While there is some consensus in the literature that increasing population growth rates retard economic growth, some researchers have found that where the growth rate of the productive sector of the population outstrips the growth rate of the overall population, the net impact is favorable for economic growth. Similarly, the literature is unsettled on the impact of population size on economic growth although the theoretical literature suggests that larger population supports economic growth. There is some consensus in the literature that foreign direct investment retards export diversification; however, the literature is less clear on its impact on economic growth. See Appendix D for definitions and data sources.

B. Methodology

To analyze the data, we adopted a feasible generalized least squares (FGLS) specification. This procedure was chosen as several significant problems were observed among the panels. A Breusch-Pagan LM test revealed significant cross-sectional dependence ($\chi^2(2135) = 7866$, $p < 0.001$). A Woolridge test revealed significant serial correlation among the idiosyncratic error terms ($\chi^2(1) = 231.7$, $p < 0.001$). And a Breusch-Pagan test revealed significant heteroskedasticity ($BP(78) = 915.72$, $p < 0.001$). Therefore, we opted to utilize FGLS regression models to analyze the data. Below are the specific econometric models that are tested.

We use the country fixed effect panel models to examine the relationship between export concentration and economic growth. Thus, we estimate the following economic growth equation:

Model 1:

$$\ln(\text{GDPpc}_{i,t}) = \beta_0 + \beta_1 \text{EXPORT\_CON}_{i,t} + \boldsymbol{X}_{i,t}\,\boldsymbol{\Gamma} + \gamma_i + \varepsilon_{i,t.} \quad (1)$$

where $ln(\text{GDPpc}_{i,t})$ denotes the natural log of GDP per capita in period t for country i; $\text{EXPORT\_CON}_{i,t}$ is the Theil Index of export concentration, $\boldsymbol{X}_{i,t}$ is a vector of the control variables that are potential determinants of growth (i.e., trade openness, investment, secondary enrollment ratio, total population, foreign direct investment, government consumption to GDP, debt to GDP, exchange rate and male life expectancy), $\boldsymbol{\Gamma}$ is a vector of coefficients on the controls, γ_i represents country fixed effects to account for omitted time-invariant country-level variables that could affect economic growth, and $\varepsilon_{i,t}$ is the model residuals. It is important to point out that the relation between the independent variables and the dependent variable in the country fixed effects model is estimated using the within-country estimator. That is, the model estimates the *change* in the dependent variable due to a unit *change* in the independent variables, within countries. Consequently, the dependent variable is the level of GDP per capita, but the estimated relation is interpreted as the impact on the change in $\ln(\text{GDPpc}_{i,t})$ or growth rate.

We then consider the fact that previous empirical studies find a non-linear, U-shaped relationship between export diversification and economic growth. So, to test for non-linearity in the export diversification-economic growth relationship, we add a quadratic term for EXPORT_CON. Accordingly, we use a country fixed-effect model that estimates the following equation:

Model 2:

$$\ln(\text{GDPpc}_{i,t}) = \beta_0 + \beta_1 \text{EXPORT\_CON}_{i,t} + \beta_2 \text{EXPORT\_CON}^2_{i,t} + \boldsymbol{X}_{i,t}\,\boldsymbol{\Gamma} + \gamma_i + \varepsilon_{i,t.} \quad (2)$$

where all variables are as previously described.

Finally, the theoretical literature suggests that a defining factor for SIDS, relative to other countries, is their small population size, which presents a diversification challenges due to economies of scale constraints. Accordingly, we

modify Model 2 by adding an interaction term between export concentration and population to estimate the following equation:

Model 3:

$$\ln(GDPpc_{i,t}) = \beta_0 + \beta_1 EXPORT\_CON_{i,t} + \beta_2 EXPORT\_CON^2_{i,t} + \beta_3 POP + \beta_4 EXPORT\_CON_{i,t} * POP_{i,t} + \beta_5 EXPORT\_CON^2_{i,t} * POP_{i,t} + \boldsymbol{X}_{i,t}\boldsymbol{\Gamma} + \gamma_i + \varepsilon_{i,t..} \quad (3)$$

where all variables are as previously described.

IV. Results

A. Summary Statistics

Trends in export diversification and economic growth of SIDS

Little or no attention has been given to the widening gap in the export development and diversification experience of SIDs relative to non-SIDS. Over the last 70 years, world exports grew more than 300-fold between 1948 and 2014 from $59 billion to $18.5 trillion (Appendix E), with advanced economies in Europe, North America, Oceania, and Asia dominating world export trade, while developing economies of Africa, Latin America, and The Caribbean precipitously lost ground. In 2014, exports emanating from advanced economies accounted for 51% of total exports (down from 66% in 1948) while exports from developing economies grew to 45% (up from 32% in 1948) during the same period. However, the impressive gains achieved by developing economies occurred exclusively within Asian economies whose exports accounted for all of the gains realized within the developing economies group. Concomitantly, exports from the developing economies of Africa, Latin America, and The Caribbean, inclusive of many SIDS, deteriorated from a high of 20% in 1948 to less than 9% by 2014.

TABLE I: Export Diversification Trends-Country Classification, 1970–2015

	All Countries					
Period	gdp _ percap gwth	Exports (% GDP)	Export_ Div	No. of Products	No. of Partners	HHI_Mkt Con
1970-74	3.79	22.31	3.49	na	na	na
1975-79	2.89	27.29	3.42	na	na	na
1980-84	1.12	27.29	3.39	na	na	na
1985-89	2.55	23.75	3.30	3,539	155	0.26
1990-94	1.43	23.05	3.20	3,279	148	0.21
1995-99	2.50	25.46	3.10	2,980	143	0.15
2000-04	2.46	28.91	3.18	2,749	147	0.16
2005-07	3.79	31.85	3.21	2,771	151	0.15
2005-09	1.93	31.01	3.18	2,775	153	0.15
2010-15	1.51	30.51	3.27	2,868	161	0.13

TABLE II. Export Diversification Trends

Table 2A. Export Diversification Trends - Country Classification - 1970-2015

	SIDS						SAS						ODS						OAS					
Period	gdp _ percap gwth	Exports (% GDP)	Export_ Div	No. of Products	No. of Partners	HHI_Mkt Con	gdp _ percap gwth	Exports (% GDP)	Export_ Div	No. of Products	No. of Partners	HHI_Mkt Con	gdp _ percap gwth	Exports (% GDP)	Export_ Div	No. of Products	No. of Partners	HHI_Mkt Con	gdp _ percap gwth	Exports (% GDP)	Export_ Div	No. of Products	No. of Partners	HHI_Mkt Con
1970-74	3.75	24.64	4.43	na	na	na	3.82	29.81	3.46	na	na	na	3.68	19.14	3.86	na	na	na	3.96	19.74	1.73	na	na	na
1975-79	2.84	32.54	4.33	na	na	na	4.19	36.18	3.28	na	na	na	2.73	23.02	3.81	na	na	na	2.61	21.80	1.70	na	na	na
1980-84	1.04	29.31	4.18	na	na	na	2.23	33.29	3.25	na	na	na	0.54	25.18	3.84	na	na	na	1.43	24.47	1.75	na	na	na
1985-89	2.89	22.23	4.09	na	na	0.26	3.66	32.53	3.44	2,417	109	0.14	1.18	22.31	3.52	2,576	136	0.25	3.16	23.72	1.77	4,291	176	0.31
1990-94	0.97	20.31	4.10	812	55	0.36	2.11	32.37	3.46	2,958	129	0.14	2.03	22.85	3.28	3,037	144	0.21	1.08	23.05	1.80	4,394	189	0.16
1995-99	2.29	19.31	4.05	705	51	0.25	3.38	33.79	3.44	2,704	142	0.11	1.69	26.71	3.11	3,257	157	0.15	3.25	28.21	1.82	4,272	189	0.10
2000-04	1.41	19.84	4.11	771	60	0.26	1.98	35.93	3.63	2,619	151	0.10	3.43	32.75	3.17	3,108	171	0.14	2.80	32.79	1.95	4,308	204	0.09
2005-07	3.43	22.83	4.14	805	63	0.25	3.22	36.29	3.72	2,568	156	0.12	4.69	35.93	3.23	3,335	180	0.12	3.48	36.35	1.94	4,251	209	0.08
2005-09	1.95	21.73	4.08	828	64	0.25	0.99	35.35	3.67	2,599	159	0.12	3.10	35.00	3.23	3,296	182	0.12	1.05	35.95	1.93	4,203	209	0.08
2010-15	1.31	17.76	4.07	1,023	73	0.22	1.43	32.70	3.76	2,450	159	0.12	2.36	34.54	3.31	3,271	187	0.10	0.90	40.14	2.13	4,187	213	0.09

