

Asian Development Policy Review

ISSN(e): 2313-8343

ISSN(p): 2518-2544

DOI: 10.18488/journal.107.2020.81.61.74

Vol. 8, No. 1, 61-74.

© 2020 AESS Publications. All Rights Reserved.

URL: www.aessweb.com



EFFECTS OF PAPERLESS TRADE POLICY AND AID FOR TRADE ON EXPORT PERFORMANCE: EVIDENCE FROM SASEC AND CAREC COUNTRIES



 **Chandan Kumar Roy¹⁺**
Huang Xiaoling²

¹PhD Candidate, School of International Trade and Economics, University of International Business and Economics, Beijing, China and Deputy Director, Bangladesh Bank (The Central Bank of Bangladesh), Dhaka, Bangladesh.

Email: chandan_hstu@yahoo.com

²PhD, Professor of Economics, School of International Trade and Economics, University of International Business and Economics, Beijing China.

Email: xlh_uibe@aliyun.com



(+ Corresponding author)

ABSTRACT

Article History

Received: 17 February 2020

Revised: 23 March 2020

Accepted: 27 April 2020

Published: 13 May 2020

Keywords

Paperless trade policy
Trade facilitation
Trade facilitation agreement
Aid for trade
Export performance
Difference-in-differences
SASEC
CAREC.

JEL Classification:

F13; F14; F35; C21.

The study aims to investigate the causal effect of cross-border paperless trade policy reforms and aid for trade on export performance in 14 Asian developing countries. Sample countries are selected based on membership of the South Asia Sub-regional and Economic Cooperation (SASEC) and Central Asia Regional Economic Cooperation (CAREC). This study uses annual panel data from 2005 to 2017, exploits the Economic and Social Commission for Asia and the Pacific (ESCAP) Trade Facilitation Measures survey data to sort out the pre-treatment and post-treatment period of the paperless trade policy transformation, and employs the difference-in-differences method of estimation. The results show that the adaptation of paperless trade facilitation policy measures and aid for trade to trade facilitation and the communication technology sector has a positive and statistically significant impact on export performance in Asian economies including in SASEC and CAREC region. However, the findings of this study also point out that the economic growth, foreign direct investment and the labour force has a positive effect on export performance. Thus the results from this study suggest that the export performance in these regions could be enhanced by adopting paperless trade policy measures and more aid allocation for the trade facilitation and communication technology sectors.

Contribution/ Originality: This study is one of very few studies which have investigated the causal effect of adaptation of cross-border paperless trade policy measures and aid for trade on export performance in Asian economics, SASEC, and CAREC member countries using difference-in-differences estimation method of panel data.

1. INTRODUCTION

Trade facilitation policy measures, particularly cross-border paperless trade policy, under the World Trade Organization (WTO) Trade Facilitation Agreement are the key contemporary issue for argument among the global leaders and policymakers. These policy measures facilitate trade integration between countries and can play a significantly greater role in advancing shared prosperity and inclusive growth (ESCAP, 2017; Ha & Lim, 2014). Several micro-level theoretical studies also confirm the advantages of paperless trade policy implication, such as for Asia and the Pacific, studies find that partial compliance of trade facilitation measures reduces trade costs by 5% and if fully implemented, costs will fall by 9%; and if cross-border paperless international trade facilitation actions are

implemented, the costs of trade could be dropped up to 16%. Japan minimizes their waiting time and cost of paper approval process through technological up-gradation from paper to electronic data interchange and this modification lessen the number of paper application forms filled up by hand almost 50%. Installation of the single-window system helps Singapore to lower the trade documentation fees to USD 1.80 from USD 6.25 per application over the period 1989 to 2010. Thailand also inaugurates the National Single Window System which drops the time to export nearly 3 days and leads saving of around USD 1.5 billion annually (UNESCAP & ADB, 2017). On the contrary, both in the micro and macro-level perspective, the empirical cross-country studies, especially for the developing countries, regarding the execution of these policy measures on the different macro-economic component are inadequate.

Trade facilitation policy measures are used for the simplification, standardization, and automation of the process which is followed by foreign trade operations, mainly the necessary conditions and formal proceedings concerned with import and export as well as to the international movement of merchandise (WTO).¹ These policy measures generate various economic benefits of international trade-encouraging competition, improve productivity, and develop the standard of living. But the pre-requisites to execute the policy measures require well-built physical infrastructures, strong information, and communication technology setup, uninterrupted power, and energy supply, and improved production capacity. Almost all the developing nations, mainly the least developed countries (LDCs) are still facing these types of structural obstacles to implementing the facilitation measures which confine themselves from economic integration, cooperation, and international trade. To surmount these types of problems, Aid for Trade (AfT) initiatives were set up by the members of WTO in 2005 which help the LDC's supply-side facility building and trade infrastructure improvement. Among all categories of AfT, aid to trade facilitation and aid to communication technology has an enormous impact on cross-border paperless trade among the nations. These categories of ODA help LDCs to execute the trade facilitation measures such as cross-border paperless data exchange, automated custom, e-payment, electronic single window, etc. to smoothen the international trade activities. Thus, implementation of trade facilitation measures accelerate global trade by reducing both the trade cost and time, and acceleration of trade helps drive inclusive growth, poverty reduction, and reallocation of physical and human capital towards areas with comparative advantages. And it is none but trade can help a country to facilitate economic reforms, employment generation and professional skill development which help to achieve United Nations SDGs especially SDG 8 (inclusive growth), SDG 9 (building resilient infrastructure), SDG 10 (reducing disparity) and SDG 17 (strengthened global cooperation and partnership) by 2030 (Gnangnon, 2018).

