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The Short-run and Long-run Effects of Trade Openness on Financial Development: Some Panel Evidence for Europe

THE SHORT-RUN AND LONG-RUN EFFECTS
OF TRADE OPENNESS ON FINANCIAL DEVELOPMENT:
SOME PANEL EVIDENCE FOR EUROPE

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Abstract
This paper analyses the short- and long-run effects of trade openness on financial development in a panel including data on 35 European countries over the period 2001-2019. For this purpose, it uses the PMG (pooled mean group) estimator for dynamic panels developed by Pesaran et al. (1999). The results differ depending on the income, governance and financial development level of the countries considered. In particular, it appears that in the middle-income countries trade openness tends to strengthen financial development in the long run but to have an adverse effect in the short run. By contrast, in the case of high-income countries with better institutions and a higher level of financial development, there is a positive and significant impact in the short run. Some policy implications of these findings are drawn.

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1. Introduction

The relationship between financial development and international trade has been analysed extensively in the literature. However, despite the fact that the causal linkages between these two variables could be bidirectional, most studies have focused mainly on the impact of the former on the latter and on whether or not a well-developed financial system can increase trade volumes and also have an impact on the trade structure. The underlying idea is that differences in financial development can generate comparative advantages and gains from specialisation. In particular, countries with better financial systems are expected to specialise in goods and sectors that rely on external finance for production (Kletzer and Bardhan, 1987; Beck, 2002, 2003; Slaveryd and Vlachos, 2005; Hur et al., 2006; Kim et al., 2011; Becker et al., 2013; Manova 2013; Bilas et al., 2017).

By contrast, only a relatively small number of papers have examined the reverse link, namely whether or not higher trade openness boosts financial development (Rajan and Zingales, 2003; Huang and Temple, 2005; Do and Levchenko, 2004, 2007; Baltagi et al., 2009; Kim et al., 2010). In this case, the latter is assumed to be endogenous and to be affected by demand for external finance in each country. Since industries and goods differ in the extent they rely on it, the financial system should be more developed in countries specialising in goods requiring external finance. Thus, financially intensive sectors should develop more in such countries as a result of trade opening (Do and Levchenko, 2007).

The present paper aims to contribute to the latter strand of the literature, which investigates the effects of international trade on financial development. More precisely, it provides evidence on whether or not the degree of trade openness affects financial development in a panel of 35 Europeans countries over the period 2001-2019. This European focus differentiates our contribution from earlier papers examining other groups of developed and developing countries. Moreover, our study also sheds light on whether or not the trade–finance link varies with the level of economic development, governance and financial development by dividing the chosen set of countries in sub-groups on the basis of these criteria and then comparing the results. Finally, our analysis distinguishes between the short- and the long-run effects of trade on financial development, an issue not much investigated in the previous literature, especially in the case of

the European countries. For this purpose, a state-of-the-art econometric method designed for heterogeneous panels is employed, namely the PMG (pooled mean group) estimator proposed by Pesaran (1999 et al.).

The paper is structured as follows. Section 2 provides a brief review of the relevant literature; Section 3 outlines the econometric framework; Section 4 describes the data and presents the empirical findings; Section 5 offers some concluding remarks.

2. Literature Review

The literature concerning the effects of trade on financial development has focused mainly on the relationship between trade openness and financial development (Do and Levchenko, 2004, 2007; Huang and Temple, 2005; Braun and Raddatz, 2005; Kim et al., 2010) or on that between financial openness, trade openness and financial development (Rajan and Zingales, 2003; Baltagi et al., 2009; Zhang et al., 2015). The available evidence generally implies positive linkages between trade openness and financial development and also between trade openness, financial openness and financial development. The rationale for these findings is that trade may create demand for financial services and thus promote financial development. External financing is required by exporters and importers for international payments as well as for the necessary investments to be competitive in the international markets. Trade openness creates an opportunity to exploit economies of scale, but undertaking large-scale operations and mass manufacturing for foreign markets requires additional funds.

Do and Levchenko (2004, 2007) analysed the effects of comparative advantage in international trade on a country's level of financial development using data for 96 countries over the period 1970–1999. In their model financial development is determined endogenously by demand for external finance in production. They showed empirically that countries with a comparative advantage in financially intensive goods will experience a higher demand for external finance, and therefore will be characterised by higher financial development. By contrast, countries that primarily export goods not relying on external finance will have lower financial development.