Table 2B. Export Diversification Trends - By Region - 1970-2015

	Europe						North America						Asia						Latin America					
Period	gdp _ percap gwth	Exports (% GDP)	Export_ Div	No. of Products	No. of Partners	HHI_Mkt Con	gdp _ percap gwth	Exports (% GDP)	Export_ Div	No. of Products	No. of Partners	HHI_Mkt Con	gdp _ percap gwth	Exports (% GDP)	Export_ Div	No. of Products	No. of Partners	HHI_Mkt Con	gdp _ percap gwth	Exports (% GDP)	Export_ Div	No. of Products	No. of Partners	HHI_Mkt Con
1970-74	4.52	22.07	1.86	NA	NA	NA	2.96	12.08	1.81	NA	NA	NA	3.52	21.62	3.95	NA	NA	NA	3.85	10.82	3.4	NA	NA	NA
1975-79	3.29	26.33	1.87	NA	NA	NA	2.56	13.77	1.77	NA	NA	NA	3.23	25.24	3.81	NA	NA	NA	1.87	11.69	3.29	NA	NA	NA
1980-84	1.41	29.82	1.94	NA	NA	NA	1.32	15.2	1.69	NA	NA	NA	1.28	26.08	3.69	NA	NA	NA	-1.2	13.59	3.45	NA	NA	NA
1985-89	2.86	28.96	1.94	3,474	159	0.28	2.52	14.39	1.75	4,578	181	NA	2.34	22.87	3.47	3,211	145	0.26	-0.38	12.74	3.03	3,978	174	0.11
1990-94	0.34	26.6	1.99	3,841	175	0.16	0.72	15.26	1.72	4,813	194	0.10	3.64	25.48	3.30	3,046	148	0.18	1.86	12.78	2.79	3,553	148	0.28
1995-99	3.05	32.01	2.00	3,891	177	0.09	2.68	20.38	1.73	4,799	205	0.13	2.72	29.38	3.18	3,318	169	0.11	0.56	14.24	2.71	3,535	147	0.25
2000-04	3.34	36.92	2.13	3,971	193	0.09	1.86	20.09	1.82	4,766	218	0.19	3.35	35.54	3.25	3,001	180	0.11	1.02	18.24	2.84	3,649	164	0.27
2005-07	4.11	39.01	2.09	3,937	199	0.08	1.58	18.52	1.78	4,690	220	0.13	3.88	39.35	3.32	3,226	186	0.1	5.29	22.14	2.95	3,743	178	0.24
2005-09	1.37	38.51	2.08	3,905	201	0.08	0.05	17.96	1.78	4,630	220	0.13	2.55	38.58	3.29	3,198	187	0.10	3.24	21.07	3	3,642	178	0.23
2010-15	1.04	43.39	2.25	3,918	205	0.07	1.34	17.21	1.97	4,507	221	0.20	2.63	37.96	3.25	3,206	194	0.09	1.71	18.75	3.34	3,435	177	0.19

Table 2B. Export Diversification Trends - By Region - 1970 -2015 (Continued)

	Caribbean Region						Pacific Region						Indian Ocean Region						African Region					
Period	gdp _ percap gwth	Exports (% GDP)	Export_ Div	No. of Products	No. of Partners	HHI_Mkt Con	gdp _ percap gwth	Exports (% GDP)	Export_ Div	No. of Products	No. of Partners	HHI_Mkt Con	gdp _ percap gwth	Exports (% GDP)	Export_ Div	No. of Products	No. of Partners	HHI_Mkt Con	gdp _ percap gwth	Exports (% GDP)	Export_ Div	No. of Products	No. of Partners	HHI_Mkt Con
1970-74	3.07	30.1	4.23	NA	NA	NA	5.02	24.29	4.73	NA	NA	NA	4.61	30.59	4.39	NA	NA	NA	2.17	10.82	4	NA	NA	NA
1975-79	3.6	43.14	4.06	NA	NA	NA	0.35	23.99	4.63	NA	NA	NA	4.72	36.93	4.11	NA	NA	NA	2.24	13.6	4.32	NA	NA	NA
1980-84	1.81	37.24	3.97	NA	NA	NA	-0.36	21.25	4.4	NA	NA	NA	3.4	39.3	4.05	NA	NA	NA	-0.36	11.49	4.54	NA	NA	NA
1985-89	3.74	25.04	4.01	NA	NA	NA	1.55	19.17	4.18	NA	NA	NA	4.37	42.31	4.09	4,822	118	0.11	1.58	9.91	4.41	NA	NA	0.26
1990-94	0.29	22.78	3.97	799	54	0.33	1.5	16.67	4.33	86	31	0.18	3.56	40.54	4.12	3,439	105	0.18	0.27	9.31	4.15	3,870	169	0.36
1995-99	2.88	20.8	3.9	833	56	0.20	0.59	17.26	4.44	478	34	0.35	3.43	39.92	4.01	1,370	69	0.18	1.66	10.65	3.82	1,970	118	0.22
2000-04	1.76	20.77	4.03	931	72	0.25	0.47	17.25	4.32	735	49	0.27	1.63	46.38	4.33	1,506	82	0.16	2.51	12.75	3.74	1,406	88	0.24
2005-07	3.59	25.82	4.16	964	76	0.24	2.04	17.39	4.34	668	47	0.26	4.94	52.19	3.99	1,524	78	0.12	4.01	13.88	3.94	1,659	102	0.25
2005-09	1.71	24.22	4.05	1,007	78	0.25	0.99	16.61	4.31	674	49	0.25	3.14	50.5	3.99	1,555	81	0.12	3.27	13.88	4	1,769	111	0.23
2010-15	0.64	17.63	4.01	1,252	83	0.23	1.37	16.22	4.24	804	58	0.24	3.31	43.15	4.32	1,553	104	0.09	1.34	13.61	4.12	1,983	122	0.18

As shown in Table I, while export diversification generally improved across all key export performance indicators for all countries during the 1970–2015 period, Table IIA and Table IIB reveal that the export development and diversification experience of SIDS, relative to other groups (by country classification and geographic location), has consistently lagged behind the other three groups. As shown in Table IIA, while the share of export to GDP for SAS, ODS and OAS expanded during the 1970-2015 period from 29.81%, 19.14%, and 19.74% respectively to 32.7%, 34.54%, and 40.14% respectively, the share of export to GDP for the average SIDS economy actually contracted from 24.64% to 17.17%.

Likewise, on the other indicators of export diversification reflected in Table IIA and Table IIB, the SIDS performance figures consistently and materially lag behind the NON-SIDS groups. Unsurprisingly then, the gap in the export development and diversification experience of SIDs relative to the other economies is pronounced, both in terms of country classification and geographic distribution.

A direct comparison of SIDs to SAS as shown in Table IIA indicates that while the number of export products and trading partners for SIDs improved from 812 to 1,023 and 55 to 73, respectively, suggesting that SIDS expanded their export base and are less reliant on one trading partner (or a group of trading partners), the SAS economies significantly outperformed the SIDs economies with the number of export products and trading partners ranging from 2,417 to 2,958 and 109 to 159, respectively. Similar gaps exist among SIDS versus the non-SIDS groups. Likewise, from a geographic perspective, as shown in Table IIB, the economies located in Europe, North America, Asia and Latin America, which represent primarily OAS and ODS economies, reflect higher levels of export diversification across all indicators as compared to SIDS economies which are primarily located in the Caribbean, Pacific, Indian Ocean and African regions.

B. Descriptive Statistics

Table III provides averages of economic growth, GDP per capita, export concentration and other variables for 1970–2015 as well as 1995–2007, the sample period used in the empirical models below. Similar to the preliminary findings presented in the trend analysis above, the summary statistics confirm that SIDS underperform other country groupings in economic growth, income, and export diversification. Hence, there is reason to think that the patterns observed in the trend and summary statistics have significant implications for the export diversification-economic growth experience of SIDS.

