Poverty, Inequality and Trade Facilitation in Low and Middle Income Countries

Nguyen, Cuong

15 September 2013

Poverty, Inequality and Trade Facilitation in Low and Middle Income Countries

Nguyen Viet Cuong[1]

Abstract

Although there are numerous empirical studies on the effect of trade facilitation on international trade and GDP, there have been no studies on the association between trade facilitation and poverty as well as inequality. This paper examines this association in low and middle income countries using GMM-type instruments for trade facilitation. It is found that trade facilitation which is measured by the number of documents and the time for exports and imports is strongly correlated with poverty, inequality and per capita GDP. Countries with more improvement in trade facilitation are more likely to have lower poverty and inequality, and higher per capita GDP than other countries with less improvement in trade facilitation.

Keywords: Trade facilitation, poverty, inequality, international trade, developing countries.

JEL Classification: F13, F15, I30.

[1] This study is funded by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), the United Nations. I would like to express great thanks to participants in the workshop "Trade Facilitation for Poverty Reduction: Building Capacity for the Implementation of Pro-Poor Trade Facilitation Policies and Measures in Developing Asian Countries" on March 26, 2013 for their useful comments on this paper. I would also like to thank an anonymous reviewer of ARTNeT Working Paper for his/her helpful comments on this paper.
Nguyen Viet Cuong is a researcher from National Economics University, and Mekong Development Research Institute, Hanoi, Vietnam.
Tel: (84) 904159258; Fax: (844) 38693369
Email: nguyen.cuong@ippm.edu.vn
Website: http://ideas.repec.org/e/png36.html

1. Introduction

International trade is a key element of global economic integration. Since the Second World War, the world economy has experienced high economic growth and the international trade. Together with global economic integration, the world trade volume has been increasing remarkably. During the period 1950-2007, the world trade volume increased by twenty-seven fold, three times as much as the world output growth (World Trade Organization, 2007). The world trade volume accounted for one-tenth of the world GDP in 1950, but around one-third of the world GDP in 2000 (Mussa, 2000).

One of the main reasons for increasing international trade is decreasing cost of the international trade. Together with continuous trade liberalization, a significant tariff reduction has been experienced in most countries throughout the world (World Trade Organization, 2007). It is estimated that "levels of protection for domestic manufacturing industries in industrial countries have declined by as much as 90 percent since the Second World War" (Mussa, 2000). Technology development in transportation and communication also contribute largely to reduction of international cost.

Recently, trade facilitation has been emerging as an important strategy in international trade promotion. Trade facilitation has been put in the agenda of WTO since 1994, and the member governments of WTO have started negotiations on trade facilitation since 2004 (Duval, 2007). As countries have been increasingly involved in bilateral and multilateral trade agreements, the tariff rates tend have been decreasing. There is a growing recognition that non-tariff regulations will be a main obstacle for international trade. The main objective of trade facilitation is to reduce transaction costs of international trade by simplifying customary and technical regulations (United Nations, 2002). Trade facilitation often refers to simplifying and improving efficiency of international trade procedures (United Nations, 2002; Wlson et al., 2003, 2005; Engman, 2005; Iwanow and Kirkpatrick; 2007). Trade facilitation can include from improving the trade logistics at ports to improving the environment of transaction costs such as simplification and harmonization of procedures on international movements of goods and services (Wilson et al., 2003, 2005; Iwanow and Kirkpatrick; 2007). According to Duval (2007), trade

facilitation can be improved by increasing efficiency of trade-related activities including customs, transport, and banking and insurance (services and infrastructure). Trade facilitation is not limited to at-the-border and customs control processes. It can be involved with governance and human resource development.

The direct impact of trade facilitation is to increase the international trade. Wilson et al. (2005) examines the relationship between trade facilitation and international trade in Asia-Pacific countries. They find that improving port efficiency, customs and e-business can have a positive effect on trade flows. On the contrary, heavy regulatory environments can harm the trade flows. In Clark et al. (2004), it shows that a reduction in inefficiencies in transport costs can result in an increase in bilateral trades of countries to the US. Dollar et al. (2006) finds that the number of days to clear goods through customs has a negative effect on exports in developing countries. Iwanow and Kirkpatrick (2007) find that a 10 percent improvement in trade facilitation can increase the export volume by around 5 percent. Djankov et al. (2010) examine how the time delays of shipment of products on international trade. They find that an additional day that a product is delayed can decrease the international trade volume by around one percent. Recently, Dennis and Shepherd (2011) show that trade facilitation improvement can promote export diversification in developing countries. A 10 percent reduction in the export cost can lead to a three percent increase in export diversification.

There are other numerous studies which find a positive relation between trade facilitation and international trade flows (e.g. APEC, 1999; Hertel et al., 2001; Hummels, 2001; Kim et al., 2004; Walkenhorst, 2005; Clarke, 2005; Hertel and Keeney, 2006; Francois and Manchin, 2006; Nordas et al., 2006; Sadikov, 2007; Duval and Utoktham, 2009). Engman (2005) provides an overview of 9 empirical studies on the effect of trade facilitation on trades, and find several interesting findings. Firstly, most studies find a positive effect of trade facilitation even very small improvement in trade facilitation. Secondly, the effect of trade facilitation in relative value tends to be higher for developing countries than developed countries. Thirdly, the effect on trade of improvement in port efficiency is larger than the effect of improvement in custom procedures.

Since trade facilitation can increase international trade of a country, it can promote economic growth and affect poverty and income distribution of the country. Economic

growth constitutes a prerequisite to reduce poverty (Dollar and Kraay, 2000; Ravallion, 2004). Many studies have documents the positive effect of trade facilitation on employment and poverty reduction (e.g., McCulloch, 2001; Harrison, 2005; Winters, et. al., 2004; Hoekman and Winters, 2005). Hoekman and Winters (2005) find the role of trade in employment generation tends to increase overtime. Expansion of export-oriented sectors can create employment for low skilled workers. Several studies find a positive correlation between trade facilitation and employment (Dennis, 2006; ESCAP, 2009; Zaki, C., 2011)

However, the effect of trade facilitation on poverty is not always known a priori. If the rich are mainly beneficiaries from economic growth caused by international trade, the effect on poverty reduction of economic growth will be modest (Kakwani and Pernia, 2000; Ravallion, 2004). International trade does not necessarily lead to poverty reduction, since it can have adverse impacts on economies and the poor in the short-run (Easterly and Kraay, 2000). A main channel for shock transmission from the global economy to an economy of a country is the price of output and inputs (Winters et. al., 2004). A sudden decrease in output prices can quickly push the poor households who are in tradable sectors into losses and poverty. Another way that trade liberalization can be harmful to the poor is through employment and wages. A traditional Hechscher-Ohlin trade model argues that if unskilled labor in developing countries is abundant, trade liberalization will result in an increase in export sectors that are unskilled labor intensive, thereby increasing employment for the unskilled labor and reducing poverty. However, if unskilled labor is not abundant, or they are concentrated in non-traded sectors, the impact on employment of the poor is negligible, e.g., in Latin America countries (Marquez and Pages, 1998, Levinsohn, 1999, and Moreira and Najberg, 2000). Trade liberalization can result in technology changes favorable for semi-skilled or skilled labors, but not unskilled labors.

International trade can change real wages, thus income and poverty can be affected. According to the Stolpher-Samuelson theorem, if the price of labor-intensive products increases, the production and employment will go up, and real wage increases. In contrast, a decrease in the price will be associated with a decrease in wages. Several empirical studies show the negative impact of trade liberalization on wage (Revenga, 1997; Marquez and Pages, 1998; Milner and Wright, 1998; Levinsohn, 1999). Thus the

effect of international trade boost on poverty cannot be predicted with a certainty. The effect of international trade on inequality is also ambiguous, since international trade can have heterogeneous effects on different people.

In this study, we aim to examine the association between trade facilitation and poverty and inequality in low and middle income countries (the list of countries is presented in Table A.3 in Appendix). We focus on the low and middle income countries for two reasons. Firstly, the poverty rate is substantially higher in low and middle income countries than in high income countries. In this study, we will measure poverty using the poverty line of $1.25 and $2 a day (PPP). Under these poverty lines, the poverty rate in all the high income countries is almost zero.[2] Secondly, compared with developed countries, trade transactions costs are higher, and there is a higher impact of trade facilitation on trade flows (Engman, 2005; Layton, 2007). As a result, we can expect a large effect of trade facilitation on poverty and inequality in the developing countries.

Although there are numerous empirical studies on the direct effect of trade facilitation on international trade, there are few empirical studies on indirect effects of trade facilitation on other economic outcomes. There are several studies which examine the effect of trade facilitation on GDP and economic welfare and they find a positive effect of trade facilitation (e.g., APEC 1999; Kinnman and Decreux and Fontagné, 2006; Hertel and Keeney, 2006; Lodefalk, 2007). Engman (2005) reviews several studies which investigate the effect of trade facilitation on government revenue and foreign direct investment. These studies find a positive association between the trade facilitation level and government revenue and foreign direct investment. To our knowledge, there have been no studies on the relation between trade facilitation and poverty as well as inequality. Thus, the study is expected to make an empirical contribution to the literature of international trade as well as development economics.

The paper is structured into five sections. The second section presents the descriptive statistics on trade facilitation, poverty and inequality of developing countries. The third section presents the estimation method, and the fourth section reports the empirical findings. Finally, the fifth section concludes.

[2] There are four countries including Croatia, Hungary, Poland, Slovak Republic reporting the poverty rate poverty line of $1.25 and $2 a day (PPP) below 1 percent in 2000s.

2. Trade facilitation, poverty and inequality

The main data source in this study is from the World Bank database.[3] Up to 2012, there were data on 1,260 indicators of countries throughout the world. The data are collected from different sources, provided by international agencies and governments. The data set includes several indicators of trade facilitation, such as logistics performance index, the number of documents, the number of days, and import and export costs for most countries in the world. Data on poverty indexes, Gini and other country-level indicators are also available. These yearly data form unbalanced panel data of countries during 2005-2012. The number of low- and middle-income countries that have data on trade facilitation as well as poverty and inequality is 90. The number of observations totals 225.

For the study detailed in this chapter, based on the availability of the World Bank's database, four measures of trade facilitation were used:

(a) The number of documents for exports (figure 1). Such documents are required by government ministries, customs authorities, port and container terminals, health and technical control agencies, and banks for each shipment to be exported;

(b) The number of documents for imports (figure 1). Such documents are required by government ministries, customs authorities, port and container terminals, health and technical control agencies, and banks for each imported shipment;

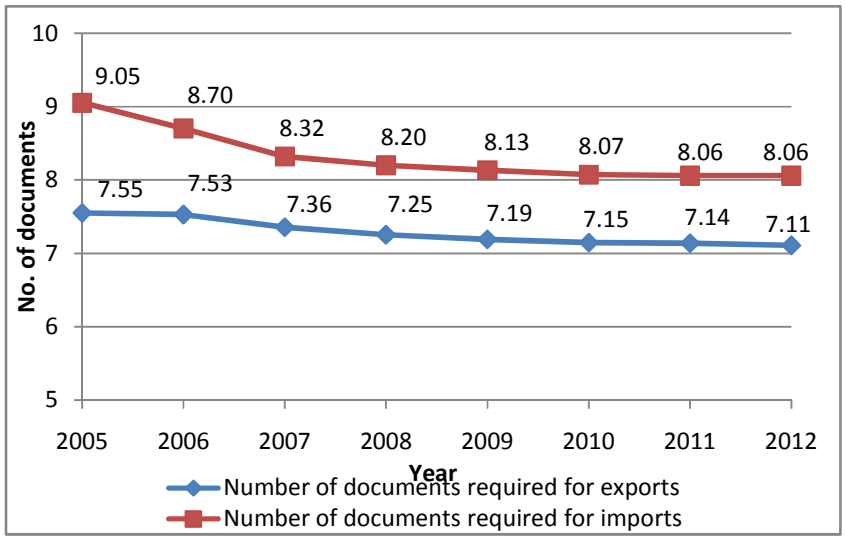
(c) Time taken to export (number of days) (figure 2). The time calculation for the export procedure starts from when a shipment is initiated up until the shipment is completed;

(d) Time taken to import (number of days) (figure 2). The time calculation for the import procedure starts from when a shipment is initiated up until receipt of the shipment is completed.