Finally, countries importing finance-dependent goods will see their financial system deteriorate, with access to finance becoming more difficult for domestic firms.

Huang and Temple (2005) instead examined whether higher openness has a positive effect on financial development by using cross-section and panel data for 88 countries over the period 1960-99. They found strong support for this hypothesis, especially in the lower-income group. Their results suggest that increases in goods market openness are typically followed by sustained increases in financial depth. Kim et al. (2010) also analysed the dynamic effects of trade openness on financial development using a sample of 88 countries over the period 1960–2005. Their findings imply that there exists a positive long-run relationship between trade openness and financial development and a negative short-run one; by splitting their sample into different income or inflation groups, they were able to establish that this holds only for relatively low-income or high-inflation economies.

Other studies also stress the importance of financial openness. Rajan and Zingales (2003) analysed the relationship between trade openness, financial openness, and financial development using a sample of 24 industrialised countries over the period 1913–1999. They argued that trade openness leads to higher financial development when it is correlated with financial openness. They proposed an interest group theory of financial development according to which incumbents (especially industrial and financial ones) oppose financial development because it breeds competition and erodes their interests, and thus their opposition becomes weaker when an economy is open to both trade and finance; institutions also play a role as they have an impact on the activities of the interest groups. Braun and Raddatz (2005, 2008) emphasised that a well-developed financial system enhances competition in the industrial sector by allowing easier entry. They showed that trade liberalisation reduces the power of groups opposed to financial development and thus improve the financial system.

Baltagi et al. (2009) examined empirically the simultaneous openness hypothesis of Rajan and Zingales's (2003) according to which both trade and financial openness are necessary for financial development to occur. They used annual data for both developing and industrialised countries and applied dynamic panel estimation techniques. Their model allows for an interactive effect of trade

and financial openness on financial development and produces evidence that both types of openness are statistically significant determinants of financial development. Thus, relatively closed economies stand to benefit most from opening up their trade and/or capital accounts; however, opening up one without the other can still generate gains in terms of banking sector development. Therefore, these results provide only partial support for the Rajan and Zingales's (2003) hypothesis. Zhang et al. (2015) investigated the impact of trade and financial openness on financial development in China in the context of a dynamic panel. They found that both trade and financial openness are statistically significant determinants of financial efficiency and competition, but openness has a negative impact on financial development because local incumbents strongly oppose the latter. Thus, their study also provides only partial support to the Rajan and Zingales's (2003) hypothesis.

On the whole, the existing empirical evidence suggests that trade openness promotes financial development; however, it also appears that the linkages between trade openness/financial openness and financial development may differ significantly across countries.

3. Financial Development and Trade Openness: An Empirical Framework

As already mentioned we analyse the effects of trade openness on financial development using a panel which includes data for 35 European countries over the period 2001-2019. More specifically, first we estimate the impact of trade openness on financial development for the whole sample. Second, we split the sample into subgroups of countries to examine whether the trade–finance link varies with the level of economic development, governance and financial development.

The general framework used to study the effects of trade on financial development is the following:

$$Finance_{i,t} = \alpha_i + \beta_{i,1} Trade_{i,t} + \sum_{k=1}^{K} CV_{i,t}^k + \mu_i + \varepsilon_{i,t} \qquad (1)$$

where: $Finance_{it}$ is an indicator of financial development, $Trade_{it}$ is an indicator of trade openness, CV_{it} is a set of control variables, ε_{it} stands for the error term and μ_i is a country-specific component., where i=1,2…,N denotes the observational unit (country) and t=1,2,…,T the time period.

The employed measure of financial development is private credit (more precisely, credit to the private sector from commercial banks and other financial institutions) as a share of GDP, as in most of the literature on the trade-finance nexus (Beck et al., 2002; Kim et al., 2010). Trade openness is calculated as the sum of imports and exports divided by GDP; this measure accounts for the level of integration and has already been used in many of the studies previously discussed (Do and Levchenko, 2004, 2007; Baltagi et al., 2009; Kim et al., 2010).