The empirical literature on both impacts of trade facilitation measures on export performance and impacts of AfT on export performance is still unclear. Some studies find a positive relationship between foreign aid and export (Gnangnon & Roberts, 2015; Kim, 2012) and some studies find negative relationship (Hühne, Meyer, & Nunnenkamp, 2014a; Munemo, Bandyopadhyay, & Basistha, 2007). No empirical study has taken into consideration independently the AfT to trade facilitation and communication sectors, and cross-border paperless trade facilitation policy impact on the export performance of SASEC and CAREC aid recipient countries. Studies conducted by UNESCAP and ADB (2017) find that the execution of trade facilitation and paperless measures are capable of reducing costs and time of trade in the Asia Pacific Region. But still some countries of this region did not implement paperless trade facilitation policy due to their lack of capital, poor governance and institutional capacity etc. and evident find that countries that partially or fully implement the paperless trade policy is growing more than that of the countries who did not implemented at least partially. This study figures out the clear portrait of the benefits of the implementation of cross-border paperless trade facilitation policy which may signal to the non-implemented country to implement the trade facilitation measures urgently.

¹ WTO website, available online at: http://www.wto.org/english/tratop_e/tradfa_e/tradfa_intro_e.htm (access date 13 January, 2019).

This empirical study aims to contribute to the literature by investigating the functionality of aid to trade facilitation and communication technology and the effectiveness of measures of paperless trade across borders on export performance of the 14 Asian Countries as well as SASEC and CAREC member countries over 2005-2017 using difference-in-differences (diff-in-diff) approach. To measure the actual casual effects of policy up-gradation, the difference-in-differences method of estimation is more appropriate than 2SLS or panel data models. Paperless trade policy intervention as well as sectoral aid to trade facilitation and communication technology impact on export performance with the diff-in-diff model still is an untouched issue both in the literature of international trade and aid effectiveness literature. Overall, this study seeks to explore two important research questions- what is the impact of cross-border paperless trade facilitation policy measures on export performance in Asian developing countries, SASEC and CAREC member countries, and whether the allocation of aid to trade facilitation and communication technology affect the export performance in these aid recipient countries.

The remainder of this study is organized as follows: the next section presents the literature reviews including theoretical background and empirical literature whereas Section 3 discusses the methodology, data sources and empirical framework. Further, Section 4 illustrates the results and discussion of results. Finally, Section 5 states the conclusion and key policy recommendations.

2. LITERATURE REVIEW

2.1. Implementation of Cross Border Paperless Trade Facilitation Policy

The ESCAP secretariat has systematically collected and checked the information regarding the execution of trade facilitation measures in the Asia and Pacific region, including SASEC and CAREC regions, to provide and prioritise capacity building and technical assistant of its member countries. Considering these issues, the Asia-Pacific Trade Facilitation Forum (APTFF) with the collaboration of ESCAP and the Asian Development Bank (ADB) conduct survey on the application of information and communication technology and implementation of trade facilitation measures in international trade procedures, annually, since 2012. The first survey was conducted in 2012-2013 in which twenty six ESCAP member countries have participated. The survey results show that most of the countries did not implement cross-border paperless trade facilitation measures except China. ESCAP secretariat then primarily started to recommend its member states to implement the paperless trade facilitation measures which are treated as the main milestone for the implementation of these policy measures. Later on, due to the increasing number of regional and sub-regional projects for facilitating electronic exchange of trade information and documents, and digitalisation of cross-border economic corridors and customs procedures, WTO takes initiatives to implement Trade Facilitation Agreement mainly in December 2013² at Bali Ministerial Conference.

2.2. Theoretical Framework

Trade facilitation edges both exporting and importing economies. If a country improves its trade operation so that cost and time of trade are lessened, the importers enjoy a lower cost, whereas exporters obtain a better worth for the exported good. Cross-border paperless trade facilitation regulates "behind-the-border" measures of international trade aiming lower of both costs and time of the trade. There is no existing theoretical base regarding this type of trade facilitation measure. This study is predominantly connected with the theoretical and empirical literature related to potential benefits from international trade due to Non-tariff Measures (NTMs), such as reduction of transport and time costs, policy barriers, legal and regulatory cost, red tape by implementing digital cross border paperless trade and customs procedures, e-signatures, e-payment, e-tracking of shipments etc. Thus, both "new-new trade theory" and the political economy would be the theoretical basis of this study. The "new-new

² During the 2013 Bali Ministerial Conference, World Trade Organization (WTO) member finalized negotiations on the Trade Facilitation Agreement (TFA), which came into force on 22 February 2017.

trade theory" categorises trade costs as a key obstacle to the entry into the trade. The importance of paperless trade facilitation measures to expand trade and lower transaction costs and trading time is increasing in the global trading environment to integrate the economy with the global value chains (GVCs). Besides, the implementation of trade facilitation measures necessitates government initiative and intervention. So, the political economy of NTMs urges for transparency of trade and customs related information. Additionally, a good political environment and good quality of institutional settings would expedite perfect utilisation of development assistance for infrastructure and corridor development and implementation of paperless trade facilitation measures.