The first two measures are more related to custom procedures and regulations, while the last two measures reflect efficiency of overall international trade procedures. A more detailed definition of these trade facilitation measures is presented in annex table 1.

[3] Data are available at http://data.worldbank.org/.

Figure 1. Number of documents required for exports and imports

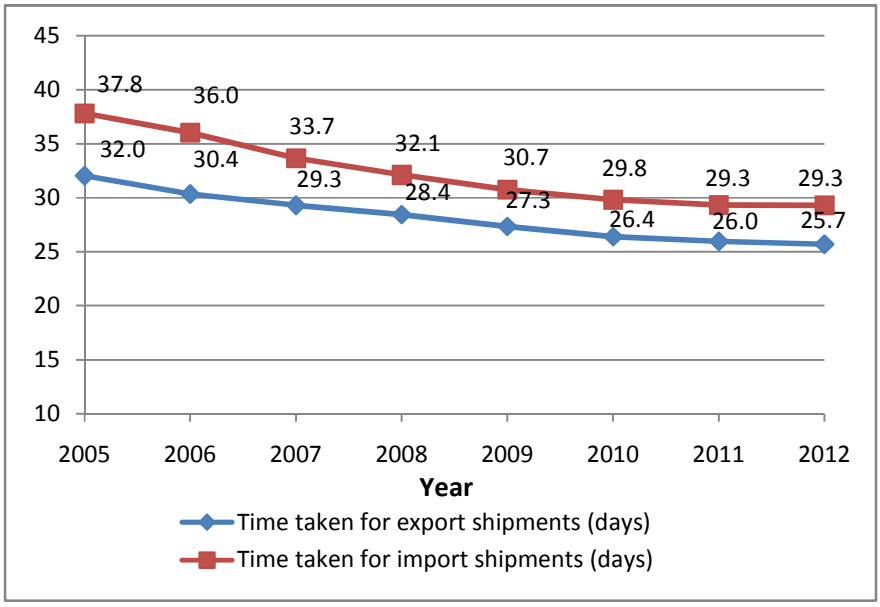


Source: Author's calculation based on the World Bank database.

According to the United Nations (2002), customs procedures and documentation can be obstacles to international trade. It is estimated that high administrative costs caused by customs procedures and requirements can account for between 7 per cent and 10 per cent of the value of global trade. Figure 1 shows the average number of documents for exporting and importing a good in low- and middle-income countries during 2005-2012. As expected, exporting requires fewer documents than importing. The number of documents required for both exporting and for importing decreased during that period. In 2005, the average number of documents for exporting and importing was approximately 7.55 and 9.05, respectively. These figures decreased to 7.11 and 8.06, respectively, in 2012.

Figure 2 shows the average time needed to export as well as to import a good in the low- and middle-income countries (expressed in the number of days). The average time decreased during 2005-2012. The time required to import a good was lower than the time to export a good. In 2012, the number of days was 25.7 for exports and 29.3 for imports, respectively.

Figure 2. Time to export and import (days)



Source: Author's calculation from the World Bank database.

Table 1 presents the four trade facilitation measures by income level and geographical region of countries. Trade facilitation has improved more in higher income countries. Countries in the Latin American and Caribbean, European, and East Asia and the Pacific regions require a smaller number of documents and a fewer days for international trade than countries in other regions. Compared with other countries, Central Asian, sub-Sahara African and South Asian countries require a higher number of documents and longer times for exports and imports.

Table 1. Trade facilitation by income levels and regions

	Documents for exports (number)	Documents for imports (number)	Time to export (days)	Time to import (days)
Income group				
Low income	8.23	9.91	40.24	46.78
Lower middle income	7.42	8.18	27.47	31.42
Upper middle income	6.51	7.41	20.81	23.61
Region				
East Asia and the Pacific	6.75	7.64	24.31	26.21
Central Asia	11.16	13.03	75.13	77.41

	Documents for exports (number)	Documents for imports (number)	Time to export (days)	Time to import (days)
Europe	6.69	7.75	19.67	22.06
Latin America and Caribbean	6.43	7.24	19.69	22.52
Middle East and North Africa	6.79	8.19	26.18	31.36
South Asia	8.34	9.47	33.05	34.73
Sub-Sahara Africa	7.88	8.94	33.96	41.00
Average	7.28	8.32	28.18	32.34

Source: Author's calculation based on the World Bank database.

The World Bank database contains data on logistics performance indexes, which are computed from Logistics Performance Index surveys conducted by the World Bank. Table 2 presents the seven logistics performance indexes for seven areas as well as the overall weighted index that is computed from the seven indexes. The logistics performance indexes express a very similar pattern for the number of documents and time for trade and tend to improve overtime. Table 2 shows that trade facilitation measured by the logistics performance indexes has improved more in higher-income countries than in lower-income countries. Countries in Latin America and the Caribbean, and East Asia and the Pacific have lower logistics performance indexes, while sub-Sahara African and South Asian countries have higher logistics performance indexes.

Table 2. Logistics performance index

	Logistics performance index						
	Efficiency of customs clearance process (1= low, 5=high)	Quality of trade and transport-related infrastructure (1=low , 5=high)	Ease of arranging competitively priced shipments (1=low, 5=high)	Competence and quality of logistics services (1=low, 5=high)	Ability to track and trace consignments (1=low, 5=high)	Frequency with which shipments reach consignee on schedule (1=low, 5=high)	Overall (1=low, 5=high)
Year							
2007	2.27	2.23	2.46	2.40	2.41	2.87	2.44
2010	2.29	2.28	2.67	2.47	2.63	3.18	2.60
2012	2.38	2.46	2.62	2.55	2.60	3.02	2.61
Income group							
Low income	2.15	2.06	2.39	2.25	2.30	2.76	2.32
Lower middle income	2.25	2.25	2.53	2.44	2.50	3.02	2.50
Upper middle income	2.49	2.58	2.78	2.67	2.78	3.22	2.76
Region							
East Asia and Pacific	2.44	2.47	2.73	2.59	2.71	3.20	2.69
Central Asia	2.21	2.22	2.45	2.32	2.42	2.91	2.36
Europe	2.40	2.47	2.77	2.60	2.69	3.17	2.71
Latin America	2.40	2.47	2.65	2.59	2.72	3.19	2.67

	Logistics performance index						
	Efficiency of customs clearance process (1= low, 5=high)	**Quality of trade and transport-related infrastructure (1=low , 5=high)**	**Ease of arranging competitively priced shipments (1=low, 5=high)**	**Competence and quality of logistics services (1=low, 5=high)**	**Ability to track and trace consignments (1=low, 5=high)**	**Frequency with which shipments reach consignee on schedule (1=low, 5=high)**	**Overall (1=low, 5=high)**
and Caribbean							
Middle East and North Africa	2.27	2.33	2.59	2.44	2.45	3.01	2.52
South Asia	2.25	2.19	2.49	2.41	2.45	2.91	2.46
Sub-Sahara Africa	2.22	2.15	2.45	2.35	2.40	2.85	2.41
Average	2.31	2.32	2.58	2.47	2.55	3.02	2.55

Source: Author's calculation based on the World Bank database.

It should be noted that in the current study the logistics performance indexes were not used as a trade facilitation measurement in the main analysis of trade facilitation and poverty because of several observations. Data on both poverty measures and the logistics performance indexes are available for only 52 countries. However, the number of documents and days needed for exports and imports can be relevant measures of trade facilitation. Table 3 shows a strongly negative correlation between the logistics performance indexes and the number of documents and days needed for exports and imports.

Table 3. Correlation between trade facilitation measures

	Documents for exporting (number)	Documents for importing (number)	Time taken to export (days)	Time taken to import (days)	Efficiency of customs clearance process	Quality of trade and transport-related infrastructure	Ease of arranging competitively priced shipment	Compete and quality of logistics services	Ability to track and trace consignments	Frequency shipments reach consignee within schedule	Overall index
Documents for exporting (number)	1.00										
Documents for importing (number)	0.57	1.00									
Time taken to export (days)	0.57	0.94	1.00								
Time taken to import (days)	0.72	0.59	0.62	1.00							
Efficiency of customs clearance process	-0.38	-0.40	-0.39	-0.37	1.00						
Quality of trade and transport-related infrastructure	-0.36	-0.45	-0.43	-0.36	0.83	1.00					
Ease of arranging competitively priced shipments	-0.34	-0.38	-0.38	-0.31	0.69	0.72	1.00				
Competence and quality of logistics services	-0.29	-0.40	-0.38	-0.31	0.83	0.85	0.75	1.00			
Ability to track and trace consignments	-0.36	-0.41	-0.40	-0.33	0.76	0.77	0.74	0.83	1.00		
Frequency shipments reach consignee within schedule	-0.31	-0.36	-0.35	-0.28	0.67	0.66	0.67	0.73	0.76	1.00	
Overall index	-0.38	-0.45	-0.44	-0.36	0.88	0.90	0.87	0.93	0.91	0.85	1.00

Source: Author's calculation based on the World Bank database.
Note: All the correlation coefficients are statistically significant (different from zero) at the 1 per cent level.

Poverty indexes, per capita GDP and the Gini index are presented in table 4. Poverty is measured by the poverty rate and poverty gap index (both in per cent).[4] There are no data on the poverty severity index. As expected, there is a strongly negative correlation between poverty and per capita GDP. The poverty rate and poverty gap index are higher in sub-Sahara African and South Asian countries, which have low per capita GDP. However, inequality measured by the Gini index is higher in high-income countries than in low-income countries.

Table 4. The average poverty index by income levels and regions during 2006-2011

	Poverty rate at poverty line of $ 1.25 a day (PPP)	Poverty rate at poverty line of $ 2 per day (PPP)	Poverty gap at poverty line of $ 1.25 per day (PPP)	Poverty gap at poverty line of $ 2 per day (PPP)	GDP per capita, PPP (constant 2005 international $)	GINI index
Income level						
Low income	43.62	66.99	16.96	31.76	1 180.4	39.66
Lower middle income	15.12	31.62	5.09	11.98	3 759.6	41.62
Upper middle income	3.36	8.12	1.33	2.91	9 887.8	44.13
Region						
East Asia and Pacific	17.18	39.49	3.90	13.19	4 530.7	40.23
Central Asia	5.95	20.11	1.46	5.66	4 852.4	33.5
Europe	1.86	6.44	0.53	1.78	8 585.4	34.47
Latin America and Caribbean	7.31	14.46	3.29	6.09	8 047.6	51.47
Middle East and North Africa	2.53	11.84	0.57	2.82	5 010.4	36.10
South Asia	27.63	59.88	6.36	20.90	2 387.8	33.76
Sub-Saharan Africa	46.51	67.41	19.09	33.72	2 655.3	44.49
Total	13.57	25.27	5.01	10.45	6 444.2	42.59

Source: Author's preparation from the World Bank's database.
Note: The number of observations is 224.

Table 5 presents the average poverty measures, per capita GDP and Gini index by different percentiles of trade facilitation measures. It is obvious that countries with greater improvement in trade facilitation are more likely to have lower poverty and higher per

[4] The poverty measures are expressed as (Foster and others, 1984):

$$FGT(\alpha) = (\frac{1}{\sum w_i})\sum w_i(1-(x_i / z))^{\alpha}$$

where x_i is per capita expenditure for those individuals with weight w_i who are below the poverty line, and zero for those above; z is the poverty line and $\sum w_i$ is total population size. Note: α takes a value of 0 for the poverty rate, 1 for the poverty gap index and 2 for the poverty severity index.

capita GDP. The relationship between the Gini index and the level of trade facilitation are less clear.