TABLE III: SUMMARY STATISTICS

	1970 - 2015 Averages				
Variables	All countries	SIDS	SAS	ODS	OAS
GDP growth rate	2.19	1.99	2.59	2.29	2.16
GDP per capita	14,367.21	5,006.84	29,467.80	7,175.46	27,560.95
Total population	45,947,757	1,308,713	1,796,058	127,466,040	31,722,049
Life expectancy - Males	67.37	63.99	73.72	64.24	72.20
Secondary enrollment ratio	78.39	65.10	91.90	63.48	98.03
Invest_to_Real GDP per capita	26.23	28.71	32.52	19.49	28.72
Govt exp_to_ GDP	26.78	22.90	33.54	27.25	28.44
Debt to GDP	50.78	56.16	62.95	42.57	50.25
FDI	6.09	4.35	34.73	1.77	2.57
Exchange rate	190.34	123.80	6.23	463.14	44.69
Theil index	3.28	4.16	3.49	3.45	1.86
Openess	80.71	105.22	119.06	60.37	61.98
Terms of trade	111.48	104.98	101.44	125.84	100.65
Exports to GDP	26.78	22.90	33.54	27.25	28.44
HHI market concentration index	0.15	0.25	0.12	0.14	0.10
Number of products exported	2,893.39	846.37	2,622.59	3,201.48	4,259.16
Number of trading partners	151.44	62.94	149.31	171.22	201.98

	1995 - 2007 Averages				
Variables	All Countries	SIDS	SAS	ODS	OAS
GDP growth rate	2.78	2.21	2.80	3.05	3.13
GDP per capita	16,476.01	5,890.13	35,746.82	6,910.54	31,233.93
Total population	51,479,663	1,467,330	2,026,350	145,038,583	33,385,803
Life expectancy - Males	69.47	66.16	75.79	66.65	73.94
Secondary enrollment ratio	89.73	78.38	101.48	74.39	106.07
Invest_to_Real GDP per capita	26.68	30.54	30.68	18.72	29.65
Govt exp_to_ GDP	28.26	20.32	35.19	31.16	31.85
Debt to GDP	55.95	70.75	61.68	43.86	52.64
FDI	8.02	5.22	44.72	2.77	4.07
Exchange rate	424.83	319.03	10.48	1,026.83	54.58
Theil index	3.16	4.09	3.57	3.16	1.90
Openess	93.71	110.27	133.44	73.75	85.30
Terms of trade	102.75	98.71	98.45	109.23	100.74
Exports to GDP	28.26	20.32	35.19	31.16	31.85
HHI market concentration index	0.15	0.26	0.11	0.14	0.09
Number of products exported	2,832.37	762.12	2,638.40	3,215.29	4,281.35
Number of trading partners	146.35	58.24	148.74	168.30	199.87

C. Empirical Results

While the study examines the relationship between export diversification and economic growth, the Theil concentration index, which is the inverse of diversification, is used in the econometric models that follow. As previously noted, the results are based on a total of 69 countries over the period 1995–2007.

D. Evidence from a Linear Model of All Countries

Table IV shows Model 1, the results from a within ("fixed effects") FGLS model, with country effects in which the dependent variable is ln (GDP per capita), the primary independent variables is export concentration, and the control variables are those discussed in the previous section. The utilized panel consisted of 69 economies with between 1 and 12 years of complete responses each. The total number of country-year observations is 652. From the model results below, we observe that the relationship between export concentration and economic growth in the full sample is significant and negative. The evidence indicates that for every unit increase in export concentration, there is a roughly 2.5%[1] decrease in GDP per capita, all other variables being held constant. Stated differently, this result supports the claim that export diversification fosters economic growth across a broad range of countries that are different in income levels, level of export diversification, population size and geographic location. A significant effect was found for all control variables except log total population and government expenditure to GDP.

Among the control variables, it is noteworthy that for every one-year increase in male life expectancy, there is an estimated 2.8% increase in GDP per capita which, based on the literature, may suggest greater productivity of the workforce. Both the exchange rate and debt to GDP independent variables have the expected negative sign.

TABLE IV: FGLS RESULTS FOR MODEL 1

Unbalanced panel: n=69, T=1-12, N=652

	Beta	SE	z-value	p-value
export_concentration	-0.02526	0.0024	-10.58	0.0000 ***
lag(investment)	0.00246	0.0001	19.91	0.0000 ***
lag(FDI)	-0.00016	0.0000	-8.32	0.0000 ***
sec_enroll_ratio	0.00088	0.0001	9.24	0.0000 ***
trade_openness	0.00188	0.0001	22.44	0.0000 ***
exchange_rate	-0.00012	0.0000	-15.62	0.0000 ***
pop_total_log	0.01182	0.0501	0.24	0.8135
life_exp_male	0.02763	0.0012	22.67	0.0000 ***
govt_exp	0.00007	0.0003	0.23	0.8187
debt_gdp	-0.00097	0.0000	-27.92	0.0000 ***

Signif. Codes: 0 '***' 001 '**' 0.01 '*' 0.05 '.'
Total Sum of Squares: 1033.9
Residual Sum of Squares: 4.914

E. Evidence from a Model with Quadratic Export Concentration

A quadratic term for export concentration was added to the model (Model 2) applied to the overall sample of countries to explore possible quadratic non-linearity in the relationship between export concentration and economic growth. The

[1] Because the dependent variable is ln(GDP per capita), the reported coefficient estimate of -0.02526 requires some manipulation to obtain the effect of the independent variable on GDP per capita, the dependent variable. Hence, compute: 100*(exp(beta)-1) to get the 2.5% change in GDP per capita, for a unit increase of the independent variable.

results of this model fit are provided in Table V. In this table, we observe that the quadratic term is insignificant (*p*-value = 0.612), suggesting that there is not a non-linear relationship between export concentration and log GDP per capita in the full sample when controlling for the other variables in the model. Somewhat surprisingly, the inclusion of a possible nonlinear effect also resulted in the insignificance of the linear component of the export concentration variable, perhaps because for this sample of countries both components of export concentration are highly correlated, resulting in multicollinearity. Main effects were significant for the remaining independent variables with the exception of lagged FDI and secondary enrollment rate. It is interesting that with the inclusion of the quadratic export concentration variable, the relative contribution of the log total population variable to economic growth jumps significantly, suggesting that population size factors prominently in the export diversification-economic growth equation. Similarly, the model suggests that increases in male life expectancy also positively impacts economic growth. Negative effects were observed for debt to GDP, government expenditure to GDP and exchange rates as expected.

TABLE V: FGLS RESULTS FOR MODEL 2 WITH QUADRATIC EXPORT CONCENTRATION

Unbalanced panel: n=69, T=1-12, N=652

	Beta	SE	z-value	p-value	
export_concentration	0.01549	0.0169	0.92	0.3594	
I(export_concentration^2)	-0.00139	0.0027	-0.51	0.6116	
lag(investment)	0.00318	0.0003	10.79	0.0000	***
lag(FDI)	0.00001	0.0001	0.17	0.8635	
sec_enroll_ratio	0.00049	0.0003	1.89	0.0592	
trade_openness	0.00188	0.0002	12.48	0.0000	***
exchange_rate	-0.00020	0.0000	-7.28	0.0000	***
pop_total_log	0.27602	0.0692	3.99	0.0001	***
life_exp_male	0.05759	0.0022	26.18	0.0000	***
govt_exp	-0.00515	0.0007	-7.62	0.0000	***
debt_gdp	-0.00101	0.0001	-9.49	0.0000	***

Signif. Codes: 0 '***' 001 '**' 0.01 '*' 0.05 '.'
Total Sum of Squares: 1033.9
Residual Sum of Squares: 3.8906

F. Impact of Export Concentration on SIDS

Thus far, the evidence indicates that export concentration has a negative, statistically significant, and economically meaningful impact on economic growth. As noted, the main focus is on the relation between economic growth and export concentration for SIDS. However, because we estimate a fixed effects panel model, we am unable to use an interaction term between export concentration and a SIDS dummy variable to explore whether the impact of export concentration is different for the SIDS. That is, since the designation of a SIDS does not vary over the sample period, the effect of a SIDS dummy variable cannot be distinguished from the effect of other time-invariant variables such as the country fixed effects. Therefore, to address the question of whether the impact of export concentration is different for SIDS, we re-estimate Model 2, with the quadratic term, for SIDS and non-SIDS, respectively.

