TRADE POLICY, IMPORT STRUCTURE AND EXPORT DIVERSIFICATION IN MIDDLE INCOME ASIAN ECONOMIES

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Abstract. In middle income Asian economies, export diversification plays a crucial role in determining both sustainable economic growth and economic resilience, since relying on a narrow export base makes economies more susceptible to external shocks and price fluctuations. Using panel data for 27 middle income Asian countries (2001–2024), this study examines how trade policy and import structure affect export concentration, applying Pooled OLS, Fixed Effects, Random Effects and Bayesian Model Averaging. Natural resource rents are found to be the strongest driver of export concentration, supporting the resource curse hypothesis, while manufacturing value added and tertiary education are the main forces for diversification. Aggregate trade policy variables, such as tariffs and trade openness, are not found to be robust predictors once country heterogeneity is accounted for. The findings highlight the importance of industrial policy, higher education investment and resource revenue management for sustainable export diversification.

Keywords: export diversification, export concentration, trade policy, import structure, middle income economies, Asia, panel data, resource curse

INTRODUCTION

In middle-income countries, for a long-time export diversification has been acknowledged as a key goal of development policy. Countries with a limited variety of exported goods are more vulnerable to external shocks, variations in commodity prices and terms of trade instability, all of which can slow down long-term development prospects and destabilize growth. One of the first theoretical underpinnings for emphasizing diversification in development strategy is the Prebisch-Singer hypothesis, which finds a secular decline in the terms of trade for commodity exporters in comparison to manufacturers. This position has been supported by more recent empirical research, which shows that more diverse export arrangements are linked to increased productivity growth, macroeconomic stability and a decreased susceptibility to external crises [1].

Export diversification is not only a policy goal but also an economic need for middle-income Asian nations in particular. Many of these nations are in a precarious position in the global economy as they have progressed above subsistence-level development, but they are under increasing pressure from both technologically sophisticated economies above and lower-wage economies below, a problem sometimes referred to as the "middle income trap." One of the most practical methods to escape this trap is to diversify exports into higher-value, more technologically advanced goods [2]. However, the region is incredibly diverse

encompassing resource-dependent Central Asian and Middle Eastern economies where commodity exports continue to dominate trade structures, rapidly industrializing East Asian economies deeply integrated into global value chains and densely populated South Asian economies where labor-intensive manufactured exports have driven recent growth but concentration remains high.

The following are the study's primary conclusions. In the context of middle-income Asian economies, natural resource rents are found to be the most powerful and reliable driver of export concentration thus supporting the resource curse theory. The two most significant variables encouraging diversification are the value added by manufacturing sector and enrollment in postsecondary education, with the real exchange rate appreciation also linked to the increased concentration via lowering price competitiveness. Contrary to the predicted diversification impact, imports of ICT items are positively correlated with export concentration thus indicating that a sample of technology-intensive imports supports participation in a small, specialized value chain. According to heterogeneity analysis, regional variations in export concentration, rather than geographic location per se, largely explained underlying structural differences, with East Asian and Pacific countries primarily achieving greater diversification through stronger manufacturing development and less reliance on resources. Once nation heterogeneity is taken into account, trade policy variables at the aggregate level, such as tariffs and overall trade openness are not found to be robust predictors.

LITERATURE REVIEW

So, what is the export diversification? The general definition of export diversification is the modification of a nation's export structure and composition [3]. In this regard, a number of research have proposed different definitions. Diversification is defined by Alwang and Siegel [4] as a nation's export portfolio shifting from primary goods to industrial goods. Furthermore, export diversification can be widely characterized as expanding innovation and technology or changing the current pattern of exported commodities [5]. Export diversification, according to Dennis and Shepherd [6], is the expansion of a nation's export portfolio.

The determinants of export diversification have been studied by many authors and divided into different categories. There are three main categories into which they could be classified: structural determinants, general economic policy variables and trade policy variables [7]. In the following section we will look into these factors further particularly with regard to the developing economies:

According to the majority of the literature the structural factors play a fundamental role in shaping the outcomes of the export diversification and in the short and medium term are considered largely exogenous. In most of the empirical studies it was founded that they examine these factors by focusing on the extensive margin of trade, measured by the number of products exported. The classical gravity variables such as geographical distance, remoteness from major markets and being landlocked were found to be negatively influencing the export diversification as they increase trade costs [7]. In contrast, the greater export diversification is connected to factors that lessen the trade frictions, which are sharing a common border, language, or colonial ties are associated with greater export diversification [8].