Table 5. Average poverty index by percentile of trade facilitation measures, 2006-2011

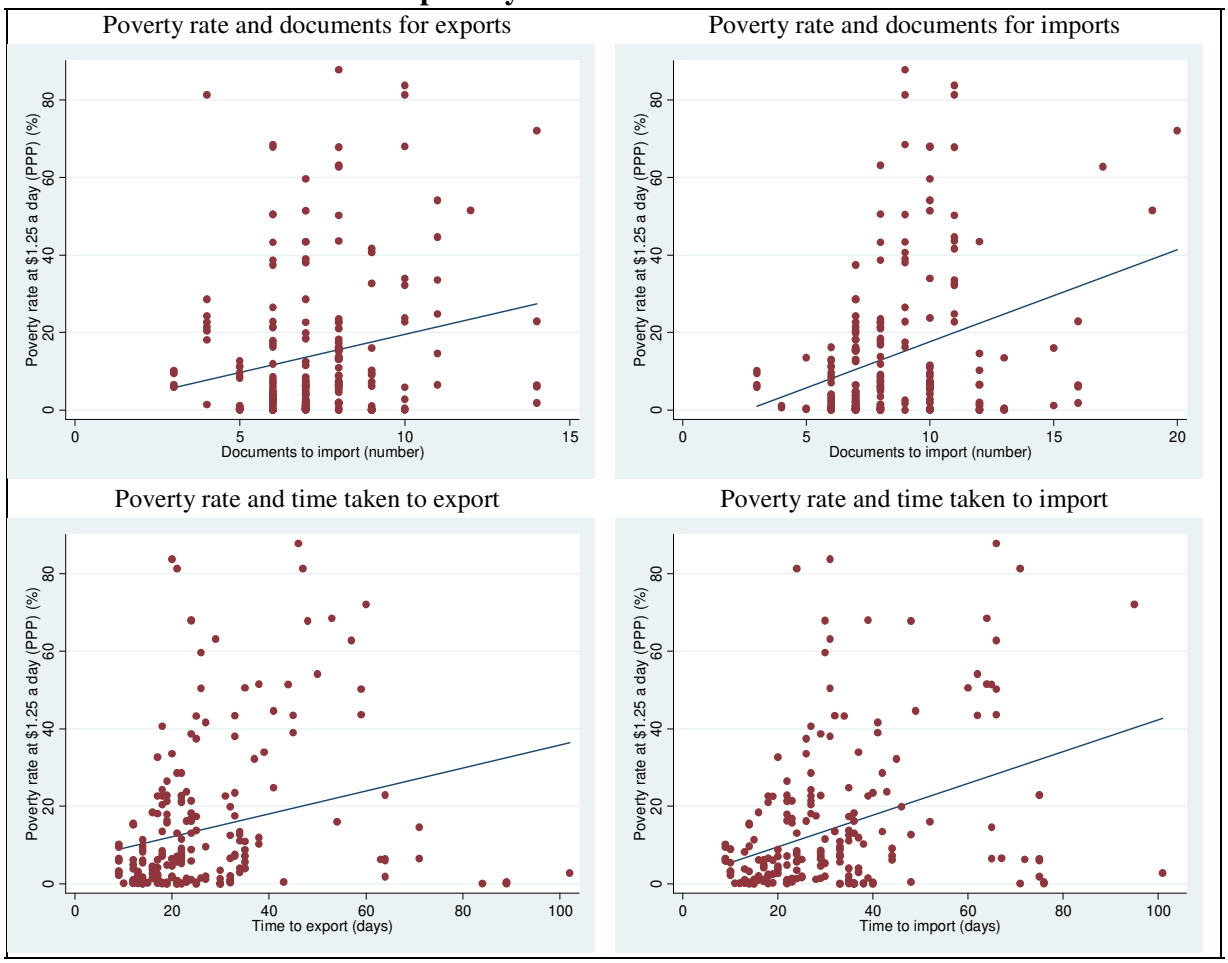
	Poverty rate at poverty line of $ 1.25 per day (PPP)	Poverty rate at poverty line of $ 2 per day (PPP)	Poverty gap at poverty line of $ 1.25 per day (PPP)	Poverty gap at poverty line of $ 2 per day (PPP)	GDP per capita, PPP (constant 2005 international $)	GINI index
Documents to export (number)						
0-25th percentile	11.23	22.11	4.04	8.79	7 305.0	43.51
25th-50th percentile	8.73	17.15	3.14	6.81	7 389.0	41.49
50th-75th percentile	18.12	32.32	7.11	13.98	4 746.8	46.32
75th -100th percentile	19.75	34.70	7.19	14.81	5 279.0	38.76
Documents to import (number)						
0-25th percentile	6.16	14.63	2.06	5.13	8 185.3	43.07
25th-50th percentile	11.65	24.29	3.67	9.09	6 235.8	44.00
50th-75th percentile	23.33	37.34	9.79	17.62	3 998.8	42.94
75th -100th percentile	23.08	38.80	8.54	17.10	5 295.0	39.27
Time taken to export (days)						
0-25th percentile	4.4	10.73	1.47	3.70	9 547.4	43.80
25th-50th percentile	12.53	23.94	4.80	9.88	6 774.9	44.93
50th-75th percentile	15.24	28.76	5.20	11.56	4 757.6	39.38
75th-100th percentile	25.25	42.60	9.72	18.95	3 506.0	41.59
Time taken to import (days)						
0-25th percentile	4.04	10.02	1.37	3.43	9 403.1	42.6
25th-50th percentile	12.83	26.77	4.45	10.24	6 595.8	45.71
50th-75th percentile	14.31	25.53	5.25	10.82	5 378.5	43.24
75th-100th percentile	24.25	40.77	9.39	18.21	3 960.1	39.38
Total	13.57	25.27	5.01	10.45	6 444.2	42.59

Source: Author's calculation based on the World Bank database.
Note: The number of observations is 224.

Figures 3, 4 and 5 show the level of poverty rate, per capita GDP and the Gini index in relation to the trade facilitation variables. The lines in the figures are the linear regressions of the variable in the vertical axis on the variable in the horizontal axis. The slope of the regression line is statistically significant at the 1 per cent level. Countries with a larger number of documents and days needed for exporting and importing tend to have a higher poverty rate, lower per capita GDP and a slightly lower inequality level.[5]

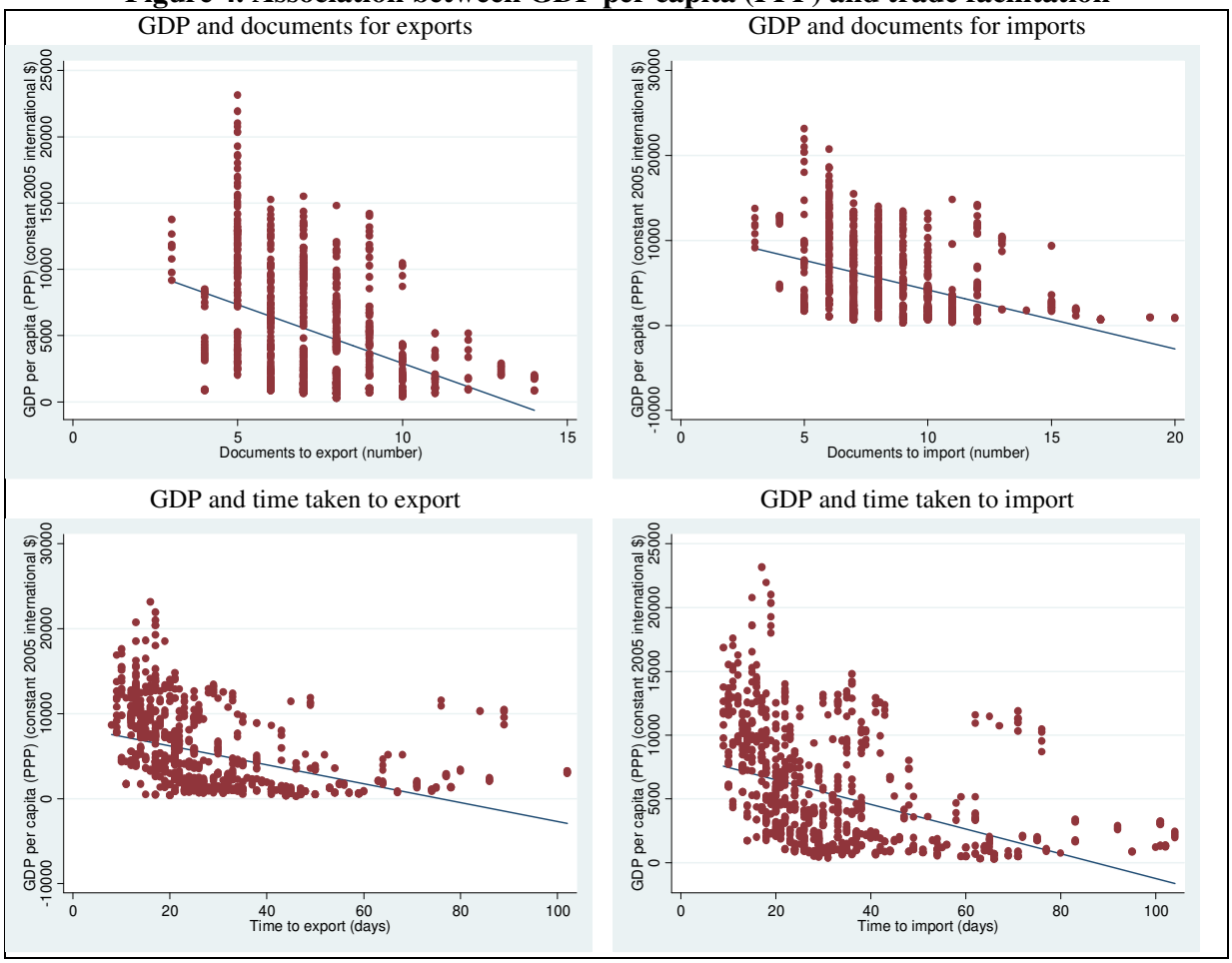
[5] The association between the poverty gap rates, and the national poverty line and the poverty line of U$ 2 PPP per day, the poverty gap index and trade facilitation variables are presented in the annex.