2.3. Empirical Literature

The empirical literature regarding the impact trade facilitation measures, particularly reformation of cross-border paperless trade facilitation policy, impact on export performance of the aid recipient countries is still under development. A more relevant study is conducted by [Principal \(2014\)](#) on Asia-Pacific countries. He applies a simple regression model to assess the potential benefits of cross-border paperless trade in terms of time and cost of export and import and trade outcomes. He found that paperless trade lowers the time and cost of both export and import and the relationship is strongly statistically significant. A 10% increase of a country's cross border paperless trade reform leads to a decline in trade time approximately by 6% and a 10% reduction in the trade time decreases the export costs by 7%. He also concludes that partial and full implementation of cross border paperless policy would raise export of this region by USD 36 billion and USD 257 billion annually respectively. A study by [Wilson, Mann, and Otsuki \(2005\)](#) uses four trade facilitation indicators such as the efficiency of port, regulatory environment, customs environment and service sector infrastructure to check their impact on trade flows. They use gravity model on 75 countries panel dataset in the period 2000-2001 and find that all four trade facilitation indicators have a positive impact on the country's imports and exports performance. South Asia region has the largest potential for gain from export than import than any other regions. [Souza and Burnquist \(2011\)](#) also use the gravity model to evaluate the impacts of trade facilitation measures on bilateral trade pattern of the Brazilian economy and its main trading partners of 43 countries. They conclude that the improvement of trade facilitation measures has a positive impact on trade flows between countries. [Porto, Canuto, and Morini \(2015\)](#) by using the gravity model and data of 72 countries, inspect the impact of trade facilitation measures on international trade flows over the period from 2011 to 2012. They use dummy of three variables of trade facilitation measures: the Authorised Economic Operator Program, the inauguration of a Single Window System, and the existence of a Mutual Recognition Arrangement, and find that Authorised Economic Operator Program and Single Window System improve the trade performance but the Mutual Recognition Arrangement does not improve the trade performance of the countries.

On the other hand, the AfT effectiveness literature exhibit that a little attention has been paid to the analysis of the impact of AfT facilitation and communication technology on aid recipient countries' export performance. Aid to the communication sector consists of aid to telecommunication, information and communication technology, and communication administration and policy implication which has a huge influence on the development of paperless and cross-border paperless trade facilitation policy. Several studies have been conducted using the data of total foreign aid ([Munemo et al., 2007](#); [Osakwe, 2007](#)) some studies total commitment of AfT ([Kim, 2012, 2017](#)) and some take total disbursement of AfT ([Gnangnon, 2018](#); [Gnangnon & Roberts, 2015](#); [Hühne et al., 2014a](#)) data to investigate their impact on export performance, diversification and export quality up-gradation. In detail, the most recent study is conducted by [Gnangnon \(2018\)](#) on how overall AfT flows influence recipients' export diversification. Taking total disbursement AfT data, he conducts two-step system GMM estimation method on an unbalanced panel of 104 aid recipient countries from 2002 through 2015 and finds that both AfT and cumulative AfT promote export product diversification. Before this study, a very few paper ([Munemo., 2011](#); [Osakwe, 2007](#)) investigate the impact of AfT on export performance. [Kim \(2012\)](#) takes a sample of 151 aid recipient countries over the period 1996 to 2010 and concludes that overall AfT commitment flows has a positive association with export diversification but

for high-income countries the effect is low. Kim (2017) once again explores the impact of AfT commitments and its' components on export concentration. Based on the sample of 133 AfT recipients, from 1996–2013, he finds that AfT declines the level of export product concentration in the short run, but in long run, AfT has no significant impact on the export structure. But AfT to productive capacity building lowers export product concentration. Gnangnon and Roberts (2015) conduct a study on whether trade related foreign aid and foreign direct investment inflows affect export upgrading of 86 aid recipient countries from 1995 to 2010. They develop unbalanced panel data and conduct System GMM estimation method and find that total AfT flows have statistically significant and positive impact on export upgrading, export quality and export product diversification in the aid recipients and LDCs enjoy most benefits of this positive impact. Hühne et al. (2014a) also assess the impact of AfT on the export of recipient countries, using gravity model and data over 1995–2010, and find that there is no significant impact on primary product export upgrading but effective for the exports of manufactures. Munemo. (2011) empirically explores the effect of foreign aid on export diversification using panel data from 69 developing countries employing the instrumental variable estimation technique. The findings of the study pointed out that foreign aid adversely affects export diversification.