Table 6 shows a within ("fixed effects") FGLS model, with country fixed effects, for log GDP per capita on export concentration and the control variables mentioned in the previous section. Since the panel was restricted to SIDS economies, the panel consists of 14 countries with up to 11 years of complete responses each. The total number of observations was 93. In this table, we observe that, as expected, the linear export concentration term is negative and highly significant, therefore indicating that, on average, export concentration retards economic growth. Interestingly, for the sample of SIDS, the quadratic term is positive and significant ($p < 0.001$) and, as would be expected, smaller in magnitude than the linear coefficient estimate on export concentration. Thus, in the subsample of SIDS, the study finds a nonlinear, U-shaped relationship, whereby SIDS that have exports concentrated in one industry or those where exports are spread across a wide array of industries achieve better results in boosting economic growth.

For the SIDS nonlinear model reflected in Table VI, the turning or inflection point of the U shape, where the value of economic growth begins to change direction, occurs when the independent variable (Theil concentration index) reaches approximately 3.90.[2] So, in the context of SIDS where their economies likely start with highly concentrated exports, growth would tend to decline at first as the economy achieves export diversification and then begin to increase after the Theil ratio of export concentration goes below 3.90. The results suggest that the benefits of export diversification to SIDs is economically large because of the large linear coefficient estimate on the concentration index (-0.2217), which is only offset by the relatively small coefficient estimate on the quadratic term (0.0284).

TABLE VI: FGLS RESULTS FOR MODEL 2- WITH QUADRATIC- SIDS

Unbalanced panel: n= 14, T= 1-11, N= 93

	Beta	SE	z-value	p-value	
export_concentration	-0.22168	0.0676	-3.28	0.0010	**
I(export_concentration^2)	0.02837	0.0083	3.40	0.0007	***
lag(investment)	0.00116	0.0005	2.54	0.0110	*
lag(FDI)	0.00623	0.0007	8.62	0.0000	***
sec_enroll_ratio	-0.00257	0.0008	-3.10	0.0019	**
trade_openness	-0.00069	0.0003	-2.27	0.0231	*
exchange_rate	0.00069	0.0003	2.13	0.0330	*
debt_gdp	-0.00042	0.0003	-1.31	0.1893	
govt_exp	-0.00686	0.0012	-5.85	0.0000	***
pop_total_log	-0.02235	0.1969	-0.11	0.9096	
life_exp_male	0.07218	0.0113	6.38	0.0000	***

Signif. Codes: 0 '***' 001 '**' 0.01 '*' 0.05 '.'
Total Sum of Squares: 69.177
Residual Sum of Squares: 0.38732

Among the control variables, debt-to-GDP and log total population were the only insignificant control variables. Consistent with literature and as seen in the previous model, negative effects were observed for debt to GDP and government expenditure relative to log GDP per capita. Further, trade openness, which was found to have negative effects on economic growth for SIDS, is particularly interesting because the theoretical literature on the impact of trade openness on growth remains lively and unsettled, particularly as it relates to SIDS with some theorists postulating a positive relationship while others suggesting a negative relationship. Finally, education and log total

[2] Given that the coefficient on export concentration = -0.2217 and on export_concentration^2 = 0.0284, the turning point is at a concentration index of approximately -(-0.2217)/(2*0.0284) = 3.90.

population were both observed to have negative effects on economic growth, a finding which is unexpected and deserves further study. To examine the nonlinearity further Fig. 1 plots changes in ln(GDP per capita) against changes in export concentration to illustrate the approximate overall impact of both the linear and nonlinear components of export concentration on per capita income. The figure indicates that growth declines as export concentration increases from a low level (exports are highly diversified), but when export concentration gets above 3.9 on the Theil index, growth begins to increase. The finding suggests that a SIDS with highly concentrated exports could experience strong economic growth. One concern with concentrated exports for a small state is that concentration is associated with economic instability as the price of or demand for the relatively few items exported could experience significant decline or volatility over time. The concern for the instability in economic growth should induce greater export diversification. The evidence uncovered in this study implies that as the small islands state diversifies its exports there is a decline in growth up to a concentration index of approximately 3.90. However, as the state continues to diversify there is a positive impact on growth.

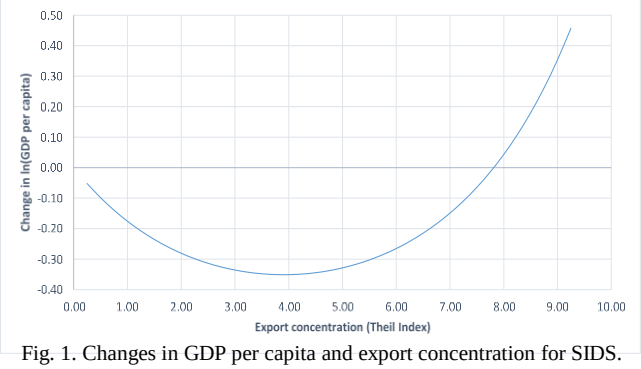


Fig. 1. Changes in GDP per capita and export concentration for SIDS.

G. Impact of Export Concentration on non-SIDS

Table VII reports the results of a within ("fixed effects") FGLS model with country fixed effects for log GDP per capita on export concentration and control variables for non-SIDS countries. The sample consists of a panel of 55 countries with up to 12 years of data. The total number of country-years is 559. In this table, the evidence indicates that all main effects, inclusive of the quadratic term are significant with the quadratic term indicating that a non-linear relationship exists between export concentration and GPD per capita. Similar to the non-linear relationship found in the SIDS model, the nonlinear relationship found in this model is interesting, since the full sample that includes both SIDS and non-SIDS does not find a nonlinear relationship. A comparison of the coefficient estimates on the linear effect of export concentration of these and the results for SIDS (-0.1249 vs -0.2217) suggests that the impact of export diversification on economic growth for SIDs is greater than that for non-SIDS. Further, similar to the SIDS nonlinear model, the turning or inflection point of the U shape, where the value of economic growth begins to change direction for non-SIDS, occurs when the Theil index reaches approximately 3.46.

Consistent with the literature and as seen in the previous model, negative effects are observed for several control variables including foreign exchange, debt to GDP and government expenditure relative to log GDP per capita. Likewise, as reflected in earlier models, with the inclusion of the quadratic export concentration variable, the relative contribution of the log total population features prominently in the export diversification-economic growth equation along with male life expectancy, both of which positively impact economic growth.

Fig. 2 plots changes in ln(GDP per capita) against export concentration. The values in this plot have the same meaning as in the previous section and clearly establish the nonlinear relation. In this figure, we observe that a unit increase in export concentration corresponds to a decrease in GDP per capita up to about 3.50, and then corresponds to an increase in GDP per capita.

TABLE VII: FGLS RESULTS FOR MODEL 2- WITH QUADRATIC- NON-SIDS

Unbalanced panel: n= 55, T= 1-12, N= 559

	Beta	SE	z-value	p-value	
export_concentration	-0.12493	0.0181	-6.90	0.0000	***
I(export_concentration^2)	0.01804	0.0031	5.86	0.0000	***
lag(investment)	0.00283	0.0003	9.17	0.0000	***
lag(FDI)	0.00021	0.0001	3.05	0.0023	**
sec_enroll_ratio	0.00122	0.0003	4.45	0.0000	***
trade_openness	0.00255	0.0001	19.80	0.0000	***
exchange_rate	-0.00019	0.0000	-6.07	0.0000	***
debt_gdp	-0.00070	0.0001	-7.98	0.0000	***
govt_exp	-0.00618	0.0007	-8.92	0.0000	***
pop_total_log	0.41259	0.0639	6.46	0.0000	***
life_exp_male	0.04699	0.0023	20.83	0.0000	***

Signif. Codes: 0 '***' 001 '**' 0.01 '*' 0.05 '.'
Total Sum of Squares: 892.15
Residual Sum of Squares: 3.3525

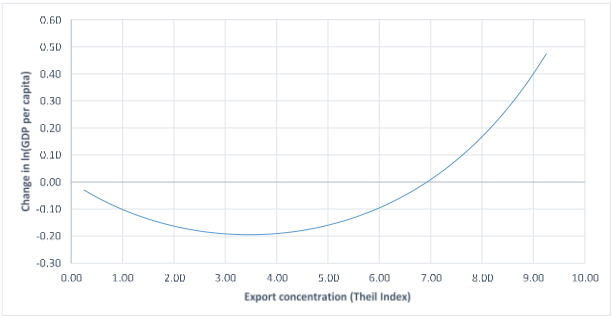


Fig. 1. Changes in GDP per Capita and Export Concentration for Non-SIDS

H. Alternative Specification of the Relation between Export Concentration and Economic Growth

To examine further the impact of concentration on growth for small states we estimate Model 3, which includes an interaction term – export_concentration × pop_total_log. Table 8 shows a within ("fixed effects") FGLS model with country fixed effects for log GDP per capita on export concentration with control variables mentioned in the previous section included. The utilized panel consisted of 69 countries with up to 12 years of data. The total number of observations was 652.