Figure 3. Association between the poverty rate (measured at the poverty line of $ 1.25 PPP per day and trade facilitation



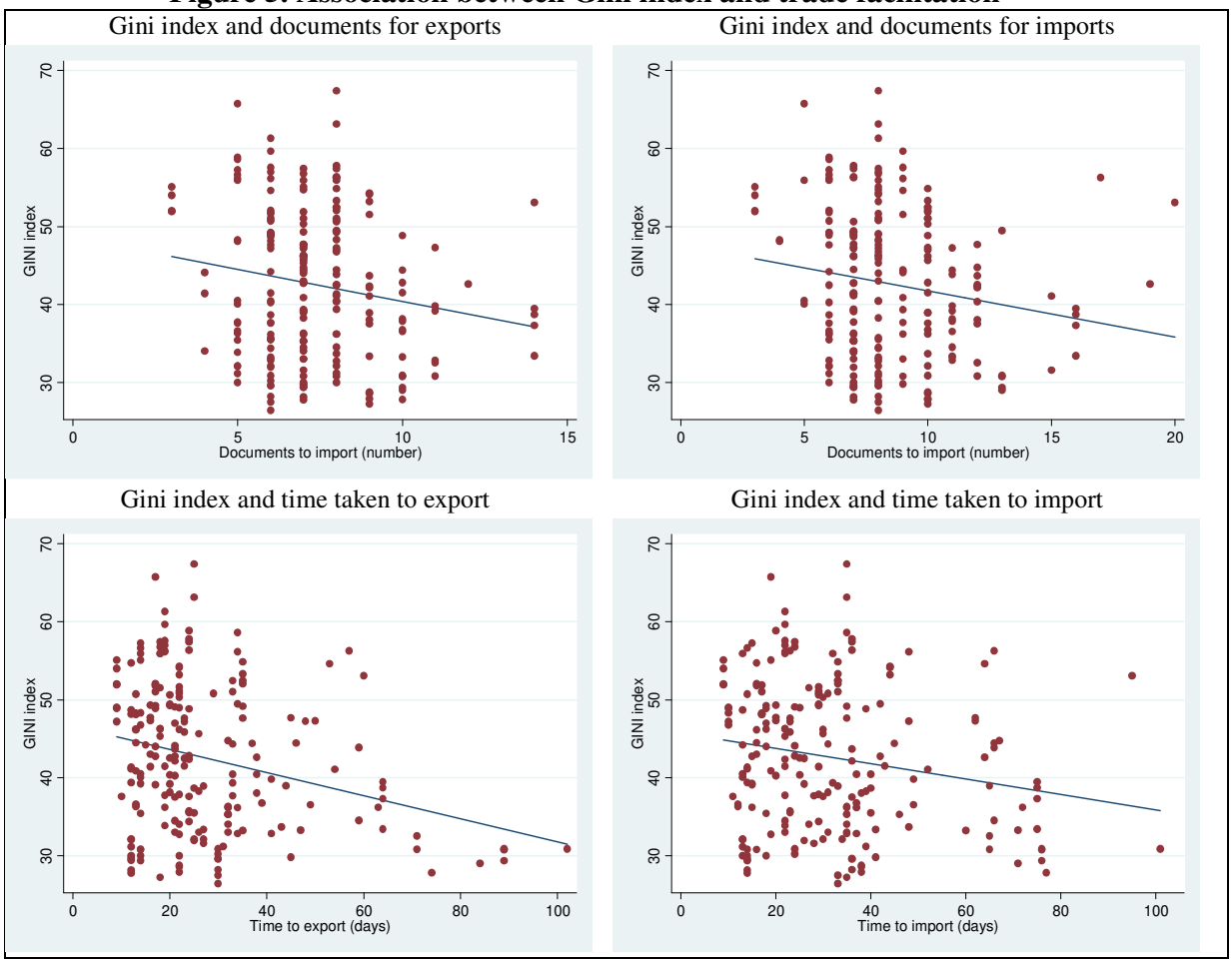
Source: Author's calculation based on the World Bank database.
Note: The number of observations is 224.

Figure 4. Association between GDP per capita (PPP) and trade facilitation



Source: Author's calculation based on the World Bank database.
Note: The number of observations is 900.

Figure 5. Association between Gini index and trade facilitation



Source: Author's calculation based on the World Bank database.
Note: The number of observations is 224.

3. Regression analysis

The study used econometric models to measure the effect of trade facilitation on poverty, GDP and inequality. More specifically, regressions were run of poverty indexes, per capita GDP and the Gini index on trade facilitation indicators and other explanatory variables, using panel data of low- and middle-income countries.[6] More specifically, the following function of poverty as well as inequality was used:

$$y_{it} = \alpha + TF_{it}\beta + X_{it}\theta + v_i + u_{it}, \quad (1)$$

where y_{it} is the poverty index (also log of per capita GDP, log of export volume and the Gini index) of country *i* in year *t*, and TF_{it} are trade facilitation variables of country *i* in

[6] Since the effect of trade facilitation on international trade is not estimated, a gravity model is not used.

year *t*. As mentioned, indicators of trade facilitation are the number of documents required for exporting and importing a good, and the number of days taken to export and import. X_{it} is a vector of explanatory (control) variables that include dummy variables of years, population density and geographical regional dummies. A small set of control variables that are strictly exogenous was used. The control variables should not be affected by trade facilitation (Heckman and others, 1999; Angrist and Pischke, 2008). As trade facilitation affects trade and GDP, it can also affect a large number of economic outcomes of the countries. In addition, the difference data were used and time-invariant control variables removed from the estimation. Thus, the number of control variables is small in the regressions. The error term is decomposed into time-invariant component v_i and time-variant component u_{it}. The effect of trade facilitation is measured by β.

Estimation of the effect of a programme or a policy is always challenging. Without randomization, the effect of a policy can be correlated with unobserved factors. The trade facilitation variables can be correlated with error terms in equation (1). We use panel data to eliminate the time-invariant component v_i by the first-differencing of equation (1):

$$\Delta y_{it} = \Delta TF_{it}\beta + \Delta X_{it}\theta + \Delta u_{it} \quad (2)$$

However, it is possible that ΔTF_{it} can still be correlated with Δu_{it}. Finding absolutely exogenous instrumental variables for trade facilitation variables is difficult. Thus, for estimates of β, a widely-used Generalized Method of Moments (GMM) developed by Holtz-Eakin and others (1988), and Arellano and Bond (1991) can be relied upon. The GMM-type instruments for ΔTF_{it} are higher order lags of the trade facilitation variables. Although the exogeneity of these instruments is always questionable, the over-identification test for the validation of the instruments can be performed.

4. Empirical results

Tables 6 to 9 present the GMM regression of the poverty rate and poverty gap index (measured at the poverty line of $ 1.25 and $ 2 PPP/day), per capita GDP and the Gini index on the trade facilitation variables and other explanatory variables. The results from the OLS regression are shown in the annex.

Several points should be noted. First, the instruments are the first lagged difference of trade variables and other explanatory variables. Since the number of observations is not large, the second-order lagged differences cannot be used as instruments. The Sargan test of over-identifying restrictions is performed and reported in the tables 6 to 9. The null hypothesis that over-identifying restrictions are valid is not rejected in all the regressions.

Second, the Arellano-Bond test for zero autocorrelation of the first-order and second-order in first-differenced errors was performed. The P-value of the test in all the regressions was above 0.1, indicating that the null hypothesis of no autocorrelation was not rejected.

Third, in each regression only one variable of trade facilitation was used in order to avoid the multi-collinearity problem. As indicated in table 3, the trade facilitation variables are strongly correlated. Thus, for each outcome, there are four models with different measures of trade facilitation.

As mentioned above, there are only 52 observations for which data are available both on poverty measures and the logistics performance indexes of trade facilitation. There are no panel data on the logistics performance indexes of trade facilitation. However, the OLS regression of outcomes was also tried on the logistics performance indexes. The results were very similar to the OLS results using the time and documents for imports and exports as the trade facilitation measures.[7]

Table 6 shows the association between the trade facilitation variables and the poverty rate at the poverty line of $ 1.25 PPP per day. Except for the variable "documents for exports", all the trade facilitation variables are statistically significant at the 5 per cent level. Countries requiring a large number of documents for imports and more time for imports and exports are more likely to have a higher poverty rate. One additional document for imports can be associated with a 0.77 percentage point increase in the poverty rate. One additional day in the time needed for exports and imports might increase the poverty rate by 0.49 and 0.47 percentage points, respectively. The sign of trade facilitation variables in GMM regressions is the same as in the OLS regression.

[7] The signs of the logistics performance indexes and the signs of the time and documents to export and import in regression of outcomes are opposite, since the higher value of the logistics performance indexes means improvement in trade facilitation, while the higher value time and documents to export and import means depreciation in trade facilitation.

Improvement in trade facilitation by reducing the number of documents and times for exports and imports is also negatively associated with the poverty gap.

Although the over-identification test is not rejected, the exogeneity of the GMM-type instruments cannot be fully convincing. Thus, the estimate of trade facilitation variables in the GMM regression could be explained as an association between trade facilitation and outcomes instead of a causal effect of trade facilitation.

Table 6. GMM regression of poverty rate at poverty line of $ 1.25 per day (PPP)

Explanatory variables	Poverty rate (%)				Poverty gap index (%)			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Documents for exporting (number)	0.357				0.107			
	(0.483)				(0.220)			
Documents for importing (number)		0.773***				0.297**		
		(0.272)				(0.122)		
Time taken to export (days)			0.494***				0.162***	
			(0.108)				(0.044)	
Time taken to import (days)				0.474***				0.163***
				(0.128)				(0.052)
Population density (people/km^2)	-0.367**	-0.247	0.276	0.493	-0.174**	-0.121	0.042	0.126
	(0.173)	(0.196)	(0.266)	(0.349)	(0.079)	(0.088)	(0.108)	(0.142)
2005	Base omitted							
2006	-0.995*	-0.670	-0.254	-0.404	-0.549**	-0.425	-0.309	-0.349
	(0.526)	(0.580)	(0.729)	(0.837)	(0.240)	(0.260)	(0.295)	(0.341)
2007	-1.701***	-1.186*	-0.362	-0.184	-0.826***	-0.635**	-0.387	-0.307
	(0.559)	(0.630)	(0.816)	(0.977)	(0.255)	(0.282)	(0.331)	(0.398)
2008	-1.838***	-1.261*	0.260	0.646	-0.649**	-0.441	0.031	0.197
	(0.566)	(0.644)	(0.904)	(1.130)	(0.258)	(0.289)	(0.366)	(0.460)
2009	-1.314**	-0.670	0.496	0.839	-0.421	-0.181	0.162	0.309
	(0.669)	(0.739)	(0.974)	(1.196)	(0.305)	(0.331)	(0.394)	(0.487)
Constant	46.884***	31.070	-25.994	-48.479	21.187***	14.247	-3.204	-12.072
	(16.998)	(19.498)	(26.958)	(36.063)	(7.744)	(8.743)	(10.920)	(14.680)
Observations	224	224	224	224	224	224	224	224
Sargan test of over-identifying restrictions: χ^2 statistic and P-value	8.129	3.957	2.427	4.177	6.403	12.36	1.858	3.208
	0.975	0.861	0.999	0.997	0.602	0.498	0.999	0.999

Source: Estimation based on the World Bank database.
Heteroskedasticity-robust standard errors are shown in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

Table 7 presents the regressions of the poverty rate at the poverty line of $ 2 (PPP) per day. All the trade facilitation variables are statistically significant and have the same sign as the regression in Table 6. The point estimates in Table 7 are larger than in Table 6, since the poverty rate measured at the poverty line of $ 2 (PPP) a day is higher than at the poverty line of $ 1.25 (PPP) a day.

Table 7.GMM regression of poverty at poverty line of $ 2 per day (PPP)

Explanatory variables	Poverty rate (%)				Poverty gap index (%)			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Documents for exporting (number)	1.342**				0.370			
	(0.669)				(0.332)			
Documents for importing (number)		1.154***				0.553***		
		(0.374)				(0.188)		
Time taken to export (days)			0.696***				0.332***	
			(0.150)				(0.074)	
Time taken to import (days)				0.748***				0.336***
				(0.189)				(0.090)
Population density (people/km^2)	-0.437*	-0.257	0.473	0.896*	-0.262**	-0.173	0.174	0.346
	(0.240)	(0.270)	(0.371)	(0.515)	(0.119)	(0.135)	(0.182)	(0.247)
2005	Base omitted							
2006	-1.170	-0.734	-0.119	-0.220	-0.747**	-0.523	-0.248	-0.326
	(0.729)	(0.798)	(1.015)	(1.237)	(0.362)	(0.401)	(0.498)	(0.593)
Year 2007	-2.368***	-1.651*	-0.516	0.026	-1.285***	-0.928**	-0.389	-0.209
	(0.774)	(0.865)	(1.137)	(1.444)	(0.384)	(0.435)	(0.558)	(0.692)
2008	-3.403***	-2.633***	-0.540	0.462	-1.392***	-1.001**	-0.001	0.356
	(0.784)	(0.886)	(1.260)	(1.670)	(0.389)	(0.445)	(0.618)	(0.800)
2009	-2.340**	-1.739*	-0.236	0.721	-0.952**	-0.554	0.185	0.514
	(0.926)	(1.015)	(1.356)	(1.767)	(0.460)	(0.510)	(0.665)	(0.847)
Constant	58.772**	41.025	-38.146	-83.826	33.501***	22.653*	-14.898	-33.154
	(23.537)	(26.796)	(37.540)	(53.305)	(11.683)	(13.460)	(18.424)	(25.548)
Observations	224	224	224	224	224	224	224	224
Sargan test of over-identifying restrictions: χ^2 statistic and P-value	1.358 0.999	2.747 0.949	8.284 0.874	2.612 0.999	5.693 0.681	2.450 0.964	2.175 0.9999	1.897 1.000

Source: Estimation based on the World Bank database.
Heteroskedasticity-robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

Table 8 shows a negative relation between per capita GDP and the number of documents and days needed for exports and imports. The OLS regression shown in the annex also shows a negative association. An additional document for exports and imports is associated with a reduction in per capita GDP by the equivalent to 2.9 per cent and 1.5 per cent of per capita GDP, respectively. It should be noted that the average number of documents required for exporting and importing a commodity is 7.3 and 8.3, respectively. It means that the elasticity of the per capita GDP with regard to the number of documents required for exporting and importing is around 0.21 per cent and 0.22 per cent, respectively. Similarly, the increase in the time taken to export and to import is negatively correlated with per capita GDP.