3. METHODOLOGY

3.1. Definition and Sources of Data

This study uses panel data of 14 aid recipient developing countries of Asia, seven from the SASEC region and rests seven from CAREC region countries, throughout 2005–2017. The countries are selected based on the scope of APTFF survey and availability of data. SASEC region includes Bangladesh, Bhutan, the Republic of India, Nepal, the Republic of Maldives, Sri Lanka and Myanmar and CAREC region includes Afghanistan, Azerbaijan, China PRC, Kyrgyzstan, Mongolia, Pakistan and Uzbekistan. The study excludes Georgia, Kazakhstan, Tajikistan and Turkmenistan from CAREC region as they are not surveyed before 2013. Maldives is the only one country in the SASEC and Afghanistan, Maldives, Mongolia and Uzbekistan in the CAREC member countries still did not implement cross-border paperless initiatives.

The main dependent variable in this study is export performance refers to the log of the total export of goods and services (lnExport). The foremost variable of interest is cross-border paperless trade facilitation policy. As per the survey of APTFF and 2013 Bali Conference on WTO Trade Facilitation Agreement, that cross-border paperless trade facilitation policy was implemented from 2013. The second explanatory variable of interest is aid for trade (lnAfT) which refers to log of total disbursement of ODA and other official flows (OOF) into two important categories AfT: trade facilitation and communication technology sectors. As communication and internet technology is the main driver of building paperless trade and cross-border connectivity, the study sums up the aid for communication technology with AfT facilitation inflows. Total aid for communication technology includes aid to communication and administrative policy management, telecom technology, radio/television/print media and information and communication technology. Based on the existing literature this study considers several control variables such as, gross domestic product (GDP) proxy of economic growth, foreign direct investment, domestic credit, total labour force and inflation are the important controls that determine the export performance of a country (Gnangnon, 2018; Jongwanich, 2010; Paudel & Cooray, 2018; Uysal & Mohamoud, 2018; Zhu & Fu, 2013).

Aid for trade data is collected from the Credit Reporting System (CRS) database of OECD. Data on export performance and all control variables are obtained from the World Development Indicators (WDI) database.

3.2. Model Specification and Estimation Strategy

This study employs a quasi-experimental approach to evaluate the causal effect of cross-border paperless trade policy on export performance. This quasi-experimental approach is popularly known as the difference-in-differences (diff-in-diff) method of estimation. This study develops two intervention period based on APTFF survey that is, the

pre-intervention period 2005 to 2012 and post-intervention period 2013-2017. Therefore, following Ashenfelter and Card (1985) and Imbens and Wooldridge (2007) the basic econometric specification of this study is-

$$\ln Export_{it} = \beta_0 + \beta_1 Tr_{it} + \beta_2 Yr_{it} + \beta_3 (Tr_{it} * Yr_{it}) + \beta_4 \ln AfT_{it} + \beta_5 \ln GDP_{it} + \beta_6 \ln FDI_{it} + \beta_7 \ln LF_{it} + \beta_8 \ln DC_{it} + \beta_9 \ln INF_{it} + \varepsilon_{it}$$

Where,

The subscript i denotes the country and t denotes the year.

$\ln Export$ refers to the export performance.

Tr is the dummy variable equals to 1 if the country partially or fully adopt cross-border paperless trade policy intervention (treatment group) and equals 0 if the country does not undertake the policy intervention (control group).

Yr implies time or year dummy, taking value 1 if the observation is in year 2013 or onward and equals 0 otherwise.

$(Tr * Yr)$ is the interaction term which is the dummy equal to 1 for those entities within the treatment group in the post-treatment period (2013 and onwards) and 0 otherwise. The coefficient of the interaction variable (β_3) is called difference-in-differences estimator which captures the actual effect of policy intervention.

$\ln AfT$ is the log of total aid disbursement to trade facilitation and communication technology sector.

$\ln GDP$ proxy of economic growth and refers to the log of gross domestic product per capita (constant 2010 USD).

$\ln FDI$ implies log of foreign direct investment per capita.

$\ln LF$ is the log of total labour force.

$\ln DC$ denotes domestic credit (% of GDP) to private sector.

$\ln INF$ means annual inflation rate and epsilon is the residual term.

The main coefficient of interest is β_3 and β_4 . We are expecting positive and significant outcome of diff-in-diff estimator (β_3) and $\ln AfT$ estimator (β_4) on exports. The coefficient of control variables are expected to be positive or negative according to the relevant economic theory and literatures.

4. RESULTS AND DISCUSSIONS

4.1. Summary Statistics

Table-1. Summary statistics: Full sample and by region.

Variables	Full Sample			SASEC Region			CAREC Region		
	Obs	Mean	S.D	Obs	Mean	S.D	Obs	Mean	S.D
$\ln Export$	182	22.92105	2.374084	91	22.3709	2.452117	91	23.47119	2.170313
Tr	182	0.714286	0.453	91	0.857143	0.351866	91	0.571429	0.497613
Yr	182	0.384615	0.487846	91	0.384615	0.4892	91	0.384615	0.4892
$\ln AfT$	182	2.632373	2.406855	91	0.63626	1.872573	91	4.628485	0.29371
$\ln GDP$	182	7.443324	0.839397	91	7.40671	0.827924	91	7.479938	0.853718
$\ln FDI$	182	3.304758	1.96622	91	2.993649	2.10027	91	3.615866	1.779927
$\ln LF$	182	16.21206	2.332691	91	16.03317	2.589055	91	16.39095	2.043388
$\ln DC$	178	37.86697	30.84325	91	38.18367	16.10014	87	37.53571	41.0662
$\ln INF$	182	7.820467	5.561503	91	6.399762	4.329842	91	9.241172	6.274958

Table 1 displays the descriptive statistics of all sample variables of both SASEC and CAREC region countries. It demonstrates the basic statistical description of the dataset. It is observed from the table that lnDC and lnINF have a higher standard deviation than that of all other variables.