The benefits of export diversification to economic growth is also evident in this model specification, as reflected by the large and significant coefficient estimate on export concentration and the relatively small coefficient estimate on the squared concentration variable. The turning or inflection

point of the U shape, where the value of economic growth begins to change direction occurs when the Theil index reaches approximately 5.29.

The results also indicate that the interaction between log total population and export concentration and between log total population and the square of export concentration are significant. The fact that the coefficient on each of the interactions are of opposite sign to export concentration and squared concentration, respectively, implies that increases in population size partly offset the negative impact of export concentration on economic growth. That is, increases in population compounds the positive effect of export diversification on economic growth. An implication of this finding for SIDS is that because they typically have relatively small populations, even a large *percentage* increase in their population would not necessarily induce significantly greater economic growth through the export diversification channel. Lagged FDI and secondary enrollment ratio were the only non-significant effects. As expected and consistent with earlier models, negative effects were observed for several significant control variables including foreign exchange, debt to GDP and government expenditure relative to log GDP per capita.

TABLE VII: FGLS RESULTS FOR MODEL 3- QUADRATIC & INTERACTIONS

Unbalanced panel: n= 69, T= 1-12, N= 652

	Beta	SE	z-value	p-value	
export_concentration	-0.82053	0.1521	-5.39	0.0000	***
I(export_concentration^2)	0.07757	0.0245	3.16	0.0016	**
pop_total_log	0.31468	0.0764	4.12	0.0000	***
lag(investment)	0.00179	0.0002	7.46	0.0000	***
lag(FDI)	-0.00008	0.0001	-0.97	0.3326	
sec_enroll_ratio	-0.00020	0.0002	-1.15	0.2496	
trade_openness	0.00081	0.0002	5.02	0.0000	***
exchange_rate	-0.00018	0.0000	-4.80	0.0000	***
debt_gdp	-0.00116	0.0001	-9.58	0.0000	***
govt_exp	-0.00785	0.0006	-12.40	0.0000	***
life_exp_male	0.05205	0.0021	24.52	0.0000	***
export_con:pop_total_log	0.05840	0.0102	5.74	0.0000	***
I(export_con^2):pop_total_log	-0.00548	0.0017	-3.31	0.0009	***

Signif. Codes: 0 '***' 001 '**' 0.01 '*' 0.05 '.'
Total Sum of Squares: 1033.9
Residual Sum of Squares: 4.3955

V. DISCUSSION AND CONCLUSION

Despite a growing consensus that export-led growth policies, inclusive of export development and diversification have served as a primary catalyst for sustained economic growth [3], [4], virtually no empirical research has been undertaken to assess the degree to which export structures of developing countries have in fact diversified (Taylor, 2003) and evaluate the associated impact on economic growth. Thus, this study revisits the export diversification-economic growth debate, to specifically examine whether export diversification matters for economic growth within SIDS.

Using panel estimations, our empirical tests find a negative, statistically significant, and economically material nonlinear relation between export concentration and economic growth, thus confirming the importance of export concentration (or conversely export diversification) as a determinant of economic growth. We also find evidence of a differential effect of export concentration on economic growth between SIDS and non-SIDS, with population growth having a moderating effect on the relationship. The findings of the four models estimated in the study follow.

In the first model, we find that the relationship between export concentration and economic growth in the full sample is significant and linear. Further, for every unit increase in export concentration, there is a roughly 2.5% decrease in log GDP per capita, all other variables being held constant. Additionally, when the quadratic term for export concentration is added to the model, we find that there is no non-linear relationship in the full sample. In the second model where the panel is restricted to SIDS economies, we find that the quadratic term is significant indicating a non-linear, U-shaped relationship whereby SIDS that have exports concentrated in one industry or those where exports are spread across a wide array of industries achieve better results in boosting economic growth. Similarly, in the third model where the panel is restricted to NON-SIDS economies, we find that all main effects including the quadratic term are significant with the quadratic term indicating a non-linear relationship between export concentration and log GPD per capita when controlling for the other variables. Furthermore, the non-linear relationship found in both the SIDS and NON-SIDS models is particularly interesting since the full sample did not find a non-linear relationship. Moreover, the benefits of export diversification to economic growth for NON-SIDs while economically large, is not as pronounced as that found for SIDS. Finally, in the fourth model, we find that export concentration and its quadratic term are significant in the presence of the interaction terms. However, while the benefits of export diversification to economic growth is pronounced across all economies, the study finds that the size of the effects of the change for small countries and islands is much larger than for countries with large populations thereby suggesting that export diversification is an effective mechanism to drive economic growth in small island states.

The findings as it relates to the diversification-economic growth nexus is consistent with previous researchers including Al-Marhubi [1], Imbs and Wacziarg [14], Hesse [6] and others who find the relationship to be economically large. However, the moderating effect of population on the export diversification-economic growth relationship is particularly interesting and noteworthy as the debate regarding the relative importance of country size to economic growth continues unabated with some researchers [21], [28], [30]-[32] finding that size does not matter, while others [27], [29] find that it does.

While this study examines the export diversification-economic growth relationship, it does not consider or address the channels through which export diversification supports economic growth although previous researchers including Al-Marhubi [1], Hausmann and Rodrik [24], Agosin [35], Samen [4], and Hesse [7]; Hesse [6] identified several potential channels including portfolio effect, the dynamic benefits associated with successful efforts to diversify comparative advantages, the cost discovery process faced by entrepreneurs and government's important role in industrial growth and structural transformation by promoting entrepreneurship and creating the right incentives to invest in a new range of activities as some potential mechanisms to drive the export diversification-economic growth policy

objective.

The findings of this study have significant policy implications. We demonstrate that export diversification is an effective mechanism to drive economic growth for SIDS. Presumably, greater export diversification has a stabilizing effect on economic output if certain industries tend to experience volatility in their growth. Therefore, export diversification could also be viewed as a risk-reducing mechanism that enhances the robustness of the economies of SIDS against economic or man-made shocks to the economy. That said, there are limits as to how much SIDS can diversify their exports. A natural constraint is their limited resources base, which, if fragmented too extensively in a quest to further increase in export diversification will adversely affect potential economies of scale, erode unique factor endowments (land, human capital, financial capital, etc.) or crowd out funding for activities in which the SIDS has an absolute advantage.

So, what should policymakers in developing countries generally and SIDS in particular do? Should they reposition their export-led growth policies away from specialization premised on comparative advantage? While the study's finding is promising and potentially beneficial to small island states, as poignantly articulated by Al-Marhubi [1], the results should not be interpreted to imply that adding distortions to the domestic economy to promote export diversification will improve long-term growth because distortions that run counter to a country's comparative advantage could have adverse effects on economic efficiency and growth performance. the results suggests that while export diversification is an effective mechanism to drive economic growth in small island states, policymakers should be deliberate and intentional in crafting policies that take account of their unique nation-specific circumstances to frame and implement growth strategies that capitalize upon their strengths and opportunities while simultaneously mitigating existing and potential weaknesses and threats to drive export development, diversification and economic growth.