To examine whether the export is the channel through which the trade facilitation affects the GDP, we run regression of log of export values on trade facilitation. The trade

facilitation variables are negative and very significant. Improvement in trade facilitation would help countries significantly increase exportation. The point estimates are larger than those in the regression of GDP on trade facilitation.

Table 8. GMM regression of log of GDP per capita and export volume, PPP (Constant 2005 international $)

Explanatory variables	Log of GDP per capita				Log of export volume			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Documents for exporting (number)	-0.029***				-0.051***			
	(0.009)				(0.012)			
Documents for importing (number)		-0.015***				-0.034***		
		(0.005)				(0.008)		
Time taken to export (days)			-0.009***				-0.022***	
			(0.002)				(0.005)	
Time taken to import (days)				-0.011***				-0.018***
				(0.002)				(0.004)
Population density (people/km^2)	0.018***	0.015***	0.006	-0.002	0.013***	0.009*	-0.013	-0.017*
	(0.003)	(0.003)	(0.004)	(0.006)	(0.004)	(0.005)	(0.008)	(0.010)
2005	Base omitted							
2006	0.017*	0.012	0.004	0.005	0.023*	0.019	0.018	0.023
	(0.009)	(0.010)	(0.012)	(0.015)	(0.014)	(0.014)	(0.020)	(0.022)
2007	0.069***	0.062***	0.046***	0.036**	0.083***	0.073***	0.052**	0.045*
	(0.010)	(0.011)	(0.014)	(0.018)	(0.015)	(0.016)	(0.022)	(0.026)
2008	0.103***	0.095***	0.066***	0.049**	0.114***	0.103***	0.046*	0.037
	(0.010)	(0.011)	(0.015)	(0.021)	(0.015)	(0.016)	(0.027)	(0.032)
2009	0.047***	0.044***	0.020	0.005	-0.012	-0.015	-0.060**	-0.068**
	(0.012)	(0.013)	(0.016)	(0.022)	(0.017)	(0.018)	(0.028)	(0.033)
Constant	7.058***	7.210***	8.173***	8.943***	22.203***	22.479***	24.799***	25.158***
	(0.287)	(0.315)	(0.428)	(0.630)	(0.412)	(0.464)	(0.841)	(1.019)
Observations	222	222	222	222	198	198	198	198
Sargan test of over-identifying restrictions: χ^2 statistic and P-value	6.370 0.605	2.771 0.947	8.394 0.495	4.587 0.917	8.185 0.415	16.39 0.228	12.01 0.605	5.546 0.986

Source: Estimation based on the World Bank database.
Heteroskedasticity-robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

An increase in the number of documents and time required for exports and imports is associated with a small decrease in per capita GDP but a relatively large increase in inequality. It means that income distribution can be worsened by increasing the number of documents and time required for exports and imports. Table 11 shows this relationship. If the number of documents needed for imports increases by one, the Gini index can increase by 0.4 percentage points. An additional day in the time taken to export and import is associated with 0.22 and 0.25 percentage point increases in the Gini index, respectively.

Table 9. GMM regression of Gini index

Explanatory variables	Model 1	Model 2	Model 3	Model 4
Documents for exporting(number)	0.444			
	(0.320)			
Documents for importing (number)		0.400**		
		(0.179)		
Time taken to export (days)			0.217***	
			(0.059)	
Time taken to import (days)				0.245***
				(0.071)
Sum of documents for exporting and importing				
Sum of time taken to export and import				
Population density (people per $km^2$of land area)	-0.174	-0.107	0.128	0.333
	(0.127)	(0.138)	(0.154)	(0.209)
2005	Base omitted			
2006	0.288	0.456	0.621	0.598
	(0.362)	(0.386)	(0.405)	(0.474)
2007	0.022	0.259	0.596	0.826
	(0.386)	(0.421)	(0.455)	(0.558)
2008	-0.571	-0.320	0.358	0.748
	(0.391)	(0.431)	(0.507)	(0.649)
2009	-0.764*	-0.553	-0.038	0.279
	(0.462)	(0.496)	(0.548)	(0.688)
Constant	55.683***	49.077***	24.544	3.517
	(12.211)	(13.392)	(15.204)	(21.008)
Observations	217	217	217	217
Sargan test of over-identifying restrictions: χ^2 statistic and P-value	11.47	6.868	12.35	8.708
	0.648	0.961	0.499	0.892

Source: Estimation based on the World Bank's database.
Heteroskedasticity-robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

5. Conclusion

Since trade facilitation can help to boost economic growth, it can also help poverty and inequality reduction. This chapter attempts to examine the effect of trade facilitation on poverty, GDP, exports and income inequality in low- and middle-income countries. Trade facilitation is measured by the number of documents and the number of days needed for exports and imports. The findings show that improvement in trade facilitation is positively correlated with exports and per capita GDP, and negatively correlated with poverty and inequality. More specifically, deterioration in trade facilitation – which is measured by the increase in the number of documents required and days taken for exporting and importing a good – can reduce per capita GDP, albeit to a small amount. Countries requiring a larger number of documents and more time for imports and exports

tend to have higher levels of poverty (measured by the headcount and poverty gap index) and inequality (measured by the Gini index) than other countries.

It should be noted that although this study is aimed at estimating the causal effect of trade facilitation on GDP and poverty in developing countries, using instrumental variable regressions, caution is advised in the interpretation of the causal effect as the exogeneity of GMM-type instruments is not fully convincing. Another limitation is the small number of observations used in this study, which does not allow for estimation of the heterogeneous effects of trade facilitation. The extent to which trade facilitation affects GDP, poverty and inequality in a country depends on the structure of the economy; therefore, it can vary across different countries. While estimating the heterogeneous effects of trade facilitation is beyond the scope of this study, it is an important aspect for future studies.

Annex

Annex table 1. Definition of trade facilitation measures

Trade facilitation measure	Detailed definition
Documents required for exporting (number)	All documents required per shipment to export goods are recorded. It is assumed that the contract has already been agreed upon and signed by both parties. Documents required for clearance by government ministries, customs authorities, port and container terminal authorities, health and technical control agencies and banks are taken into account. Since payment is by letter of credit, all documents required by banks for the issuance or securing of a letter of credit are also taken into account. Documents that are renewed annually and that do not require renewal per shipment (for example, an annual tax clearance certificate) are not included.
Time taken to export (days)	Time is recorded in calendar days. The time calculation for a procedure starts from the moment it is initiated and runs until it is completed. If a procedure can be accelerated for an additional cost, the fastest legal procedure is chosen. It is assumed that neither the exporter nor the importer wastes time and that each commits to completing each remaining procedure without delay. Procedures that can be completed in parallel are measured as simultaneous. The waiting time between procedures – for example, during unloading of the cargo – is included in the measure.
Documents required for importing (number)	All documents required per shipment to import goods are recorded. It is assumed that the contract has already been agreed upon and signed by both parties. Documents required for clearance by government ministries, customs authorities, port and container terminal authorities, health and technical control agencies, and banks are taken into account. Since payment is by letter of credit, all documents required by banks for the issuance or securing of a letter of credit are also taken into account. Documents that are renewed annually and that do not require renewal per shipment (for example, an annual tax clearance certificate) are not included.
Time taken to import (days)	Time is recorded in calendar days. The time calculation for a procedure starts from the moment it is initiated and runs until it is completed. If a procedure can be accelerated for an additional cost, the fastest legal procedure is chosen. It is assumed that neither the exporter nor the importer wastes time and that each commits to completing each remaining procedure without delay. Procedures that can be completed in parallel are measured as simultaneous. The waiting time between procedures – for example, during unloading of the cargo – is included in the measure.
Logistics performance index: Efficiency of customs clearance process (1=low to 5=high)	Logistics professionals' perception of the efficiency of country's customs clearance processes (i.e., speed, simplicity and predictability of formalities), on a rating ranging from 1 (very low) to 5 (very high). Scores are averaged across all respondents.
Logistics performance index: Quality of trade and transport-related infrastructure (1=low to 5=high)	Logistics professionals' perception of country's quality of trade and transport related infrastructure (e.g., ports, railroads, roads and information technology), on a rating ranging from 1 (very low) to 5 (very high). Scores are averaged across all respondents.
Logistics performance index:	Logistics professionals' perception of the ease of arranging competitively priced shipments to a country, on a rating ranging from 1 (very difficult) to 5 (very easy).

Trade facilitation measure	Detailed definition
Ease of arranging competitively priced shipments (1=low to 5=high)	Scores are averaged across all respondents.
Logistics performance index: Competence and quality of logistics services (1=low to 5=high)	Logistics professionals' perception of country's overall level of competence and quality of logistics services (e.g., transport operators, customs brokers), on a rating ranging from 1 (very low) to 5 (very high). Scores are averaged across all respondents.
Logistics performance index: Overall (1=low to 5=high)	Logistics Performance Index overall score reflects perceptions of a country's logistics based on efficiency of customs clearance process, quality of trade- and transport-related infrastructure, ease of arranging competitively priced shipments, quality of logistics services, ability to track and trace consignments, and frequency with which shipments reach the consignee within the scheduled time. The index ranges from 1 to 5, with a higher score representing better performance.
Logistics performance index: Frequency with which shipments reach consignee within scheduled or expected time (1=low to 5=high)	Logistics professionals' perception of how often the shipments to assessed country reach the consignee within the scheduled or expected delivery time, on a rating ranging from 1 (hardly ever) to 5 (nearly always). Scores are averaged across all respondents.
Logistics performance index: Ability to track and trace consignments (1=low to 5=high)	Logistics professionals' perception of the ability to track and trace consignments when shipping to the country, on a rating ranging from 1 (very low) to 5 (very high). Scores are averaged across all respondents.

Source: World Bank database. Available at http://data.worldbank.org/.

Annex table 2. Summary statistics of variables

Variables	Obs.	Mean	Std. Dev.	Min.	Max.
Documents required for exporting (number)	225	7.209	1.972	3	14
Documents required for importing(number)	225	8.471	2.644	3	20
Time taken to export (days)	225	26.236	15.972	9	102
Time taken to import (days)	225	30.831	17.543	9	101
Population density (people per km^2 of land area)	224	95.54	135.00	3.20	1 142.29
East Asia and the Pacific	225	0.098	0.298	0	1
Europe and Central Asia	225	0.302	0.460	0	1
Latin America and Caribbean	225	0.347	0.477	0	1
Middle East and North Africa	225	0.053	0.225	0	1
South Asia	225	0.044	0.207	0	1
Sub-Saharan Africa	225	0.156	0.363	0	1
Poverty rate at poverty line of $ 1.25 a day (PPP)	225	13.571	18.948	0	87.72
Poverty rate at poverty line of $ 2 a day (PPP)	225	25.265	26.490	0.05	95.15
Poverty gap at poverty line of $ 1.25 a day (PPP)	225	5.009	8.447	0	52.76
Poverty gap at poverty line of $ 2 a day (PPP)	225	10.454	13.558	0.01	67.58
GDP per capita, PPP (constant 2005 international $)	223	6 444.17	4 153.85	284.20	2 1026.04
GINI index	218	42.593	9.277	26.44	67.4

Source: Author's estimation, based on the World Bank database.