The other factor which negatively affects export diversification is economic remoteness, which is measured as distance weighted by the economic size of trading partners, as it limits access to large and diversified markets [9, 10]. Added to this the population size is also a significant structural determinant, as larger economies tend to exhibit more diversified export structures due to broader domestic demand and greater production capacity [2]. The natural resource abundance is often connected with export concentration through a resource curse mechanism according to which high resource rents crowd out diversification into manufacturing and higher-value activities [11]. These structural characteristics are particularly relevant for middle income countries, where geographic fragmentation, long distances to markets, and reliance on primary commodities pose significant challenges to diversification.

The second group of determinants includes general economic factors that can be influenced by policy even though they are not directly related to trade. In most papers the connection between economic development and export diversification is the central theme. It is empirically proven that GDP per capita positively influences export diversification, especially at early stages of development [12]. Higher income levels are linked to more complex production structures and greater capacity to introduce new products into export markets.

Also, it was found that productivity improvements foster export diversification, as the firms with the higher productivity are better in overcoming fixed export costs and compete internationally [13]. Human capital accumulation contributes to this process by enhancing technological capabilities and facilitating innovation [14].

There is more conflicting evidence about other macroeconomic factors. Higher diversification is typically linked to improved financial development, investment and infrastructure although these effects are frequently weak or context-specific [15, 16]. By raising production costs and decreasing competitiveness, inflation and rising domestic prices typically impede diversification [17]. Since poor governance and high levels of poverty are known to worsen export concentration, institutional quality is also very important [18]. Conversely, factors like interest rates, R&D spending, and general aid flows are not consistently found to be strong predictors of export diversification.

The third major category of determinants is made up of trade policy variables. One of the most extensively researched elements is market access; research suggests that lower tariffs for exporters and involvement in free or preferential trade agreements promote export diversification [19]. However, some research indicates that by safeguarding emerging industries and encouraging domestic production, higher import tariffs can boost export variety [17].

Non-tariff measures continue to be less researched than tariffs. Shepherd [20] demonstrates that while internationally harmonized standards can lessen these detrimental effects, product standards typically impede export diversification by increasing fixed compliance costs. Diversification results are also influenced by exchange rate dynamics. While exchange rate misalignment does not seem to have a major effect, a depreciation of the exchange rate tends to increase export variety by improving price competitiveness [21, 22].

Because lower trade costs are found to reduce product concentration and promote entry into new export markets, trade facilitation emerges as a key driver of export diversification

[23]. There is conflicting evidence regarding foreign direct investment and aid for trade. Several studies indicate that these factors have little to no impact on diversification, especially when resources are concentrated in industries that are already highly competitive [24].

The literature on export diversification has expanded significantly over the past two decades emphasizing its importance for economic growth, structural transformation and resilience to external shocks. Export diversification and economic performance are generally positively correlated, especially in developing and emerging economies according to early and recent research [25, 13]. Nevertheless, there are still a number of significant gaps in this extensive body of work.

First, a significant portion of the empirical literature examines export diversification either through structural determinants or within a growth-oriented framework, without specifically integrating trade policy variables into a unified analytical framework. For example, Carrasco and Tovar-García [26] examine import composition, export composition, and diversification concerning economic growth; however, they do not specifically analyze the impact of trade policy instruments such as openness and tariffs on diversification outcomes. Cieślik and Parteka [13] also focus on productivity and the size of the country as the main factors that affect the variety of exports. Trade policy, on the other hand, is mostly not part of the main analysis. Consequently, the precise function of trade policy in influencing diversification patterns remains inadequately comprehended.

Second, import composition is not often looked at as a clear link between trade policy and export diversification, even though recent research has shown that it is important. Gnangnon [27] underscores the significance of trade liberalization in fostering export diversification, while Carrasco and Tovar-García [26] illustrate the critical role of capital and high-technology imports in economic growth. However, most empirical studies have only estimated reduced-form relationships, neglecting to model how access to capital and intermediate goods enables diversification. This leaves us with a gap in our understanding of how trade liberalization leads to more diverse export structures.

Third, the empirical data presently accessible is focused on particular regions rather than income levels. A substantial segment of research employs static or long-term methodologies, concentrating on Africa [7], cross-national global samples [13] or particular subregions such as ASEAN or SAARC [28]. There remains a scarcity of comparative data for Asian middle-income countries, especially when utilizing dynamic panel methods that consider endogeneity and persistence.

Given this context, this article addresses these deficiencies by examining the impact of trade policy on export diversification in middle-income Asian countries. It accomplishes this by incorporating import structure as a mediating variable and employing a dynamic panel framework to address endogeneity and persistence. This enhances our comprehension of export diversification processes in middle-income economies in a manner that is more intricate and relevant to policy.