Following the empirical literature on this topic we also include a set of control variables, specifically real GDP per capita (RGDPC), inflation (INFL), an uncertainty index (UI) and a governance index (IQ) as determinants of financial development. RGDPC is meant to control for the link between the income level and financial development (Do and Levchenko, 2004; Rajan and Zingales, 2003): as the level of per capita income increases, the financial systems develops further. Inflation (INFL) is used as an indicator of macroeconomic stability as in other studies (Kim et al., 2011). The uncertainty index (UI) captures the uncertainty related to economic and political events, a higher value indicating higher uncertainty. The governance index (IQ) reflects the process by which governments are selected, monitored and replaced, the ability of the government to formulate and implement sound and effective policies and the respect of citizens for the institutions that govern economic and social interactions among them; better governance and institutions are expected to enhance trade and financial development (Andrianova et al., 2008; Baltagi et al., 2009).

Therefore the empirical specification of model (1) is the following:

$$DCPS_{it} = \alpha_1 + \beta_1 TO_{it} + \beta_2 RGDPC_{it} + \beta_3 INFL_{it} + \beta_4 IQ_{it} + \beta_5 UI_{it} + \mu_i + \varepsilon_{it} \quad (2)$$

where: DCPS = domestic credit to the private sector as a percentage of GDP; TO = trade openness as a share of GDP, RGDPC = real income per capita; INFL = inflation (based on the CPI), IQ = governance index (ranging between -2.5 and 2.5); UI= uncertainty index (ranging between 0 and 1).

For the empirical modelling we follow the ARDL (autoregressive distributed lag) approach originally introduced by Pesaran and Shin (1999) in a time series context, which is also suitable for variables exhibiting different orders of integration. Pesaran et al. (1999) extended it to the case of heterogenous panels; within this framework both short- and long-run linkages can be estimated consistently despite the possible presence of endogeneity by including lags of both the dependent and independent variables. We use the pooled mean group (PMG) estimator whose advantages over the dynamic fixed effects (DFE) and mean group (MG) ones have been shown by Pesaran et al. (1999). In particular, it lets the short-run dynamics be data-determined for each country and assumes homogeneous long-run coefficients; it represents a useful alternative to estimating separate regressions (which allows the coefficients and error variances to differ across the groups) and using conventional fixed-effects estimators (which assumes the same slope coefficients and error variances in all cases).

The dynamic heterogeneous panel regression is the following:

$$\Delta \text{DCPS}_{i,t} = \sum_{l=1}^{p-1} \gamma_{i,l} \Delta \text{DCPS}_{i,t-l} + \sum_{l=0}^{q-1} (\tau_i \Delta TO_{i,t-l} + \rho_{i,1} \Delta RGDPC_{i,t-l} + \rho_{i,2} \Delta INFL_{i,t-l} + \rho_{i,3} \Delta IQ_{i,t-l} + \rho_{i,4} \Delta UI_{i,t-l}) + \varphi_i [DCPS_{i,t-1} - \{\beta_{i,0} + \varrho_{i,1} TO_{i,t-1} + \beta_{i,1} RGDPC_{i,t-1} + \beta_{i,2} INFL_{i,t-1} + \beta_{i,3} IQ_{i,t-1} + \beta_{i,4} UI_{i,t-1}\}] + \mu_i + \varepsilon_{i,t} (3)$$

where: $\gamma_{i,l}$ denotes the short-run coefficients on the lagged dependent variable and τ_i and $\rho_{i,k}$ (k=1,2,..4) those on the independent variables, ϱ_i and $\beta_{i,j}$ (j=1,2,…4) are the long-run coefficients, and φ_i is the speed of adjustment to the long-run equilibrium. The subscripts i and t denote country and time, respectively, and l is the lag length. Finally, the term in square brackets represents the long-run equilibrium. The error term $\varepsilon_{i,t}$ is assumed to be independently distributed across i and t, but the variances may be heterogeneous across countries. By an appropriate choice of the lag length p and q for the dependent and independent variables respectively, the estimation of equation (3) can help to solve the 'reverse causality' issue between international trade and financial development.

4. Empirical Results

4.1 Data

Our panel consists of annual data for 35 European countries (see the list of variables in the Appendix) over the period 2001–2019. The series were obtained from the World Bank database, including the World Governance Indicators (WGI) constructed by Kaufmann et al. (2010), and from the International Monetary Fund (Finance and Development- Ahir et al., 2018) (see the Appendix for more details). The governance index (IQ) includes six dimensions of governance, namely voice and accountability, political stability, government effectiveness, regulatory quality rule of law and control of corruption; it is averaged for each country over the sample. For each dimension of governance, the estimated value is between -2.5 (weak) and 2.5 (strong) governance performance; higher values of IQ indicate a high governance performance and better quality of institutions and thus should boost trade and financial development.