Annex table 3. List of low- and middle-income countries

Afghanistan	Egypt	Mauritania	Syrian Arab Republic
Albania	El Salvador	Mauritius	São Tomé and Principe
Algeria	Eritrea	Mexico	Tajikistan
American Samoa	Ethiopia	Micronesia	Tanzania
Angola	Fiji	Moldova	Thailand
Antigua and Barbuda	Gabon	Mongolia	The Gambia
Argentina	Georgia	Montenegro	Timor-Leste
Armenia	Ghana	Morocco	Togo
Azerbaijan	Grenada	Mozambique	Tonga
Bangladesh	Guatemala	Myanmar	Tunisia
Belarus	Guinea	Namibia	Turkey
Belize	Guinea-Bissau	Nepal	Turkmenistan
Benin	Guyana	Nicaragua	Tuvalu
Bhutan	Haiti	Niger	Uganda
Bolivia	Honduras	Nigeria	Ukraine
Bosnia and Herzegovina	India	Pakistan	Uruguay
Botswana	Indonesia	Palau	Uzbekistan
Brazil	Islamic Rep. of Iran	Panama	Vanuatu
Bulgaria	Iraq	Papua New Guinea	Venezuela
Burkina Faso	Jamaica	Paraguay	Viet Nam
Burundi	Jordan	Peru	
Cambodia	Kazakhstan	Philippines	Yemen
Cameroon	Kenya	Romania	Zambia
Cape Verde	Kiribati	Russian Federation	Zimbabwe
Central African Republic	Kosovo	Rwanda	
Chad	Kyrgyz Republic	Samoa	
Chile	Lao PDR	Senegal	
China	Latvia	Serbia	
Colombia	Lebanon	Seychelles	
Comoros	Lesotho	Sierra Leone	
Congo	Liberia	Solomon Islands	
Costa Rica	Libya	Somalia	
Cuba	Lithuania	South Africa	
Côte d'Ivoire	Macedonia	South Sudan	
Dem. Rep. of the Congo	Madagascar	Sri Lanka	
Dem. Rep. of Korea	Malawi	St. Lucia	
Djibouti	Malaysia	St. Vincent and Grenadines	
Dominica	Maldives	Sudan	
Dominican Republic	Mali	Suriname	
Ecuador	Marshall Islands	Swaziland	

Annex table 4. OLS regression of poverty indexes at poverty line of $ 1.25 per day (PPP)

Explanatory variables	Dependent variable is poverty rate (%)				Dependent variable is poverty gap index (%)			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Documents required for exporting (number)	0.915**				0.341			
	(0.439)				(0.232)			
Documents required for exporting (number)		1.229***				0.537***		
		(0.297)				(0.153)		
Time taken to export (days)			0.177***				0.071***	
			(0.051)				(0.025)	
Time taken to import (days)				0.202***				0.089***
				(0.050)				(0.026)
Population density (people/km^2)	0.018***	0.018***	0.019***	0.016***	0.007**	0.007**	0.007**	0.006**
	(0.006)	(0.006)	(0.006)	(0.005)	(0.003)	(0.003)	(0.003)	(0.002)
2005	Base				Base			
	Omitted				Omitted			
2006	-0.613	-0.216	-0.257	-0.434	0.656	0.823	0.795	0.728
	(2.329)	(2.323)	(2.235)	(2.150)	(1.310)	(1.300)	(1.283)	(1.230)
2007	-3.196	-2.417	-2.776	-2.161	-0.781	-0.440	-0.613	-0.326
	(2.639)	(2.550)	(2.612)	(2.554)	(1.173)	(1.146)	(1.172)	(1.148)
2008	-3.147	-2.292	-2.301	-1.688	-0.789	-0.413	-0.451	-0.144
	(1.989)	(1.906)	(1.944)	(1.982)	(0.954)	(0.926)	(0.960)	(0.982)
2009	-6.809***	-5.720***	-6.408***	-5.657***	-2.463**	-1.978**	-2.299**	-1.946*
	(2.155)	(2.058)	(2.062)	(2.090)	(1.012)	(0.972)	(0.992)	(1.006)
2010	0.758	1.453	1.724	2.522	1.101	1.437	1.500	1.911
	(3.131)	(3.069)	(3.100)	(3.142)	(1.848)	(1.851)	(1.856)	(1.865)
East Asia and the Pacific	Base							
	Omitted							
Europe and Central Asia	-15.125***	-15.460***	-15.403***	-15.774***	-3.398***	-3.614***	-3.537***	-3.756***
	(2.599)	(2.545)	(2.457)	(2.351)	(0.698)	(0.688)	(0.646)	(0.621)
Latin America and Caribbean	-9.595***	-9.031***	-9.108***	-9.466***	-0.546	-0.305	-0.354	-0.495
	(2.587)	(2.518)	(2.445)	(2.329)	(0.742)	(0.746)	(0.704)	(0.660)
Middle East and North Africa	-16.211***	-16.292***	-17.276***	-17.989***	-3.838***	-3.876***	-4.263***	-4.622***
	(2.923)	(2.767)	(2.949)	(3.012)	(0.795)	(0.751)	(0.854)	(0.914)
South Asia	1.712	1.574	1.755	1.877	-0.823	-1.010	-0.858	-0.883
	(3.905)	(3.748)	(3.840)	(3.653)	(1.364)	(1.242)	(1.239)	(1.136)
Sub-Saharan Africa	27.255***	25.980***	26.520***	24.617***	14.306***	13.654***	13.974***	13.047***
	(4.848)	(4.722)	(4.701)	(4.738)	(2.418)	(2.360)	(2.336)	(2.318)
Constant	11.888***	7.541**	13.389***	12.215***	1.562	-0.733	1.998	1.291
	(4.210)	(3.695)	(3.149)	(3.173)	(1.955)	(1.674)	(1.222)	(1.294)
Observations	224	224	224	224	224	224	224	224
R-squared	0.686	0.703	0.697	0.706	0.564	0.583	0.574	0.586

Source: Author's estimation, based on the World Bank database.
Heteroskedasticity-robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

Annex table 5. OLS regression of poverty indexes at the poverty line of $ 2 per day (PPP)

Explanatory variables	Dependent variable is poverty rate (%)				Dependent variable is poverty gap index (%)			
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Documents required for exporting (number)	1.705***				0.703**			
	(0.577)				(0.315)			
Documents required for importing (number)		1.783***				0.910***		
		(0.422)				(0.214)		
Time taken to export (days)			0.314***				0.137***	
			(0.079)				(0.038)	
Time taken to import (days)				0.317***				0.154***
				(0.066)				(0.036)
Population density (people/km^2)	0.017**	0.016**	0.018***	0.014*	0.011***	0.011***	0.011***	0.010***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.004)	(0.004)	(0.004)	(0.004)
2005	Base				Base			
	Omitted				Omitted			
2006	-3.700	-3.089	-3.062	-3.393	-0.428	-0.133	-0.154	-0.291
	(2.941)	(2.970)	(2.746)	(2.719)	(1.710)	(1.706)	(1.634)	(1.572)
2007	-6.810*	-5.683	-6.066*	-5.191	-2.416	-1.839	-2.091	-1.628
	(3.627)	(3.511)	(3.521)	(3.470)	(1.855)	(1.791)	(1.832)	(1.788)
2008	-6.531**	-5.311*	-5.036*	-4.258	-2.346	-1.715	-1.692	-1.235
	(2.814)	(2.723)	(2.704)	(2.779)	(1.434)	(1.373)	(1.403)	(1.432)
2009	-11.045***	-9.526***	-10.347***	-9.281***	-4.955***	-4.153***	-4.644***	-4.077***
	(3.192)	(3.095)	(2.968)	(3.027)	(1.557)	(1.488)	(1.484)	(1.503)
2010	-2.697	-1.892	-1.027	-0.077	0.325	0.826	1.076	1.666
	(3.565)	(3.372)	(3.414)	(3.506)	(2.316)	(2.270)	(2.295)	(2.322)
East Asia and the Pacific	Base				Base			
	Omitted				Omitted			
Europe and Central Asia	-32.786***	-32.834***	-33.184***	-33.489***	-11.317***	-11.536***	-11.539***	-11.806***
	(4.955)	(4.878)	(4.703)	(4.542)	(1.866)	(1.829)	(1.755)	(1.676)
Latin America and Caribbean	-25.407***	-24.557***	-24.537***	-25.182***	-7.055***	-6.636***	-6.679***	-6.957***
	(4.925)	(4.747)	(4.636)	(4.461)	(1.873)	(1.815)	(1.759)	(1.669)
Middle East and North Africa	-30.088***	-30.189***	-31.972***	-32.863***	-11.444***	-11.503***	-12.268***	-12.798***
	(5.835)	(5.577)	(5.691)	(5.772)	(2.142)	(2.021)	(2.139)	(2.187)
South Asia	9.895	10.507	10.148	10.735	1.953	1.906	1.975	2.091
	(6.532)	(6.616)	(6.608)	(6.515)	(2.705)	(2.646)	(2.667)	(2.556)
Sub-Saharan Africa	23.951***	22.706***	22.779***	20.248***	18.860***	17.957***	18.282***	16.858***
	(6.430)	(6.246)	(6.109)	(6.142)	(3.480)	(3.381)	(3.348)	(3.355)
Constant	32.571***	28.793***	35.780***	34.892***	9.440***	6.392**	10.564***	9.724***
	(6.718)	(6.051)	(5.398)	(5.296)	(3.054)	(2.662)	(2.265)	(2.260)
Observations	224	224	224	224	224	224	224	224
R-squared	0.721	0.734	0.737	0.742	0.675	0.693	0.689	0.698

Source: Author's estimation, based on the World Bank database.
Heteroskedasticity-robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1.