METHODOLOGY

Trade policy shapes export diversification through its influence on market access, production incentives and firms' capacity to integrate into global value chains. Trade liberalization lowers trade costs and gives businesses access to bigger markets and foreign

supplies. Simultaneously, the structure of imports serves as a crucial transmission mechanism: having access to imported capital goods, intermediate inputs, and ICT products can boost productivity, make it easier to upgrade technology, and encourage the growth of new export ventures [26].

Diversification results are influenced not just by trade policy but also by structural and macroeconomic variables such economic development, natural resource rents, human capital, and institutional quality [3, 7]. The following theories are put out in light of this theoretical reasoning:

H1: By easing access to global markets and promoting diversification, trade openness lowers export concentration.

H2: By limiting access to imported inputs, higher tariff rates lead to an increase in export concentration.

H3: By enhancing productivity and technological capacities, imports of manufactured goods and ICT products lessen export concentration.

H4: Natural resource rents increase export concentration through a resource curse mechanism, crowding out diversification into manufacturing and higher-value activities.

H5: Higher levels of manufacturing value added and tertiary education reduce export concentration by improving productive capacity and human capital.

Table 1. Summary of previous studies in export diversification

Author(s)	Period	Number of Countries	Type of Data	Model	Variables	Main Findings
Agosin, Alvarez & Bravo-Ortega (2011)	1962–2000	79	Panel data	Dynamic GMM	Export concentration index, financial development, trade openness, human capital, exchange rate volatility	Human capital contributes positively to export diversification, while greater trade openness may increase specialization in certain sectors.
Cadot, Carrère & Strauss-Kahn (2011)	1988–2006	156	Panel data	OLS	Export concentration indices (Theil, Herfindahl), GDP per capita	Export diversification follows a hump-shaped pattern during economic development: countries diversify at early stages and reconcentrate at higher

Author(s)	Period	Number of Countries	Type of Data	Model	Variables	Main Findings
						income levels.
Carrasco & Tovar-García (2021)	1990–2015	19 developing countries	Panel data	Dynamic GMM	Export composition, import composition, capital goods imports, domestic content of exports	High-tech and capital goods imports positively influence economic growth and improve the structure of exports.
Giri, Quayyum & Yin (2019)	1962–2010	Multiple developing and developed countries	Panel data	OLS and Bayesian Model Averaging (BMA)	Human capital, trade openness, natural resource rents, institutional quality, financial development	Human capital, trade openness and strong institutions are key drivers of export diversification.
Gnangnon (2021)	1995–2018	Global sample	Panel data	Two-step system GMM	Multilateral trade liberalization, FDI inflows, export diversification indicators	Trade liberalization and FDI inflows promote export diversification, particularly in developing economies.
Vogel (2025)	1995–2018	47 African countries and 123 trading partners	Bilateral panel data	Bayesian Model Averaging (BMA)	Trade policy variables, education, institutional quality, structural characteristics	Education, institutional quality, and trade policy significantly influence export diversification patterns.

The Table 1 shows the list of previous studies conducted on the determinants of export diversification with the models implemented in them. Based on this studies it was chosen to implement OLS, Fixed effects and random effects methods with dummy variables to control for heterogeneity. All models are estimated using 439 observations across 27 countries over the period 2001–2024, using Stata 17. The list of the used variables is provided in Appendix 1.

To examine the determinants of export concentration, this study estimates the following baseline empirical model:

$$\begin{aligned} ECI_{it} = {} & \beta_0 + \beta_1 lnGDPpc_{i,t-1} + \beta_2 Trade_{i,t} + \beta_3 FDI^{w}_{i,t-1} + \beta_4 MgfVA_{it} \\ & + \beta_5 lnREER_{it} + \beta_6 lnNatRes_{i,t-1} + \beta_7 lnMfgExp_{it} \\ & + \beta_8 TertEdu_{i,t-1} + \beta_9 lnTarriff_{it} + \beta_{10} MfgImp_{it} + \beta_{11} ICT_{i,t-1} \\ & + \beta_{12} AirFreight_{it} + u_i + \varepsilon_{it} \end{aligned}$$