4.2. The Stylized Facts

Figure 1 illustrates the relationship between AfT to trade facilitation and communication technology and export performance of all sample countries over the period of 2005-2017. The X-axis represents the natural logarithm of aid disburse to trade facilitation and communication technology sectors and the Y-axis depicts the export performance. The regression line is an upward trend showing that increasing inflow of aid to these sectors is associated with raising the exports of the aid recipient countries. It is also seen that aid is quite strongly and positively correlated with the level of export growth of the aid recipients.

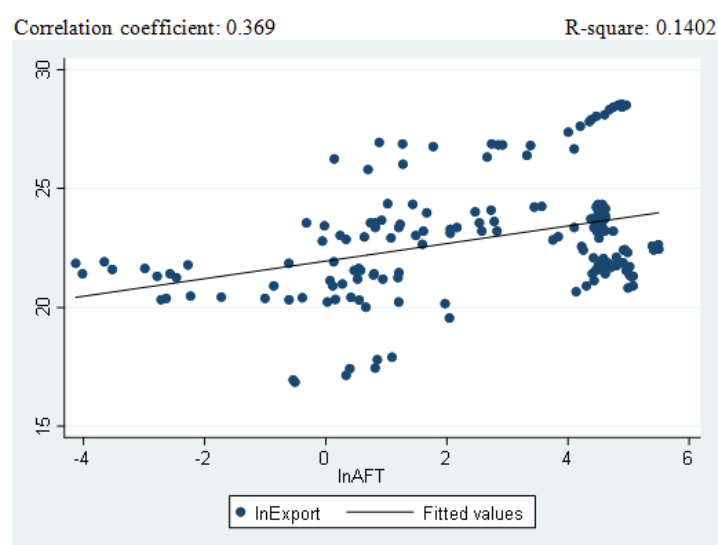


Figure-1. AfT inflows and export performance, 2005-2017.

4.3. Correlation Matrix

Table-2. Correlation matrix of all sample countries.

Variables	lnExport	Yr	Tr	ln AfT	lnGDP	lnFDI	lnLF	lnDC	lnINF
lnExport	1								
Yr	0.1458	1							
Tr	0.2304*	0	1						
lnAfT	0.3744*	0.0615	-0.0741	1					
lnGDP	0.3071*	0.1743	-0.1251	-0.1849	1				
lnFDI	0.1865	0.0856	-0.2134*	-0.0297	0.7576*	1			
lnLF	0.8253*	0.0254	0.1751	0.1542	0.0338	-0.0988	1		
lnDC	0.6303*	0.1478	0.1797	-0.0086	0.4292*	0.2113*	0.5790*	1	
lnINF	0.0842	-0.0697	0.0018	0.2493*	-0.011	0.1224	0.0345	0.0359	1

Note:*significant at 10% level.

Table 2 represents the correlation matrix using all 14 sample countries. It is observed that AfT to trade facilitation and communication technology sector, gross domestic product, labour force and domestic credit have a strong positive correlation with the export performance, which is significant at 10% level in the aid recipient developing countries. Foreign direct investment and inflation have positive correlation with export, but the relation is not significant. Year and policy dummy also positively correlated with export but the only policy has found a 10% level of significance.

4.4. Difference-in-Differences Estimation Results Using All Sample Countries Data

Table 3 represents the full sample empirical results using difference-in-differences method where the control group consists of Afghanistan, Maldives, Mongolia and Uzbekistan and the treatment group includes Azerbaijan, the People's Republic of Bangladesh, Bhutan, the People's Republic of China, the Republic of India, Kyrgyzstan, Myanmar, Nepal, Pakistan and Sri Lanka.

Table-3. Diff-in-diff estimation for all sample countries.

	(1)	(2)
Variables	Lnexport	Lnexport
Yr	0.358 (0.221)	-0.169 (0.156)
Tr	1.018*** (0.350)	0.743*** (0.136)
diff-in-diff	0.493 (0.511)	0.519** (0.233)
ln AfT		0.332*** (0.0237)
lnGDP		0.809*** (0.105)
lnFDI		0.0912** (0.0413)
lnLF		0.729*** (0.0469)
lnDC		0.00311 (0.00211)
lnINF		-0.0131 (0.0108)
Constant	21.92*** (0.141)	3.269*** (1.074)
Observations	182	178
R-squared	0.076	0.892

Note: heteroskedasticity-robust t statistics are reported.
(***), (**) and (*) denote the significance level at 1%, 5% and 10% respectively.

Column 1 represents the analysis of diff-in-diff without considering control variables in the regression equation and this study find the policy intervention has no significant impact on export performance. It is also seen that total seven percent data variation could be explained by the regression. Thus, the study takes important control variables and run diff-in-diff model (Column 2). The discussion of the results is mainly based on the result of Column 2 of Table 3 in which almost 90% data variation could be explained by the regression.