4.2 Results

Table 1 reports the PMG estimation results [1] for the whole sample as well as for two subgroups of countries, namely high- and middle-income countries according to the World Bank's classification.[2]

<div align="center">INSERT TABLE 1 ABOUT HERE</div>

There appears to be a positive long-run effect of trade openness on financial development in general, whilst the short-run results differ between the two groups of countries. For the high-income group of countries (column 2) we find positive and significant short-run effects of trade on financial development and positive but insignificant long-run ones. Note that these countries are characterised by a higher level of financial development and international trade based on sectors relying on external finance. By contrast, for the middle-income group (column 3) there

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[1] Note that estimates were also obtained using the DFE method; however, the Hausman test confirms that the PMG results are to be preferred and therefore we only report the PMG results.

[2] Middle income countries: Albania, Bulgaria, Bosnia, Belarus, Moldavia, Macedonia, Montenegro, Romania, Russia, Serbia, Ukraine.
  High income countries: Austria, Belgium, Cyprus, Czech Republic, Germany, Denmark, Spain, Finland, France, UK, Greece, Croatia, Hungary, Ireland, Island, Italy, Luxembourg, Malta, Nederland, Norway, Poland, Portugal Switzerland, Sweden.

appear to be negative short-run effects of trade on financial development and positive and significant long-run ones. A possible explanation is that in the short run these countries experience more frequent economic shocks resulting from their higher trade openness, which is associated with greater risk and increased exposure to foreign competition. Instead in the long run higher trade openness, followed by restructuring and more investment and lending to cope with increasing competition, creates demand for external finance and thus has a positive effect on financial development. On the whole, it is clear that the trade-finance link varies with the development stage (Huang and Temple, 2005).

Table 1 also reports the estimated coefficients on the control variables. RGPDC has a positive and more sizeable short-run impact on financial development in the case of higher-income countries, as in other studies (Do and Levchenko, 2004). Inflation has a negative short- and long-run effect in all cases; this is not surprising since higher inflation generates more uncertainty, which can be detrimental to international trade and financial development (Rousseau and Wachtel, 2002; Khan et al., 2006). It is noteworthy that the effect of inflation on financial development appear to be stronger in the case of the middle-income countries, which tend to have higher inflation compared to the higher-income ones.[3] Better governance is expected to strengthen trade and reinforce financial development. We find evidence of a positive and significant long-run effect for both sets of countries, but of a short-run one only in the case of the high-income countries. Finally, the uncertainty index has a negative impact. Note that the average level of uncertainty is higher in the middle-income economies, possibly because of greater political instability, which also leads to greater economic fluctuations.

Next we split the sample on the basis of governance since, according to the literature (Baltagi et al., 2009), the quality of institutions is an important determinant of financial development. Table 2 reports the estimated short- and long-run effects of trade openness on financial development for two sub-samples including countries with high- and low-governance respectively. [4]

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[3] See Figure 1 in the Appendix.
[4] Note that in the remainder of the discussion we only focus on these effects and do not report the other estimated coefficients; these additional results are available from the authors upon request.

INSERT TABLE 2 ABOUT HERE

As expected, we find a negative short-run effect of trade openness in the case of the low-governance countries, whose weak institutions seems to impair financial development, and a positive one for high-governance countries. However, in the long run reforms can improve governance and the quality of institutions, reducing corruption and political instability, and thus increasing confidence in the rule of law, the quality of contract enforcement or property rights and the credibility of the government's commitments. Consequently, in the long run trade openness can affect positively financial development owing to an improvement in governance. On the whole, it appears that the trade-finance link also varies with the level of governance, consistently with previous studies (Kim et al., 2011).

Finally, we examine possible differences between three sub-groups of countries characterised by high, middle and low financial development according to the IMF index, which encompasses both financial institution and financial market indices (depth, access and efficiency). Higher values (which are typical of high-income countries) indicate greater financial development, namely a higher degree of efficiency of financial institutions and markets in providing funding to business at low cost while maintaining sustainable profits and sufficient liquidity. The key estimation results are reported in Table 3.