Future research could benefit from the use of better models and more complete data in the estimation of the effect of export diversification on economic growth among SIDS. Additionally, future studies should (1) refine the categorization and operationalization of the SIDS variable to account for the variation in income over time, (2) take into account that some SIDS have transitioned from developing to advanced economy status during the time period of the study, (3) distinguish between manufactured products, raw materials and services when studying export concentration, (4) incorporate more qualitative research on successful SIDS to shed more light on how they diversified their exports (e.g., Singapore and Ireland), and (5) determine whether there is a pecking order or sequence to the diversification stages (for example, did commodities come first, then manufactured goods, then knowledge-based services?).

Appendix

Appendix A: Upside-down and Pacific-Centered World Map with SIDS by Region

Adapted from "Globalization Challenges for Small Island Developing States", by Augustin, A., 2007.
http://www2.pazifik-infostelle.org/uploads/diplomarbeit_anita_augustin.pdf

Appendix B: 100 Economies Included in Sample

ECONOMY	Country class	Income level	Region	Avg growth rate	GDPpc			Export_Div (Theil)		Export_to_GDP (% of GDP)		No. of Export Partners		No. of Export Products		Population		
				1971-2015	1970	2015	2015/1970	1970	2014	1970	2014	2000	2012	2000	2012	1970	2015	2015 / 1970
Maldives	SIDS	2	7_IOR	4.57	674	5,139	7.63	3.72	5.54	9.19	9.72	23	36	58	29	115,768	409,163	3.53
Mauritius	SIDS	2	7_IOR	4.13	1,273	7,685	6.04	5.85	3.37	35.06	24.53	115	140	2,279	2,557	826,000	1,262,605	1.53
Aruba	SIDS	1	7_CR	4.03	3,490	21,232	6.08	na	4.71		9.77	58	38	na	1,114	59,063	104,341	1.77
St. Kitts	SIDS	2	7_CR	3.78	2,208	12,180	5.52	na	4.35	15.45	6.71	34	na	524	na	44,885	54,288	1.21
Grenada	SIDS	2	7_CR	3.62	1,379	6,931	5.03	3.81	3.93	31.41	4.18	42	na	398	na	94,426	106,823	1.13
Seychelles	SIDS	1	7_IOR	3.57	3,798	15,814	4.16	5.21	5.04	9.62	39.95	57	78	425	321	53,600	93,419	1.74
Domin_Rep	SIDS	2	7_CR	3.28	1,458	5,795	3.97	4.33	2.42	13.40	15.47	na	147	na	2,606	4,503,114	10,528,394	2.34
Dominica	SIDS	2	7_CR	3.15	1,520	6,371	4.19	5.77	2.85	25.62	6.88	46	52	403	682	71,073	73,162	1.03
St. Vincent	SIDS	2	7_CR	2.60	1,742	5,687	3.26	4.90	4.38	16.73	6.60	41	45	603	647	90,452	109,455	1.21
Cuba	SIDS	2	7_CR	2.57	1,938	5,554	2.87	4.67	3.68	18.37	6.02	107	na	1,094	na	8,715,123	11,461,432	1.32
Antigua	SIDS	2	7_CR	2.54	3,509	11,360	3.24	5.28	5.52	32.25	7.74	55	59	1,286	1,046	67,098	99,923	1.49
Cabo Verde	SIDS	3	7_AR	2.48	911	2,903	3.19	3.42	4.48	2.28	4.28	40	75	826	1,352	270,198	532,913	1.97
St. Lucia	SIDS	2	7_CR	2.30	2,055	5,947	2.89	4.47	3.93	38.06	11.43	47	60	654	1,293	104,160	177,206	1.70
Tonga	SIDS	3	7_PR	2.16	1,023	2,716	2.66	4.73	3.17	17.51	4.36	23	43	53	545	84,369	106,364	1.26
Trinidad	SIDS	1	7_CR	2.09	5,655	14,576	2.58	3.86	4.58	58.58	53.42	107	139	2,680	2,431	945,993	1,360,092	1.44
Fiji	SIDS	2	7_PR	1.89	1,947	4,134	2.12	3.92	3.38	32.40	30.72	na	113	na	2,082	520,529	892,149	1.71
Guyana	SIDS	3	7_CR	1.80	1,325	2,634	1.99	4.24	3.92	31.65	37.93	81	107	1,070	1,222	704,934	768,514	1.09
Belize	SIDS	3	7_CR	1.77	1,758	3,969	2.26	4.00	3.55	74.57	34.27	51	67	447	521	122,182	359,288	2.94
Vanuatu	SIDS	3	7_PR	1.70	989	2,024	2.05	4.81	4.41	30.26	7.73	40	na	na	na	85,389	264,603	3.10
Solomon Isl	SIDS	3	7_PR	1.58	711	1,207	1.70	5.00	4.87	24.92	41.61	na	32	na	na	160,290	587,482	3.67
Suriname	SIDS	2	7_CR	1.52	2,989	5,432	1.82	4.43	3.69	40.49	40.94	66	103	633	1,033	371,273	553,208	1.49
Samoa	SIDS	3	7_PR	1.41	1,416	2,520	1.78	4.40	2.80	11.71	6.18		37		446	143,176	193,759	1.35
Sao Tome	SIDS	3	7_AR	1.15	752	1,083	1.44	4.58	4.82	23.54	2.86	10	19	64	136	74,253	195,553	2.63
Fs_Polynesia	SIDS	1	7_PR	0.97	13,341	20,618	1.55	5.02	4.30	6.93	2.82	44	57	680	792	110,495	277,690	2.51
Barbados	SIDS	1	7_CR	0.85	9,948	14,563	1.46	3.19	3.19	18.33	10.90	115	125	1,704	1,756	238,848	284,217	1.19
P_NewGuinea	SIDS	3	7_PR	0.76	1,275	1,539	1.21	3.94	3.83	9.53	39.45	67	85	617	959	2,527,586	7,919,825	3.13
Comoros	SIDS	3	7_IOR	0.70	1,215	1,552	1.28	2.12	4.79	12.42	1.91	18	30	76	99	230,054	777,424	3.38
Bahamas	SIDS	1	7_CR	0.31	18,443	19,979	1.08	3.55	4.14	15.81	9.68	70	66	1,319	1,153	169,354	386,838	2.28
Guinea-Bissau	SIDS	4	7_AR	0.30	433	450	1.04	4.33	5.24	1.32	16.17	na	na	na	na	711,827	1,770,526	2.49
Jamaica	SIDS	3	7_CR	(0.05)	4,068	3,948	0.97	4.40	4.24	21.55	10.45	76	107	1,178	1,572	1,875,381	2,871,934	1.53
Haiti	SIDS	4	7_CR	(0.29)	599	476	0.80	3.63	5.12	9.19	9.77	na	na	na	na	4,708,642	10,711,061	2.27
Kiribati	SIDS	3	7_PR	(0.40)	2,134	1,154	0.54	6.03	6.04	38.80	5.45	na	15	na	39	51,178	112,407	2.20
Singapore	SAS	1	7_IOR	4.77	4,862	38,701	7.96	2.60	3.17	80.94	133.60	216	215	4,653	4,294	2,074,500	5,535,002	2.67
Malta	SAS	1	1	4.48	2,861	19,855	6.94	2.72	3.93	14.87	27.28	130	179	1,630	1,582	302,650	431,874	1.43
Ireland	SAS	1	1	3.98	12,089	63,080	5.22	1.96	2.94	25.45	47.53	201	212	3,782	3,678	2,957,250	4,676,835	1.58
Cyprus	SAS	1	1	2.71	6,243	22,845	3.66	3.42	2.16	17.30	13.53	165	179	2,124	1,714	613,621	1,160,985	1.89
Iceland	SAS	1	1	2.36	21,186	60,505	2.86	4.19	4.07	27.61	29.41	107	125	1,345	1,603	204,438	330,815	1.62
Israel	SAS	1	3	2.09	10,434	25,985	2.49	2.81	2.65	12.81	22.19	162	204	2,552	3,055	2,974,000	8,380,100	2.82
Cayman Isl	SAS	1	7_CR	1.51	26,219	52,877	2.02	3.23	5.82		0.72	na	na	na	na	9,144	59,963	6.56
NewZealand	SAS	1	4	1.32	17,001	30,547	1.80	3.32	2.50	18.82	20.94	190	214	3,831	3,861	2,810,700	4,595,700	1.64
NewCaledonia	SAS	1	7_PR	1.04	21,981	31,774	1.45	5.65	5.29	50.68	15.59	41	73	1,153	1,373	112,000	273,000	2.44
Bermuda	SAS	1	7_CR	0.99	42,337	70,480	1.66	4.29	4.06	30.13	0.39	na	16	na	333	55,000	65,235	1.19
China	ODS	2	3	7.68	147	4,125	28.11	1.75	2.01	2.57	22.23	204	214	4,798	4,414	818,315,000	1,371,220,000	1.68
CHN_Taiwan	ODS	1	3	5.64	1,845	22,381	12.13	na	na	24.69	60.39	na	na	na	na	na	na	na
Malaysia	ODS	2	3	4.25	1,213	7,524	6.20	3.86	2.69	43.65	69.19	206	226	4,188	4,168	10,803,978	30,723,155	2.84
Vietnam	ODS	3	3	4.20	180	1,115	6.20	na	2.64	na	80.67	182	140	1,141	3,536	42,729,000	91,713,300	2.15
Thailand	ODS	3	3	4.12	616	3,814	6.20	3.25	1.96	10.02	55.86	221	223	4,274	4,365	36,884,913	68,657,600	1.86
Indonesia	ODS	3	3	4.10	349	2,038	5.83	3.81	2.21	10.61	19.80	223	213	4,249	3,958	114,834,780	258,162,113	2.25
India	ODS	3	3	3.78	259	1,281	4.94	2.37	2.16	3.40	15.77	212	221	4,501	4,460	553,578,513	1,309,053,980	2.36
Romania	ODS	2	1	3.38	1,583	6,516	4.12	1.92	2.08	14.55	34.98	170	191	3,314	3,948	20,250,398	19,815,481	0.98
Bulgaria	ODS	2	1	3.18	1,321	5,214	3.95	1.98	2.10	22.27	51.56	172	198	3,898	3,753	8,489,574	7,177,991	0.85
Egypt	ODS	3	5	3.07	369	1,538	4.17	3.92	2.65	9.35	9.04	156	169	1,799	2,751	35,046,273	93,778,172	2.68
Chile	ODS	2	3	2.69	3,235	10,069	3.11	4.74	3.51	13.06	29.03	162	179	3,277	3,223	9,563,865	17,762,681	1.86