Table-4. Diff-in-diff estimation whole sample with controls.

Outcomes	lnExport	S. Error	t	P>t
Before (Base Line)				
Control	3.269			
Treated	4.012			
Diff (T-C)	0.743	0.136	5.47	0.000***
After (Follow up)				
Control	3.1			
Treated	4.361			
Diff (T-C)	1.262	0.212	5.95	0.000***
Diff-in-Diff	0.519	0.233	2.23	0.027**

Note: heteroskedasticity-robust t statistics are reported.
(***), (**) and (*) denote the significance level at 1%, 5% and 10% respectively.

This result illustrates that in the absence of cross-border paperless policy intervention the pure effect of the flow of time on export is on average -0.169 but insignificant. The estimates of “Treated” is positive and significant which suggests that absence of paperless trade policy interference, the export of the treatment group countries has on average 0.743 units [Table 4](#) higher than their peers in the control group countries, which is also the difference between exports of the two groups in the baseline year [Table 3](#). The main parameter of interest is the coefficient of diff-in-diff. The study finds strong positive casual effect of paperless trade policy reform on export which is significant at the 5% level. The result signifies that paperless policy in the treatment group tends to increase on average 0.52 units more export than their peers in the control group due to the policy adaptation. The estimate of diff-in-diff is not unexpected at all, given that paperless trade reforms mostly help to cut the time and non-tariff cost of export and subsequently enhance the export performance of the country. [Principal \(2014\)](#) found that a 1% raise in a country’ score of cross border paperless trade implementation is correlated with an approximately 0.6% decline in the trade times, for both export and import times, and a 1% reduction in time of trade is associated with about a 0.7% reduction in export cost. An influential study by [Djankov, Freund, and Pham \(2010\)](#) also finds that a unit percentage change in Doing Business Export Time is associated with an increase in exports by 0.35%.

Within the same identification strategy, the coefficient of lnAfT is strongly significant and has a positive impact on export. Basing on the result of column 2 [Table 3](#), it is evident that a 1% raise in AfT causes export growth to hike up by 0.33%. This finding is coinciding with the theoretical and empirical literature perspectives. Aid to trade facilitation and communication technology can affect the export performance in three different channels through which they would lower the associated cost and time of goods’ export and import, which in turn affects the performance of trade of the countries ([Cadot, Fernandes, Gourdon, Mattoo, & Melo, 2014](#)). These channels include hard infrastructures (road, rail, port, airport, etc.), soft infrastructures (communication infrastructure, regulatory policies, and institutional qualities) and border related costs (custom administration and the number of documents). [Ferro, Portugal-Perez, and Wilson \(2014\)](#); [Ghimire, Mukherjee, and Alvi \(2016\)](#); [Portugal-Perez and Wilson \(2012\)](#); [Wagner \(2003\)](#) also find that financial assistance for ‘trade facilitation’ extends the export performance of the beneficiary nations which could lead an enhancement in trade by approximately US\$415 million. The effect of GDP on exports is highly significant with a positive sign. A 10% growth of GDP per capita leads to 8.1% increase in export growth, on average. Large size of GDP of an economy may make environment for both local and overseas investment decisions. [Majeed and Ahmad \(2006\)](#) has a similar finding that effect of GDP on exports is positive and significant. Foreign direct investment (FDI) is a crucial determinant of export performance. FDI facilitates better technology transfer, boosts domestic capital for further export, and helps access to the new and large international markets, and upgrades technical and management skills. The study finds a 10% addition of FDI also promote export by 2.5% on average and this result is unswerving with numerous empirical studies such as [Bhatt \(2013\)](#); [Cabral \(1996\)](#); [Jongwanich. and Kohpaiboon \(2008\)](#); [Lee and Ries \(2016\)](#); [Majeed and Ahmad \(2006\)](#). Available skilled labour force is a source of export competitiveness and low production cost. The effect of labour force is positive on export performance. A 10% raise in labour forces lead to a 7.3% increase in export. This impact is statistically significant at 1% level. This findings is coincide the results of [Majeed and Ahmad \(2006\)](#); [Pfaffermayr \(1996\)](#). Although the coefficient of domestic credit (DC) and inflation rate (INF) is positive and negative respectively, there is no statistical evidence, at least at the 10% level, to claim that domestic credit improves or inflation rate declines export performance.

4.5. Difference-in-Differences Estimation for SASEC and CAREC Countries

[Table 5](#) summarises the results for SASEC and CAREC member countries separately. Using similar econometric specification, the study gets similar findings that both paperless international trade policy and aid to trade facilitation and communication technology (lnAfT) has significant positive impact on the export performance of SASEC and CAREC member states. The diff-in-diff estimator in the both regions is positive and statistically

significant at 10% and 5% level respectively. Due to the execution of paperless trade facilitation measures, the expected average rise in export of the treatment group, respectively, is 1.021 and 0.344 units. In the absence of policy intervention the pure effect of the passage of time on export is negative for the both regions but statistically significant for CAREC region only. The negative effect of time variable is 0.238 units higher in the CAREC region than that of SASEC region. These coefficients mean that the expected average decrease in export is 0.272 units and 0.510 units respectively from before to after the launching of policy intervention among the control group countries. The coefficient of the treated variable has a significant (at 1% level and 5% level) positive impact on the export performance in both regions which implies that before the amendment of paperless policy intervention, the estimated mean differences of exports are 1.470 and 0.179 between the treatment group economies and control group economies in SASEC and CAREC region respectively.