INSERT TABLE 3 ABOUT HERE

It is immediately apparent that the relationship under examination is affected by the level of financial development. In countries where this is low or medium trade openness has a negative impact in the short run. A plausible explanation is that such countries have a comparative disadvantage since they specialise mainly in goods with constant or very small increasing returns to scale and exports of goods not relying on external finance. However, the effect is positive in the long run when changes in trade patterns can boost financially intensive sectors. By contrast, in countries with a high level of financial development there is a positive effect in both the short and the long run – such economies have a comparative advantage in manufacturing industries (Kletzer and Bardhan, 1987).

5. Conclusions

This paper analyses the impact of trade openness on financial development in both the short and the long run in the case of 35 European countries over the period 2001-2019. Dynamic panel methods are used for this purpose, more specifically the PMG estimator developed by Pesaran et al. (1999), which has been shown to have a number of advantages over alternative methods. The chosen countries are relatively diverse in terms of their financial development, governance and per capita income; this offers an interesting opportunity to examine whether these variables affect the trade-finance nexus by splitting the sample into subgroups on their basis and estimating the model for each subgroup. Note that according to the World Bank, European countries can be classified as either middle- or high-income ones, and financial development tends to be higher in the latter group.

Our findings confirm that trade openness is an important determinant of financial development in the countries under examination, although there are differences between short- and long-run effects and also between the sub-groups created on the basis of the income, governance and financial development level, which is consistent with other studies on this topic (Do and Levchenko, 2007; Huang and Temple, 2005; Kim et al. 2011). In particular, we find evidence that in the middle-income countries trade openness tends to strengthen financial development in the long run but to have an adverse effect in the short run. This result also holds for the countries characterised by low governance, weaker institutions and lower financial development. By contrast, in the case of high-income countries with better institutions and a high level of financial development, there is a positive and significant impact of trade openness on financial development in the short run.

To sum up, our results confirm that trade openness boosts financial development and also that the trade–finance link is affected by the level of economic development, governance and financial development in the European countries. Interestingly, in the case of middle-income, low-governance and low and middle financial development countries there is an adverse impact of trade openness on financial development in the short run, but this effect becomes positive in the

long run when higher openness, followed by restructuring and the implementation of trade and financial reforms, boosts trade as well as financial development.

These findings are also of interest to policy makers given the fact that international trade and financial development are both key drivers of economic growth (Levine, 2005). Trade can improve living standards not only directly, through specialisation and economies of scale, but also indirectly, by boosting financial development. The latter effect depends to some extent on policy makers, since the degree of trade openness is at least partly a matter of policy choice.

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Table 1: PMG results on the trade-finance nexus in the short and long run

Sample / Variable	Full sample of European countries	High Income countries	Middle income countries
	(1)	(2)	(3)
TO	0.291	0.600	1.311
	(1.09)	(1.11)	(3.08)**
RGDPC	1.149	0.565	0.320

	(2.38)**	(5.12)***	(0.93)
INFL	-0.145	-0.290	-0.667
	(0.73)	(1.24)	(1.77)*
IQ	0.467	0.103	0.545
	(1.79)*	(1.83)*	(1.92)*
UI	-0.157	0.050	-0.017
	(0.59)	(0.88)	(1.53)
ec	-0.042	-0.106	-0.059
	(4.24)***	(4.99)***	(2.32)**
ΔTO	0.068	0.117	-0.057
	(0.72)	(1.80)*	(1.66)*
Δ.RGDPC	0.180	0.408	0.257
	(1.68)*	(2.18)**	(1.88)*
Δ.INFL	-0.243	-0.009	-0.047
	(1.08)	(1.61)	(1.81)*
Δ.IQ	0.046	0.053	-0.133
	(0.76)	(1.82)*	(1.86)*
Δ.UI	-0.004	0.001	-0.006
	(1.79)*	(0.54)	(2.24)**
Constant	0.525	-0.318	0.269
	(4.18)***	(5.02)***	(2.12)**
Observations	649	442	207
Absolute value of z statistics in parentheses			
* significant at 10%; ** significant at 5%; *** significant at 1%			

Table 2: PMG and results on the trade-finance nexus in the short and long run by governance level