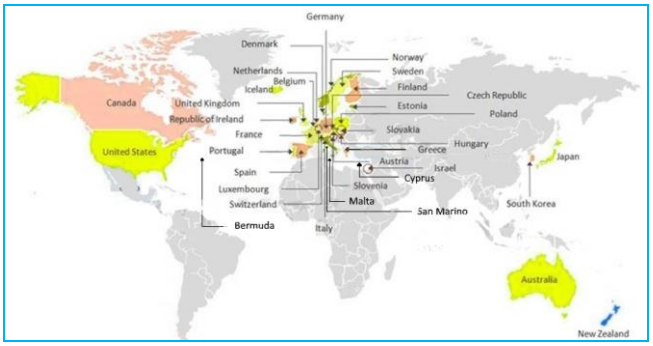
ECONOMY	Country class	Income level	Region	Avg growth rate	GDPpc			Export_Div (Theil)		Export_to_GDP (% of GDP)		No. of Export Partners		No. of Export Products		Population		
				1971-2015	1970	2015	2015/1970	1970	2014	1970	2014	2000	2012	2000	2012	1970	2015	2015 / 1970
Colombia	ODS	2	6	2.33	1,791	4,747	2.65	4.45	3.95	7.13	14.50	149	171	3,300	3,414	22,061,215	48,228,697	2.19
Oman	ODS	2	3	2.28	4,248	11,983	2.82	6.07	4.37	53.17	62.59	123	144	1,320	2,263	723,852	4,199,810	5.80
Bangladesh	ODS	4	3	2.22	271	652	2.40	na	4.95	na	17.57	139	184	902	1,679	65,047,770	161,200,886	2.48
Nigeria	ODS	3	5	2.06	745	1,734	2.33	4.65	5.62	5.18	16.57	64	148	289	972	55,981,400	181,181,744	3.24
Pakistan	ODS	4	3	1.96	371	902	2.43	3.48	3.08	3.41	9.96	na	197	na	2,961	58,090,759	189,380,513	3.26
Philippines	ODS	3	3	1.94	826	1,717	2.08	3.69	3.08	14.04	21.80	176	201	2,547	2,811	35,804,729	101,716,359	2.84
Brazil	ODS	2	6	1.93	2,385	5,491	2.30	3.19	2.56	7.78	9.31	198	215	4,264	4,071	95,326,793	205,962,108	2.16
Peru	ODS	2	6	1.59	2,432	4,274	1.76	3.77	2.87	17.98	19.52	144	170	2,920	3,315	13,341,069	31,376,671	2.35
Mexico	ODS	2	6	1.47	4,751	8,684	1.83	2.28	2.43	3.17	30.66	184	203	4,380	4,256	52,029,861	125,890,949	2.42
Argentina	ODS	2	6	1.04	4,385	6,328	1.44	2.78	2.60	5.22	11.99	158	183	3,964	3,612	23,973,058	43,417,765	1.81
Saudi Arabia	ODS	1	3	0.60	15,750	15,138	0.96	5.96	5.31	44.09	45.26	120	166	1,611	2,299	5,836,389	31,557,144	5.41
S. Africa	ODS	2	5	0.55	4,825	6,038	1.25	2.21	2.59	18.16	26.27	210	218	4,690	4,507	22,502,502	55,011,977	2.44
Iran	ODS	3	3	0.38	3,388	3,500	1.03	5.17	4.64	21.89	20.88	151	na	2,333	na	28,514,010	79,360,487	2.78
Venezuela	ODS	2	6	0.05	5,647	5,631	1.00	5.02	5.95	24.66	15.49	111	49	2,786	288	11,587,761	31,155,134	2.69
Qatar	ODS	1	3	(0.36)	71,027	53,986	0.76	6.33	4.68	44.51	63.65	111	159	930	na	109,514	2,481,539	22.66
UAE	ODS	1	3	(2.01)	89,219	27,967	0.31	5.52	3.86	na	93.02	182	209	na	4,321	235,499	9,154,302	38.87
Ukraine	ODS	3	1	na	na	1,870	na	na	2.06	na	40.60	160	185	3,473	3,683	47,086,761	45,154,029	0.96
Russia	ODS	2	3	na	na	6,697	na	na	3.81	na	24.46	176	192	4,413	4,244	130,404,000	144,096,870	1.11
Korea	OAS	1	3	5.89	1,824	25,130	13.78	2.84	2.42	9.29	40.58	223	225	4,371	4,235	32,240,827	51,014,947	1.58
Poland	OAS	2	1	2.81	3,651	11,727	3.21	1.99	1.65	12.55	40.37	168	213	3,072	4,394	32,664,300	37,986,412	1.16
Luxembourg	OAS	1	1	2.55	26,506	85,010	3.21	0.00	2.06	56.81	29.39	180	191	3,298	3,336	339,171	569,604	1.68
Hungary	OAS	1	1	2.24	4,801	12,500	2.60	1.66	2.18	27.15	79.42	179	190	3,287	3,868	10,337,910	9,843,028	0.95
Norway	OAS	1	1	2.18	24,346	67,459	2.77	1.99	3.76	19.17	29.03	203	207	3,913	3,638	3,875,763	5,188,607	1.34
Japan	OAS	1	3	2.11	15,370	39,215	2.55	1.50	2.12	9.13	14.23	216	212	4,591	4,218	104,345,000	127,141,000	1.22
Portugal	OAS	1	1	1.96	7,468	18,644	2.50	1.86	1.79	11.66	27.80	210	206	4,139	4,196	8,680,431	10,358,076	1.19
Austria	OAS	1	1	1.94	16,671	40,740	2.44	1.35	1.60	18.63	40.66	203	218	4,496	4,343	7,467,086	8,633,169	1.16
Finland	OAS	1	1	1.93	15,766	38,777	2.46	2.44	2.17	20.29	27.28	208	213	4,328	3,911	4,606,307	5,479,531	1.19
Germany	OAS	1	1	1.86	17,383	40,280	2.32	1.27	1.74	18.05	38.52	216	226	4,767	4,430	78,169,289	81,686,611	1.04
UK	OAS	1	1	1.85	18,750	42,974	2.29	1.18	1.95	14.87	16.83	217	224	4,786	4,504	55,663,250	65,128,861	1.17
USA	OAS	1	2	1.85	20,548	46,833	2.28	1.33	1.72	4.00	9.26	222	226	4,911	4,568	205,052,000	320,896,618	1.56
Belgium	OAS	1	1	1.75	17,328	38,645	2.23	na	2.02	43.20	88.86	212	228	4,797	4,486	9,655,549	11,274,196	1.17
Spain	OAS	1	1	1.71	11,484	25,985	2.26	1.59	1.74	5.84	23.59	208	221	4,799	4,486	33,814,531	46,447,697	1.37
Sweden	OAS	1	1	1.70	22,772	47,712	2.10	1.67	1.99	18.09	28.69	210	216	4,616	4,304	8,042,801	9,799,186	1.22
Australia	OAS	1	4	1.65	19,641	41,748	2.13	2.45	3.19	10.57	16.62	219	213	4,589	4,224	12,507,000	23,789,338	1.90
Netherlands	OAS	1	1	1.63	20,807	44,300	2.13	1.02	1.95	35.45	76.44	216	229	4,644	4,485	13,038,526	16,939,923	1.30
Canada	OAS	1	2	1.62	18,779	38,329	2.04	2.19	2.32	19.10	26.57	208	217	4,658	4,446	21,324,000	35,846,610	1.68
France	OAS	1	1	1.60	17,406	36,078	2.07	1.08	1.69	12.21	20.39	213	221	4,749	4,383	52,035,095	66,624,068	1.28
Denmark	OAS	1	1	1.48	25,338	49,757	1.96	1.61	2.04	19.65	31.65	209	217	4,360	4,224	4,928,757	5,683,483	1.15
Italy	OAS	1	1	1.42	15,219	29,681	1.95	1.39	1.58	11.68	24.64	215	223	4,804	4,472	53,821,850	60,730,582	1.13
Switzerland	OAS	1	1	0.93	38,648	59,198	1.53	1.73	2.40	20.82	43.87	224	225	4,630	4,300	6,180,877	8,282,396	1.34
Greece	OAS	1	1	0.79	11,071	17,732	1.60	2.51	3.02	4.89	15.25	204	195	3,908	3,952	8,792,806	10,820,883	1.23
SanMarino	OAS	1	1	0.67	28,442	45,383	1.60	na	na	na	na	na	na	na	na	19,138	32,960	1.72
Latvia	OAS	2	1	na	na	9,896	na	na	1.86	na	46.39	129	191	3,183	3,580	2,359,164	1,977,527	0.84
Czech_Rep	OAS	1	1	na	5,450	15,637	2.87	na	2.00	23.27	84.22	192	210	4,650	4,408	9,858,071	10,546,059	1.07
Slovenia	OAS	1	1	na	na	19,510	na	na	2.00	na	72.59	169	188	4,016	4,031	1,724,891	2,063,531	1.20
Slovak_Rep	OAS	1	1	na	na	12,825	na	na	2.40	na	85.80	181	192	4,092	3,889	4,538,223	5,423,801	1.20
Estonia	OAS	2	1	na	na	12,409	na	na	2.42	na	61.20	144	165	3,664	3,676	1,360,076	1,315,407	0.97