Annex table 6. OLS regression of GDP per capita, PPP (constant 2005 international $) and Gini index

Explanatory variables	Dependent variable is log of GDP per capita				Dependent variable is Gini index			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Documents required for exporting (number)	-0.106***				0.029			
	(0.023)				(0.201)			
Documents required for importing (number)		-0.084***				0.016		
		(0.020)				(0.177)		
Time taken to export (days)			-0.019***				-0.042*	
			(0.004)				(0.023)	
Time taken to import (days)				-0.018***				-0.023
				(0.003)				(0.025)
Population density (people/km^2)	-0.001***	-0.001***	-0.001***	-0.001***	-0.002	-0.002	-0.002	-0.002
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.002)	(0.002)	(0.002)
2005	Base							
	Omitted							
2006	0.024	-0.006	-0.015	0.005	0.734	0.741	0.676	0.729
	(0.130)	(0.134)	(0.120)	(0.122)	(1.215)	(1.216)	(1.219)	(1.223)
2007	0.082	0.035	0.037	-0.012	0.156	0.167	0.060	0.038
	(0.145)	(0.145)	(0.143)	(0.142)	(1.219)	(1.198)	(1.194)	(1.197)
2008	0.115	0.061	0.025	-0.012	-0.650	-0.641	-0.864	-0.826
	(0.120)	(0.119)	(0.112)	(0.116)	(1.125)	(1.140)	(1.135)	(1.160)
2009	0.180	0.118	0.137	0.078	-0.088	-0.076	-0.218	-0.240
	(0.149)	(0.149)	(0.133)	(0.138)	(1.316)	(1.311)	(1.287)	(1.310)
2010	0.098	0.073	0.001	-0.040	-1.372	-1.369	-1.718	-1.651
	(0.175)	(0.162)	(0.149)	(0.158)	(1.413)	(1.423)	(1.396)	(1.432)
East Asia and the Pacific	Base							
	Omitted							
Europe and Central Asia	0.667***	0.644***	0.685***	0.688***	-6.073***	-6.070***	-5.758***	-5.825***
	(0.149)	(0.149)	(0.133)	(0.131)	(1.266)	(1.278)	(1.280)	(1.302)
Latin America and Caribbean	0.648***	0.611***	0.595***	0.630***	11.173***	11.167***	11.040***	11.187***
	(0.138)	(0.133)	(0.126)	(0.122)	(1.233)	(1.231)	(1.202)	(1.210)
Middle East and North Africa	0.198	0.231	0.303	0.325*	-3.967**	-3.981***	-3.741**	-3.740**
	(0.180)	(0.170)	(0.192)	(0.194)	(1.549)	(1.528)	(1.447)	(1.500)
South Asia	-0.075	-0.174	-0.095	-0.133	-5.739***	-5.717***	-5.232***	-5.439***
	(0.180)	(0.200)	(0.176)	(0.190)	(1.804)	(1.799)	(1.827)	(1.828)
Sub-Saharan Africa	-0.818***	-0.794***	-0.755***	-0.636***	3.947*	3.945*	4.476**	4.480**
	(0.227)	(0.223)	(0.214)	(0.221)	(2.033)	(2.096)	(2.037)	(2.152)
Constant	8.948***	8.946***	8.732***	8.752***	40.300***	40.379***	41.630***	41.143***
	(0.228)	(0.229)	(0.193)	(0.183)	(2.115)	(2.082)	(1.478)	(1.547)
Observations	222	222	222	222	217	217	217	217
R-squared	0.543	0.548	0.594	0.591	0.660	0.660	0.665	0.662

Source: Author's estimation, based on the World Bank database.
Heteroskedasticity-robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

Annex table 7. OLS regression of poverty rate at poverty line of $ 1.25 per day (PPP)

Explanatory variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Efficiency of customs clearance process	-13.82***						
	(5.06)						
Quality of trade and transport-related infrastructure		-4.36					
		(5.40)					
Ease of arranging competitively priced shipments			-2.60				
			(4.89)				
Competence and quality of logistics services				-8.48**			
				(3.93)			
Frequency shipments reach consignee within schedule					-15.26***		
					(4.70)		
Ability to track and trace consignments						-12.27***	
						(3.52)	
Overall logistic performance index							-11.48***
							(4.18)
Population density (people per km^2 of land area)	0.026***	0.024***	0.024***	0.023***	0.029***	0.025***	0.026***
	(0.004)	(0.005)	(0.005)	(0.004)	(0.005)	(0.004)	(0.005)
Year 2010	3.20	2.93	3.05	3.15	8.21*	5.52	4.75
	(3.77)	(3.58)	(3.83)	(3.70)	(4.38)	(3.75)	(3.87)
East Asia and the Pacific	Base						
	Omitted						
Europe and Central Asia	-21.95***	-20.83***	-19.95***	-20.87***	-22.18***	-21.97***	-21.52***
	(3.70)	(5.63)	(6.04)	(4.84)	(3.87)	(4.40)	(4.22)
Latin America and Caribbean	-16.71***	-16.44***	-16.10**	-15.94***	-16.24***	-16.82***	-16.43***
	(3.82)	(5.61)	(6.04)	(4.99)	(3.88)	(4.53)	(4.38)
Middle East and North Africa	-24.22***	-21.36***	-20.53***	-23.53***	-23.78***	-29.24***	-23.24***
	(4.19)	(5.71)	(6.42)	(4.81)	(3.93)	(4.82)	(4.35)
South Asia	-11.18	-8.78	-7.94	-8.32	-14.37**	-11.28*	-11.01
	(6.66)	(7.28)	(7.45)	(6.93)	(6.96)	(6.47)	(6.77)
Sub-Saharan Africa	33.50***	34.35***	35.46***	33.03***	30.42***	30.78***	32.57***
	(10.69)	(11.40)	(11.90)	(10.87)	(9.58)	(10.50)	(10.89)
Constant	53.34***	30.53**	26.30*	41.29***	66.64***	52.64***	49.79***
	(12.05)	(13.72)	(13.12)	(10.16)	(14.27)	(9.14)	(10.61)
Observations	54	54	54	54	54	54	54
R-squared	0.798	0.768	0.766	0.782	0.827	0.805	0.790

Source: Author's estimation, based on the World Bank database.
Heteroskedasticity-robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

Annex table 8. OLS regression of poverty gap at poverty line of $ 1.25 per day (PPP)

Explanatory variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Efficiency of customs clearance process	-4.58**						
	(2.19)						
Quality of trade and transport-related infrastructure		0.42					
		(2.28)					
Ease of arranging competitively priced shipments			1.37				
			(2.31)				
Competence and quality of logistics services				-2.54*			
				(1.43)			
Frequency shipments reach consignee within schedule					-6.42**		
					(2.43)		
Ability to track and trace consignments						-4.55***	
						(1.56)	
Overall logistic performance index							-3.30**
							(1.61)
Population density (people per km^2 of land area)	0.008***	0.007***	0.006**	0.007***	0.010***	0.008***	0.008***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Year 2010	1.47	1.15	0.86	1.43	3.65	2.36	1.88
	(2.18)	(1.99)	(2.09)	(2.12)	(2.57)	(2.20)	(2.23)
East Asia and the Pacific	Base						
	Omitted						
Europe and Central Asia	-4.91***	-4.10**	-4.11*	-4.52***	-5.20***	-5.00***	-4.69***
	(1.04)	(1.93)	(2.10)	(1.29)	(1.27)	(1.29)	(1.16)
Latin America and Caribbean	-2.68**	-2.45	-2.48	-2.43*	-2.54*	-2.75*	-2.57*
	(1.20)	(1.88)	(2.12)	(1.44)	(1.28)	(1.41)	(1.32)
Middle East and North Africa	-5.91***	-4.86**	-5.20**	-5.60***	-6.00***	-7.89***	-5.49***
	(1.54)	(1.98)	(2.25)	(1.50)	(1.43)	(1.90)	(1.45)
South Asia	-3.67*	-2.07	-1.71	-2.67	-5.39**	-3.87*	-3.43*
	(1.99)	(2.20)	(2.50)	(1.84)	(2.39)	(1.92)	(1.92)
Sub-Saharan Africa	19.76***	20.65***	20.69***	19.69***	18.26***	18.66***	19.59***
	(6.03)	(6.13)	(6.19)	(5.96)	(5.45)	(5.82)	(6.08)
Constant	15.26***	3.07	0.64	10.56***	23.86***	16.30***	12.76***
	(5.23)	(6.08)	(6.40)	(3.88)	(7.41)	(4.22)	(4.27)
Observations	54	54	54	54	54	54	54
R-squared	0.709	0.691	0.694	0.699	0.745	0.718	0.702

Source: Author's estimation, based on the World Bank database.
Heteroskedasticity-robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

Annex table 9. OLS regression of log of GDP per capita, PPP (constant 2005 international $)

Explanatory variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Efficiency of customs clearance process	1.20***						
	(0.22)						
Quality of trade and transport-related infrastructure		1.19***					
		(0.20)					
Ease of arranging competitively priced shipments			0.82***				
			(0.21)				
Competence and quality of logistics services				1.08***			
				(0.19)			
Frequency shipments reach consignee within schedule					1.03***		
					(0.21)		
Ability to track and trace consignments						0.98***	
						(0.20)	
Overall logistic performance index							1.26***
							(0.19)
Population density (people per km^2 of land area)	-0.001**	-0.001***	-0.001***	-0.001*	-0.001***	-0.001**	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Year 2010	-0.03	-0.10	-0.16	-0.05	-0.35*	-0.21	-0.21
	(0.14)	(0.14)	(0.19)	(0.14)	(0.19)	(0.17)	(0.15)
East Asia and Pacific	Base						
	Omitted						
Europe and Central Asia	0.91***	1.01***	0.78***	0.86***	0.89***	0.90***	0.92***
	(0.20)	(0.20)	(0.28)	(0.24)	(0.23)	(0.27)	(0.21)
Latin America and Caribbean	0.93***	0.97***	0.88***	0.86***	0.89***	0.94***	0.92***
	(0.15)	(0.17)	(0.23)	(0.20)	(0.20)	(0.22)	(0.17)
Middle East and North Africa	0.60***	0.39**	0.14	0.63***	0.51**	0.97***	0.56***
	(0.16)	(0.15)	(0.25)	(0.19)	(0.19)	(0.23)	(0.16)
South Asia	0.28	0.42	0.23	0.09	0.41	0.26	0.36
	(0.36)	(0.33)	(0.36)	(0.36)	(0.33)	(0.32)	(0.33)
Sub-Saharan Africa	-0.90***	-0.71**	-1.00***	-0.75**	-0.74**	-0.70**	-0.75**
	(0.29)	(0.30)	(0.37)	(0.29)	(0.31)	(0.30)	(0.29)
Constant	5.17***	5.14***	6.02***	5.36***	4.94***	5.48***	4.80***
	(0.55)	(0.50)	(0.53)	(0.49)	(0.64)	(0.51)	(0.50)
Observations	54	54	54	54	54	54	54
R-squared	0.725	0.740	0.680	0.743	0.742	0.727	0.754

Source: Author's estimation, based on the World Bank database.
Heteroskedasticity-robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

Annex table 10. OLS regression of log of export volume

Explanatory variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Efficiency of customs clearance process	1.95**						
	(0.80)						
Quality of trade and transport-related infrastructure		2.93***					
		(0.53)					
Ease of arranging competitively priced shipments			1.64**				
			(0.64)				
Competence and quality of logistics services				2.30***			
				(0.50)			
Frequency shipments reach consignee within schedule					1.70***		
					(0.51)		
Ability to track and trace consignments						1.64***	
						(0.56)	
Overall logistic performance index							2.52***
							(0.63)
Population density (people per km^2 of land area)	-0.002	-0.001	-0.002*	-0.001	-0.002*	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Year 2010	0.00	-0.12	-0.22	0.01	-0.58	-0.30	-0.37
	(0.36)	(0.32)	(0.41)	(0.33)	(0.42)	(0.45)	(0.39)
East Asia and the Pacific	Base						
	Omitted						
Europe and Central Asia	-1.44*	-0.79	-1.59*	-1.27	-1.53*	-1.44*	-1.16
	(0.76)	(0.72)	(0.82)	(0.81)	(0.86)	(0.84)	(0.80)
Latin America and Caribbean	-1.16	-0.80	-1.22*	-1.13	-1.27	-1.14	-0.98
	(0.73)	(0.68)	(0.72)	(0.74)	(0.76)	(0.77)	(0.74)
Middle East and North Africa	-0.93	-1.01	-1.73**	-0.57	-1.10	-0.27	-0.71
	(0.92)	(1.00)	(0.83)	(1.09)	(0.93)	(1.10)	(0.99)
South Asia	0.67	0.73	0.73	-0.08	0.95	0.67	0.76
	(1.40)	(0.91)	(1.33)	(1.08)	(1.42)	(1.56)	(1.21)
Sub-Saharan Africa	-3.56***	-2.29**	-3.42***	-2.68**	-3.35***	-3.13***	-2.86***
	(0.94)	(1.01)	(1.12)	(1.05)	(1.01)	(0.99)	(1.01)
Constant	19.73***	16.90***	20.27***	18.39***	19.30***	20.07***	17.65***
	(2.43)	(1.70)	(2.10)	(1.78)	(2.00)	(2.04)	(2.14)
Observations	48	48	48	48	48	48	48
R-squared	0.465	0.606	0.460	0.559	0.494	0.476	0.540