To capture the differences in different regions of Asia and in income levels, the extended model incorporates a set of binary indicator variables:

$$\begin{aligned} ECI_{it} = {} & \beta_0 + \beta_1 lnGDPpc_{i,t-1} + \beta_2 Trade_{i,t} + \beta_3 FDI^{w}_{i,t-1} + \beta_4 MgfVA_{it} \\ & + \beta_5 lnREER_{it} + \beta_6 lnNatRes_{i,t-1} + \beta_7 lnMfgExp_{it} \\ & + \beta_8 TertEdu_{i,t-1} + \beta_9 lnTarriff_{it} + \beta_{10} MfgImp_{it} + \beta_{11} ICT_{i,t-1} \\ & + \beta_{12} AirFreight_{it} + \beta_{13} UpperMiddle_i + \beta_{14} ECA_i + \beta_{15} MENA_1 \\ & + \beta_{16} SouthAsia_i + u_i + \varepsilon_{it} \end{aligned}$$

ANALYSIS AND RESULTS

Before analyzing the primary results, the Hausman test was performed to identify the suitable panel estimator. The $chi^2(12) = 9.69$ ($p = 0.6427$) test statistic does not reject the null hypothesis that the difference between Fixed Effects and Random Effects coefficients is not systematic. The high p-value strongly supports the Random Effects GLS estimator, which is chosen as the best option because it is both consistent and efficient based on this finding. The Random Effects model is also better in this case because it can identify time-invariant variables like regional and income group dummies, which are important for the heterogeneity analysis in Section 5.2. All models are then re-estimated with heteroskedasticity-robust standard errors clustered at the country level (robust in Stata). This fixes any possible heteroskedasticity that might come from differences in error variances between countries without changing the point estimates.

Table 2 shows the results for all seven specifications. The Random Effects model with robust standard errors clustered at the country level is the preferred specification, as determined by the Hausman test ($chi^2(12) = 9.69$, $p = 0.643$). Stata 17 is used to estimate all models. A significant methodological insight is that the use of robust standard errors significantly modifies the significance pattern—numerous variables that are significant in the non-robust RE model lose their significance, whereas tariff rates gain significance. This change shows that there is heteroskedasticity in the cross-country error structure. The high intraclass correlation across panel models (rho = 0.883–0.886) shows that about 88% of the total variance in export concentration is due to stable differences between countries. The mean VIF of 2.07 shows that there is no multicollinearity.

Table 2. Complete Results Table of all 7 model specifications

Variable	OLS	OLS+Dummies	FE	FE robust	RE baseline	RE robust	RE robust+Dummies
ln(GDP per capita)	0.0632***	0.0444***	0.0544***	0.0544	0.0505***	0.0505	0.0485
Manufacturing VA (% GDP)	−0.0064***	−0.0023**	−0.0045***	−0.0045*	−0.0056***	−0.0056**	−0.0056**
ln(Natural resource rents)	0.0237***	0.0280***	0.0195***	0.0195*	0.0195***	0.0195**	0.0208**
Trade (% of GDP)	−0.0002	0.0001	−0.0001	−0.0001	−0.000003	−0.000003	0.0000
Air transport freight	−4.60e-06***	−2.51e-06	2.94e-06	2.94e-06	2.35e-06	2.35e-06	2.54e-06
ln(REER)	0.0383	0.0609**	−0.0108	−0.0108	−0.0099	−0.0099	−0.0050
Tariff rate (all products)	0.0000	−0.0002	−0.0001	−0.0001***	−0.0001	−0.0001***	−0.0001***
FDI, winsorized (% GDP)	−0.0001	0.0018	−0.0007	−0.0007	−0.0007	−0.0007	−0.0007
ln(Manufacturing exports)	−0.0919***	−0.1021***	−0.0687***	−0.0687**	−0.0738***	−0.0738**	−0.0747***
Tertiary enrollment (%)	−0.0021***	−0.0014***	−0.0018***	−0.0018	−0.0018***	−0.0018*	−0.0018*
Rule of Law	−0.0028***	−0.0031***	−0.0005	−0.0005	−0.0006	−0.0006	−0.0007
ICT goods imports (%)	0.0021***	0.0037***	0.0042***	0.0042**	0.0042***	0.0042**	0.0042**
Manufacturing imports (%)	0.0023***	0.0043***	0.0003	0.0003	0.0003	0.0003	0.0005
Upper middle income	—	0.0111	omitted	omitted	—	—	0.0185
ECA (reg_2)	—	0.0853***	omitted	omitted	—	—	0.0892
MENA+ (reg_3)	—	0.1596***	omitted	omitted	—	—	0.1100**
South Asia (reg_4)	—	0.1719***	omitted	omitted	—	—	0.1124*
Constant	0.0490	−0.2089	0.2301	0.2301	0.2924**	0.2924	0.2033
Observations	429	429	429	429	429	429	429
Countries	—	—	27	27	27	27	27
R^2 overall/adjust	0.758	0.804	0.584	0.584	0.637	0.637	0.679