	Dependent Variable: DCPS	
	Low governance countries	**High governance countries**
Long-run coefficients		
Trade openness (TO)	0.259	0.094
	(2.48)**	(1.86)*
Error correction		
__C	-0.108	-0.066
	(1.69)*	(4.30)***
Short-run coefficients		
ΔTO	-0.071	0.017
	(1.89)*	(2.24)**
Constant	-0.217	0.462
	(0.59)	(4.72)***
Sample	151	498

Table 3: PMG results on the trade-finance nexus in the short and long run by financial development level

	Dependent Variable : DCPS		
	Low Financial Development countries	**Middle Financial Development countries**	**High Financial Development countries**
Long-run coefficients			
Trade openness (TO)	0.103	0.335	0.206
	(2.69)**	(1.86)*	(1.00)
Error correction			
__C	-0.018	-0.016	-0.138
	(2.30)**	(1.92)*	(3.62)***
Short-run coefficients			
ΔTO	-0.077	-0.023	0.326
	(1.84)*	(0.37)	(1.67)*
Constant	-0.173	0.133	0.193
	(1.54)	(0.56)	(2.18)**
Sample	170	221	258

APPENDIX

Table A1: List of Countries

Albania	Denmark	Luxembourg	Romania
Austria	Finland	Malta	Russia
Belgium	France	Moldavia	Serbia
Bulgaria	Greece	Macedonia	Switzerland
Bosnia	Germany	Montenegro	Sweden
Belarus	Hungary	Nederland	Spain
Cyprus	Ireland	Norway	Ukraine
Czech Republic	Iceland	Poland	United Kingdom
Croatia	Italy	Portugal	

Table A2: List of variables

Code	Variables	Source
$DCPS_{it}$	Domestic Credit to the private sector as share of GDP	World Bank-World Development Indicators (WDI)
TO	Trade openness as share of GDP	World Bank-World Development Indicators (WDI)
RGDPC	Real income per capita, (current international $)	World Bank-World Development Indicators (WDI)
INF	Inflation, consumer price index	World Bank-World Development Indicators (WDI)
IQ	World Governance index	World Bank-World Development Indicators (WDI) Authors' calculations based on the WDI database
UI	Uncertainty index	IMF database

Figure 1: Inflation for middle income and high income countries, 2001-2019

$y = 0.0908x^2 - 2.619x + 22.423$
$y = 0.0009x^2 - 0.1493x + 3.4439$
$R^2 = 0.5484$
$R^2 = 0.4057$

Legend:
- Middle_income
- High-income
- Poly. (Middle_income)
- Poly. (High-income)
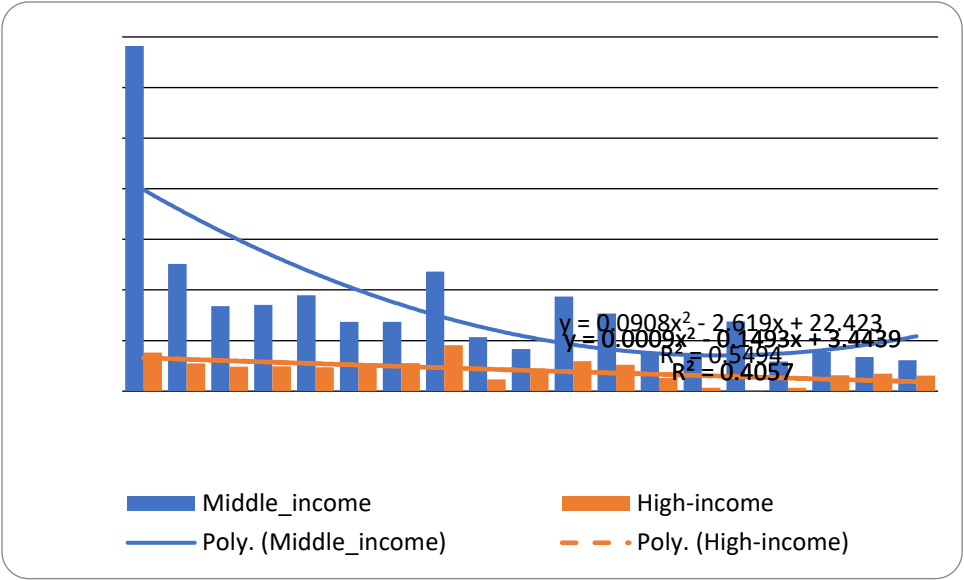
Source : Authors' calculations based on the WDI database