Key:

Income level - obtained from UNCTADSTAT (as reported by World Bank for 2015): level 1 High-income US$12,476 or more; Level 2 Upper-middle income US$4,036 - $12,475; level 3 Lower-middle income - US$1,026 - $4,035; level 4 Low-income US$1,025 or less

Geographic regions: Region 1 - Europe; Region 2 - North America; Region 3 - Asia; Region 4 - Oceania; Region 5 - Africa; Region 6 - Latin America; Region 7AR - African region; Region 7CR - Caribbean Sea region; Region 7IOR - Indian Ocean region; Region 7PR - Pacific Ocean region

APPENDIX C: WORLD MAP HIGHLIGHTING 36 ADVANCED ECONOMIES



Adapted from "http://www.24point0.com/ppt-shop/oecd-map-powerpoint" to reflect 36 advanced countries.

APPENDIX D: DEFINITIONS, DESCRIPTIONS & DATA SOURCES

Variable	Description	Source
GDP per capita growth rate	GDP per capita growth rate	UNCTAD
GDP Per capita income	Log real GDP per capita	UNCTAD
Export concentration	Theil index measures level of concentration where the higher the value, the higher the export concentration	IMF
Human capital	(1) Ratio of total enrollment to population of the same age group	WDI
	(2) Life expectancy of males	WDI
Population	Total population	WDI
Openness	Export plus imports divided by GDP	PWT 6.3
Foreign investment	Ratio of net FDI to GDP	UNCTAD
Domestic investment	Investment share of real GDP per capita	PWT 6.3
Government consumption	Ratio of total government consumption purchases tol GDP	WDI
National debt	Debt to GDP	IMF
Exchange Rate	Exchange rate of local currency with that of US$	PWT 6.3

Term	Definition	Source
Export Diversification	Export diversification, considered a proxy for economic diversification, is variously defined as the change in the composition of a country's existing export product mix or export destination, or as the spread of production over many sectors. For many developing countries, and as part of an export led growth strategy, export diversification is conceived as the progression from traditional to non-traditional exports.	Samen S. (2010).
Developed (Advanced) Economies	The International Monetary Fund (IMF) defines newly designated advanced countries as countries with "relatively high income levels (comfortably within the range of those in the [existing advanced] country group), well developed financial markets and high degrees of financial intermediation, and diversified economic structures with rapidly growing service sectors." World Bank's 1989 World Development Indicators defined high-income countries as countries with a per capita GNI above US$6,000. According to the United Nation's classification system, developed countries are countries in the top quartile in the Human Development Index (HDI-distribution). The HDI is a composite index of three indices measuring countries' achievements in longevity, education, and income.	Nielsen, L. (2013).
Developing Economies	The IMF defines "emerging market and developing countries" as countries that are not advanced, but there is no explicit definition of what constitutes an advanced country. According to the United Nation's classification system, developing countries are those in the bottom three quartiles in the Human Development Index (HDI-distribution).	Nielsen, L. (2013).
Small Island Developing States (SIDS)	Small Island Developing States (SIDS) category represents the intersection of three groups — small states, island states, and developing or least-developed states — which all face significant challenges in their own right. Consequently, SIDS are among the most vulnerable states in the international community. There is no consistent definition of 'small states'. A population threshold of 1.5 million is often used, although some states with somewhat larger populations may be included on the ground that they share the relevant characteristics, and higher thresholds have been suggested, along with other measures such as land area and total gross domestic product. For the purposes of this study, the SIDS included in the study were selected from the 57 economies recognized as SIDS by the United Nations based on availability of data.	Von Tigerstrom, B. (2005).

APPENDIX E: MERCHANDISE: TOTAL WORLD EXPORT TRADE (1948–2016)

ECONOMY	1948	1953	1963	1973	1983	1993	2003	2014	Change b/w 1948 vs 2014
World ($Billions)[1]	59	84	157	579	1,838	3,688	7,380	18,494	18,435
Regions (%)									
Developing economies	31.78	30.14	22.99	20.39	26.97	27.32	32.52	44.63	12.85
Transition economies	2.73	3.90	5.17	4.18	5.45	1.72	2.64	4.01	1.29
Developed economies	65.5	65.97	71.84	75.43	67.58	70.96	64.84	51.36	-14.14
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00
Developing economies by region (%)[2]									
Developing economies: Africa	7.43	6.80	5.8	4.79	4.41	2.42	2.36	2.92	-4.51
Developing economies: America*	12.27	10.79	6.93	4.90	5.83	4.29	5.15	5.70	-6.57
Developing economies: Asia	11.95	12.39	10.12	10.52	16.63	20.49	24.93	35.94	23.99
Developing economies: Oceania	0.13	0.15	0.14	0.17	0.09	0.12	0.07	0.07	-0.06
	31.78	30.14	22.99	20.39	26.97	27.32	32.52	44.63	12.85

Source: 1 - International Trade Statistics 2015, World Trade Organization. / 2 - UNCTAD

* - This group primarily includes Latin America and The Caribbean

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