Once again, it is observed from the Table 5 that there is a significant positive impact of AfT on exports in both regions. A 10% rise in aid causes export growth to increase by 4.14% in the SASEC region and 3.78% in the CAREC region. In the SASEC region (Column 1), GDP, FDI and labour force has a positive effect on exports. A 10% increase in GDP, FDI and labour force leads to a 7.1%, 3.0% and 8.0% increase in exports respectively. The results are statistically significant at 5% for GDP and 1% for both FDI and labour force.

The elasticity of domestic credit (DC) on exports is negative in this region implies a 1% increase in the domestic credit given to private stakeholders declines export by 0.02%. This may happen due to the lake of conviction of banking and financial sectors in the private investors and entrepreneurs as well as the difficulties involved in obtaining loans and advances in the SASEC countries.

Table-5. Diff-in-diff estimation SASEC and CAREC region.

Variables	(1) Sasec Region	(2) Carec Region
Time	-0.272 (0.402)	-0.510*** (0.133)
Treated	1.470*** (0.518)	0.179** (0.0838)
diff-in-diff	1.021* (0.523)	0.344** (0.143)
lnAfT	0.414*** (0.0879)	0.378*** (0.0996)
lnGDP	0.709** (0.275)	1.153*** (0.0551)
lnFDI	0.299*** (0.0951)	-0.0343 (0.0255)
lnLF	0.797*** (0.0481)	0.746*** (0.0333)
lnDC	-0.0167* (0.00857)	0.00389** (0.00173)
lnINF	-0.0297 (0.0239)	0.00640* (0.00363)
Constant	2.528 (2.423)	0.788 (1.015)
Observations	91	87
R-squared	0.883	0.987

Note: heteroskedasticity-robust t statistics are reported.
(***), (**) and (*) denote the significance level at 1%, 5% and 10% respectively.

The coefficient of inflation is negative and has no statistical evidence to inspect its' effects on export performance. In the CAREC region (Column 2), GDP and Labour force has a positive effect on exports. A 10% increase in GDP and labour force leads to an 11.5% and 7.5% growth in the exports respectively.

The results are statistically significant 1% for both the coefficient of GDP and labour force. The impact of FDI in CAREC region is negative and this result has no statistical evidence that FDI shrinks exports. The access to credit facilities helps a significant increase in export of the manufacturer (Molina & Roa, 2014). The estimator of domestic borrowings to the private sector is found to have a negative relationship with export.

The study gets a 1% increase of the domestic credit leads to increase the export by 0.003% in CAREC region. The pattern of trade for CAREC region countries and SASEC region countries are not similar at all. Most of the CAREC region countries produce capital intensive goods such as petroleum, gas, gold, metal ore, machine parts, broadcasting equipments, etc.

Higher inflation might affect exports by means of having a direct influence on prices and costs of production inputs, for example, raw materials and labour (Ahmed, Ghauri, Vveinhardt, & Streimikiene, 2018; Dexter, Levi, & Nault, 2005; Kiganda, Obange, & Adhiambo, 2017). This study obtains positive sign for the coefficient of inflation and this effect is statistically significant.

4.6. Test of Parallel Trend Assumption of Diff-in-Diff Estimation

A violation of the parallel trend hypothesis may lead to biased results in diff-in-diff estimation. The parallel trend assumption requires that in the non-existence of the policy (treatment) intervention, the distinction between the treatment and control country group is steady over the time being (Gertler, Martinez, Premand, Rawlings, & Vermeersch, 2011).

In Appendix Figure A.1 represents the graphical presentation of parallel trend of diff-in-diff estimation using all sample countries, SASEC region and CAREC region. When no countries accept the cross border paperless policy measures, the export performance over time is constant for both treatment and control groups which also confirms the validity of the diff-in-diff analysis.

5. CONCLUSIONS

This study mainly examines empirically the causal effect of cross border paperless trade policy and inflow of AfT, particularly, aid to trade facilitation and communication technology sectors on the export performance of the SASEC and CAREC member countries using panel data covering the period 2005-2017. According to the ESCAP survey of trade facilitation measures and WTO initiatives for implementing trade facilitation agreement, we consider that the cross-border paperless trade policy come to effective from 2013.

Employing difference-in-differences method of estimation, the study first evaluates the impact of the policy implication on export performance using whole sample countries where the control group consists of Afghanistan, Maldives, Mongolia and Uzbekistan and the treatment group includes Azerbaijan, the People's Republic of Bangladesh, Bhutan, the People's Republic of China, the Republic of India, Kyrgyzstan, Myanmar, Nepal, Pakistan and Sri Lanka. The study finds positive and statistically significant effect of paperless policy intervention on exports of these countries.

Due to the implementation of the policy, the export of the treatment group increases on average 0.52 units more than that of their peers in the control group. This study also finds a positive and significant association between aid to trade facilitation and information and communication technology and exports. A 1% increase in AfT causes export growth to increase by 0.33% in the whole sample countries. Later on, the study decomposes the whole sample countries into two groups, namely SASEC and CAREC.