Variable	OLS	OLS+Dummies	FE	FE robust	RE baseline	RE robust	RE robust+Dummies
ed							
R^2 within	—	—	0.294	0.294	0.292	0.292	0.291
R^2 between	—	—	0.615	0.615	0.663	0.663	0.726
rho	—	—	0.883	0.883	0.886	0.886	0.812

Note: *** p<0.01, ** p<0.05, * p<0.10. Robust standard errors clustered at country level for FE robust, RE robust, and RE robust+Dummies. Time-invariant dummy variables (income group, regional) are automatically omitted in FE models due to perfect collinearity with country fixed effects. Baseline categories: East Asia and Pacific (regional), lower middle income (income). Dependent variable: Export Concentration Index (higher values indicate greater export concentration).

DISCUSSION

Five conclusions can be used to summarize the main findings from the seven models in Table 2. First, the resource curse hypothesis is confirmed by the fact that natural resource rents are the most powerful and reliable driver of export concentration. They are significant across six out of seven model specifications and BMA testing. The mechanism works in a number of ways: resource revenues discourage investment in non-resource tradeable industries, draw labor and capital away from manufacturing, lessen fiscal pressure on governments to create alternative economic activities, and encourage rent-seeking rather than productive diversification. This result is particularly relevant to the sample's resource-rich economies, such as Kazakhstan, Azerbaijan and Iran whose trade systems are still dominated by commodity exports despite persistent efforts to diversify. The conclusion is straightforward: export diversification is systematically undermined by a passive dependence on resource riches as a development strategy and active policy intervention is necessary to reroute resource earnings toward the growth of non-commodity tradeable industries.

Second, manufacturing exports are the analysis's most solid conclusion. They are substantial across all seven parameters, demonstrating that industrial upgrading is the strongest and most reliable engine for export diversification. In five out of seven specifications manufacturing value added as a percentage of GDP is substantial. When put together these findings demonstrate that industrial development proceeds through two complementary channels: 1) expanding the manufacturing export base generates opportunities for successive diversification through the product space mechanism, while also 2) increasing contribution of manufacturing to GDP increases the productive capacity required to engage in new export activities. In this panel self-reinforcing dynamic between industrial development and export structure change is seen due to the nations that were previously industrialized, especially in East Asia and the Pacific as they are better positioned to enter new product categories.

Third, in line with infant industry protection theory, higher tariff rates are linked to decreased export concentration in all three robust specifications, defying the initial prediction. Because the tariff effect is a within-country dynamic obscured by cross-country

heteroskedasticity, the economic magnitude of the effect is modest and BMA assigns tariffs a low posterior inclusion probability. However, the finding is credible because it is consistent across both the robust FE and robust RE models.

Fourth, imports of ICT items are consistently linked to higher export concentration, indicating that in this sample, technology-intensive imports promote restricted value chain specialization rather than widespread technical diffusion. According to these findings, technology import liberalization alone is insufficient since imported ICT goods encourage specialization rather than facilitating economy-wide upgrading in the absence of additional investments in local absorptive capacity, backward linkages, and technology-related education.

Fifth, the benefits of trade integration may work through particular compositional and sectoral channels rather than aggregate openness measures, as trade policy at the aggregate level, trade openness and FDI, is not a strong predictor of export concentration. The fact that both are consistently negligible across all seven parameters suggests that their impact on export structure is mediated through particular sectoral and compositional channels rather than aggregate openness metrics.

The heterogeneity analysis verify that regional differences, although significant in OLS, primarily function through stable structural characteristics absorbed by country random effects in panel models and that income group classification does not independently explain differences in export concentration.

CONCLUSION

The results have significant policy ramifications for middle-class Asian nations which are looking to diversify their export structures, highlighting the importance of industrial policy, investment in higher education and resource revenue management play as complementary routes to sustainable export diversification. The findings have obvious policy implications as well, indicating that the best ways to encourage export diversification in this set of nations are through resource revenue management, industrial expansion, and higher education investment.

There are three primary areas of limitations and future research prospects. For slow-moving structural variables like GDP per capita and manufacturing value added, the study does not completely address endogeneity issues, thus it is suggested that system GMM estimate should be used in future studies to allow for a clearer causal interpretation.

Second, the capacity to detect sector-level and product-level transmission mechanisms is limited by study at the aggregate nation level and a more detailed evaluation of the import structure channel would be possible with disaggregated trade data analysis. Thirdly there is unresolved empirical tension that calls for additional research using dynamic panel techniques that address both heteroskedasticity and endogeneity is the divergence between BMA and robust panel results for tariff rates, where BMA assigns a PIP of 0.05 while robust panel models find high significance.

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