Source: Author's estimation, based on the World Bank database.
Heteroskedasticity-robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

Annex table 11. OLS regression of Gini index

Explanatory variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Efficiency of customs clearance process	0.97						
	(2.96)						
Quality of trade and transport-related infrastructure		3.87*					
		(2.06)					
Ease of arranging competitively priced shipments			4.31**				
			(1.60)				
Competence and quality of logistics services				4.17**			
				(1.80)			
Frequency shipments reach consignee within schedule					2.01		
					(1.80)		
Ability to track and trace consignments						1.88	
						(2.03)	
Overall logistic performance index							3.66*
							(2.06)
Population density (people per km^2 of land area)	-0.004	-0.005**	-0.006**	-0.004*	-0.005*	-0.004	-0.005*
	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)
Year 2010	-1.82	-2.16	-2.76*	-2.06	-2.50	-2.25	-2.46
	(1.50)	(1.46)	(1.53)	(1.48)	(1.66)	(1.62)	(1.52)
East Asia and the Pacific	Base						
	Omitted						
Europe and Central Asia	-7.33*	-6.78**	-7.74***	-7.14**	-7.17**	-7.34**	-7.17**
	(3.94)	(3.16)	(2.45)	(2.69)	(3.55)	(3.47)	(2.95)
Latin America and Caribbean	10.98***	10.99***	10.39***	10.65***	10.95***	10.87***	10.79***
	(3.82)	(2.98)	(2.45)	(2.63)	(3.43)	(3.38)	(2.84)
Middle East and North Africa	-1.60	-1.87	-3.38	-0.86	-1.48	-0.76	-1.41
	(4.18)	(3.35)	(2.75)	(3.27)	(3.76)	(4.13)	(3.29)
South Asia	-2.42	-0.81	-1.16	-1.65	-1.62	-2.13	-1.31
	(4.45)	(3.59)	(2.94)	(2.93)	(4.08)	(3.85)	(3.42)
Sub-Saharan Africa	0.00	0.87	-0.16	0.98	0.54	0.42	0.61
	(4.23)	(3.50)	(2.88)	(3.22)	(3.99)	(3.97)	(3.41)
Constant	38.75***	31.74***	30.72***	30.70***	34.93***	36.25***	31.77***
	(8.94)	(6.65)	(5.16)	(5.84)	(7.30)	(7.07)	(6.84)
Observations	51	51	51	51	51	51	51
R-squared	0.776	0.791	0.802	0.798	0.781	0.780	0.789

Source: Author's estimation, based on the World Bank database.
Heteroskedasticity-robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

References

Angrist J., and Pischke J. S. (2008), *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton University Press.

APEC (1999), "Assessing APEC Trade Liberalization and Facilitation: 1999 Update", Economic Committee, September 1999, APEC: Singapore.

Arellano, M. and Bond S. (1991), "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations", *Review of Economic Studies*, 58: 277-297.

Clark, X., D. Dollar, and A. Micco (2004), "Port Efficiency, Maritime Transport Costs, and Bilateral Trade." *Journal of Development Economics*, vol. 75, no. 2, pp. 417-450.

Clarke, RG. (2005), "Beyond tariff and quotas: why don't African manufacturing enterprises export more?" World Bank Policy Research Working Paper no. WPS3617.

Decreux, Yvan and Lionel Fontagné (2006), "A Quantitative Assessment of the Outcome of the Doha Development Agenda", *CEPII Working Paper* No. 2006-10.

Dennis, A. (2006), **"**The Impact of Regional Trade Agreements and Trade Facilitation in the Middle East North Africa Region", World Bank Policy Research Working Paper 3837, The World Bank, DC. Washington.

Dennis, A. and B. Shepherd. 2011. "Trade Facilitation and Export Diversification." *World Economy*, vol. 34, no. 1, pp. 101-122.

Djankov S, Freund C, and Pham CS (2010), "Trading on time", *Review of Economics and Statistics* 92: 166-173

Dollar, D. and Kraay, A. (2000), *Growth Is Good for the Poor*, Development Research Group, Washington, D.C., World Bank.

Dollar, D., M. Hallward-Driemeier and T. Mengistae (2006), "Investment Climate and International Integration", *World Development* 34(9), 1498–1516.

Duval Y. and Utoktham C. (2009) "Behind the Border Trade Facilitation in Asia-Pacific: Cost of Trade, Credit Information, Contract Enforcement and Regulatory Coherence," Working Papers 6709, Asia-Pacific Research and Training Network on Trade (ARTNeT).

Duval Y. and Utoktham C. (2011), "Trade Costs in the India-Mekong Subregion: Identifying Policy Priorities for Trade Facilitation," Working Paper Series 411, United Nations Economic and Social Commission for Asia and the Pacific (ESCAP).

Duval, Y. (2007), “Trade facilitation beyond the Doha Round of negotiations”, Chapter I in ESCAP (2007), *Trade facilitation beyond the multilateral trade negotiations: Regional practices, customs valuation and other emerging issues – A study by the Asia-Pacific Research and Training Network on Trade*, (United Nations, New York).

Easterly, W. and A. Kraay (2000), “Small States, Small Problems? Income, Growth, and Volatility in Small States”, *World Development*, 28(11): 2013-27.

Engman, M. (2005), "The Economic Impact of Trade Facilitation", *OECD Trade Policy Working Papers*, No. 21, OECD Publishing.

ESCAP (2009), “Impact Of Trade Facilitation On Export Competitiveness: A Regional Perspective”, Studies in Trade and Investment 66, Economic And Social Commission For Asia And The Pacific.

Foster, J., Greer, J., Thorbecke, E., (1984), “A Class of Decomposable Poverty Measures”, *Econometrica* 52 (3), pp. 761-766.

Francois J, and Manchin M. (2006), “Institutional quality, infrastructure and the propensity to export”, CEPR Discussion Paper 6068.

Harrison, Anne (2005), “Globalization and Poverty”, National Bureau of Economic Research Conference Report, edited by Harrison Anne, Chicago University Press.

Heckman J, R Lalonde, Smith J. (1999), The economics and econometrics of active labor market programs. *Handbook of Labor Economics* 1999; Volume 3, Ashenfelter, A. and D. Card, eds., Elsevier Science.

Hertel T, and Keeney R. (2006), “What’s at stake: the relative importance of import barriers, export subsidies and domestic support”. In Agricultural Trade Reform and the Doha Development Agenda, Anderson K, Martin W (eds). OUP and World Bank: Oxford and Washington DC.

Hertel, Thomas ; Walmsley, Terrie ; and Itakura, Ken (2001), "Dynamic Effects of the "New Age" Free Trade Agreement between Japan and Singapore". *GTAP Working Papers.* Paper 15. http://docs.lib.purdue.edu/gtapwp/15

Hoekman, Bernard, and L. Alan Winters. 2005. “Trade and Employment: Stylized Facts and Research Findings.” World Bank Policy Research Working Paper no. 3676. Washington, D.C.: World Bank.

Holtz-Eakin, D., W. Newey, and H. S. Rosen (1988), “Estimating Vector Autoregressions with Panel Data”, *Econometrica*, 56: 1371–1395.

Hummels, D. (2001), "Time as a Trade Barrier", Working Paper, Purdue University.

Iwanow, Tomasz and Colin Kirkpatrick (2007), "Trade Facilitation, Regulatory Quality and Export Performance", *Journal of International Development*, 19, 735–753

Kakwani, N. C., and Pernia, E. M. (2000), "What is Pro-poor Growth", *Asian Development Review*, Asian Development Bank.

Kim, S., H. Lee and I. Park (2004), "Measuring the Impact of APEC Trade Facilitation: A Gravity Analysis", paper presented at the APEC EC Committee meeting 30 September 2004 in Santiago, Chile.

Kinnman, Susanna and Magnus Lodefalk (2007), "What is at Stake in the Doha Round?", *World Economy*, 30(8), 1305-1325.

Layton, B. (2007), "Trade Facilitation: A study in the context of the ASEAN Economic Community Blueprint", Chapter 5 in ERIA Research Project, Deepening Economic Integration in East Asia: The ASEAN Economic Community and Beyond, (ed. H. Soesastro).

Lee, H. and Kim, C. (2012), "The Impact of Trade Facilitation on the Extensive and Intensive Margins of Trade: An Application for Developing Countries", *Journal of East Asian Economic Integration* 16(1), 67-96.

Levinsohn, J. (1999), "Employment responses to international Liberalization in Chile", *Journal of International Economics,* Vol. 47, n2, pp. 321-344.

Marquez, G. and C. Pagés-Serra (1998), "Trade and Employment: Evidence from Latin America and the Caribbean",WP-366, Inter-American Development Bank, Washington, D.C.

Martinez-Zarzoso, I. and L. Marquez-Ramos. (2008), "The Effect of Trade Facilitation on Sectoral Trade." *B.E. Journal of Economic Analysis & Policy*, 8(1), 1-42.

McCulloch, N.; L. A. Winters and X Cirera (2001), "Trade Liberalization and Poverty: A Handbook", London, Centre for Economic Policy Research.

Milner, C. and P. Wright (1998), "Modeling Labor Market Adjustment to Trade Liberalization in an Industrializing Economy", *Economic Journal*, Vol. 108, pp. 509-28.

Moreira , M. M. and S. Najberg (2000), "Trade Liberalization in Brazil:- Create exporting jobs?", *Journal of Development Studies,* Vol. 36, n3, pp. 78-100.

Mussa, Michael (2000), "Factors Driving Global Economic Integration", International Monetary Fund.

Nadal, A. (2000), "The Environmental and Social Impacts of Economic Liberalization on Corn Production in Mexico", Oxfam GB (U.K.) and WWF International.

Nordas H, Pinali E, Geloso Grosso M. (2006), "Logistics and time as a trade barrier", OECD Trade Policy Working Paper No. 35.

Persson, Maria (2010), "Trade Facilitation and the Extensive Margin", *Journal of International Trade and Economic Development*, Forthcoming.

Ravallion, M. (2004), "Pro-poor Growth: A Primer", *World Bank Policy Research Working Paper* No. WPS3242, the World Bank.

Revenga, Ana (1997), "Employment and Wage Effects of Trade Liberalization: The Case of Mexican Manufacturing", *Journal of Labor Economics*, Vol. 15(3), S20-S43.

Sadikov, A. (2007), "Border and Behind-the-Border Trade Barriers and Country Exports." IMF Working Paper No. 07/292. Washington, DC: International Monetary Fund.

United Nations (2002), *Trade Facilitation Handbook: For the Greater Mekong Subregion*, Economic and Social Commission For Asia and The Pacific, United Nations, New York.

Walkenhorst, Yasui. (2005), "Benefits of trade facilitation: a quantitative assessment". In *Quantitative Measures to assess the Effects of Non Tariff Measures*, Dee P (ed.). World Scientific Ltd: Singapore.

Wilson, J., C. Mann and T. Otsuki (2003), "Trade Facilitation and Economic Development: A New Approach to Quantifying the Impact", *World Bank Economic Review*, 17 (3): 367-389.

Wilson, J., C. Mann and T. Otsuki (2005), "Assessing the Benefits of Trade Facilitation: A Global Perspective", *World Bank Economic Review*, 17 (3): 367-389.

Winters Alan, McCulloch, and Andrew McKay (2004), "Trade Liberalization and Poverty: The Evidence So Far", *The World Economy*, Vol. 28, No. 6 pp. 841-871.

World Bank (2005), World Business Environment Survey (WBES) 2000, The Washington DC.

World Trade Organization (2007), World Trade Report 2007, World Trade Organization.

Zaki, C. (2011), "Assessing the Global Effect Of Trade Facilitation: Evidence From The Mirage Model", Working Paper 659, The Economic Research Forum.