Employing similar model specification and diff-in-diff technique, the study finds cross-border paperless policy intervention has significant positive effects on the export performance of both the regions. For the policy interference the average increase in the export of the treatment country group is 1.021 (in SASEC region) and 0.34 (in CAREC region) unit higher than the export growth of control country group. In the both country groups the

impact of AfT over exports is highly significant and positive. All the results are coinciding with the economic theory and preceding literature.

The key contribution and policy recommendation of this study is that both cross-border paperless trade policy measures and aid to trade facilitation and communication technology assist developing countries to accelerate progress towards regional economic integration and global partnership (SDG 17). To get more benefits from international trade, Asian economics should forward their hand of cooperation for regional economic integration and should not avoid adopting cross border paperless trade policy reforms. Moreover, donors and development partners should raise their international financial assistance for the digitalisation of cross-border activities and modernisation of economic corridors. Policymakers should employ policies that attract donors for more development assistances in these sectors.

The future scope of the study should focus on examining the paperless trade policy effects on country-specific cases and employ more robust econometric specifications. Furthermore, AfT specially disbursed to corridor digitalisation and development would provide better results for aid effectiveness literatures which are very limited.

Funding: This study received no specific financial support.

Competing Interests: The authors declare that they have no competing interests.

Acknowledgement: Both authors contributed equally to the conception and design of the study.

REFERENCES

- Ahmed, R. R., Ghauri, S., Vveinhardt, J., & Streimikiene, D. (2018). An empirical analysis of export, import, and inflation: A case of Pakistan. *Journal for Economic Forecasting*, 21(3), 117-130.
- Ashenfelter, O., & Card, D. (1985). Using the longitudinal structure of earnings to estimate the effect of training programs. *The Review of Economics and Statistics*, 67(4), 648-660.
- Bhatt, P. (2013). Causal relationship between exports, FDI and income: The case of Vietnam. *Applied Econometrics and International Development*, 13(1), 161-176.
- Cabral, S. (1996). Comparative export behaviour of foreign and domestic firms in Portuga. *Banco de Portugal, Working Paper No. 8*.
- Cadot, O., Fernandes, A., Gourdon, J., Mattoo, A., & Melo, J. D. (2014). Evaluating aid for trade: A survey of recent studies. *The World Economy*, 37(4), 516-529. Available at: <https://doi.org/10.1111/twec.12138>.
- Dexter, A. S., Levi, M. D., & Nault, B. R. (2005). International trade and the connection between excess demand and inflation. *Review of International Economics*, 13(4), 699-708. Available at: <https://doi.org/10.1111/j.1467-9396.2005.00532.x>.
- Djankov, S., Freund, C., & Pham, C. S. (2010). Trading on time. *The Review of Economics and Statistics*, 92(1), 166-173.
- ESCAP. (2017). Trade facilitation and paperless trade implementation global report 2017. Retrieved from https://www.unescap.org/sites/default/files/Global%20Report%20Final_26%20Oct%202017.pdf. [Accessed 12/ 23, 2018].
- Ferro, E., Portugal-Perez, A., & Wilson, J. S. (2014). Aid to the services sector: Does it affect manufacturing exports? *The World Economy*, 37(4), 530-541. Available at: <https://doi.org/10.1111/twec.12151>.
- Gertler, P. J., Martinez, S., Premand, P., Rawlings, L. B., & Vermeersch, C. M. (2011). *Impact evaluation in practice*. Washington DC: The World Bank.
- Ghimire, S., Mukherjee, D., & Alvi, E. (2016). Aid for trade and export performance of developing countries. *Applied Econometrics and International Development*, 16(1), 23-34.
- Gnangnon, S. K. (2018). Aid for trade and employment in developing countries: An empirical evidence. *Review of Labor Economics and International Relations*, 33(1), 77-100. Available at: <https://doi.org/10.1111/labr.12139>.
- Gnangnon, S. K., & Roberts, M. (2015). Aid for trade, foreign direct investment and export upgrading in recipient countries. WTO Staff Working Paper ERS-2015-10.

- Ha, S. H., & Lim, S. W. (2014). *The progress of paperless trade in Asia and the Pacific: Enabling international supply chain integration* No. 137. Manila, Philippines: Asian Development Bank.
- Hühne, P., Meyer, B., & Nunnenkamp, P. (2014a). Aid for trade: Assessing the effects on recipient exports of manufactures and primary commodities to donors and non-donors. Kiel Working Paper, No. 1953.
- Imbens, G. W., & Wooldridge, J. (2007). What's new in econometrics? Difference-in differences estimation. NBER, Summer'07. Retrieved from: https://www.nber.org/WNE/lect_10_diffindiffs.pdf.
- Jongwanich, J. (2010). Determinants of export performance in East and Southeast Asia. *World Economy*, 33(1), 20-41. Available at: <https://doi.org/10.1111/j.1467-9701.2009.01184.x>.
- Jongwanich, J., & Kohpaiboon, A. (2008). Export performance, foreign ownership, and trade policy regime: Evidence from Thai manufacturing. ADB Economics Working Paper Series No. 140, 1-44.
- Kiganda, E. O., Obange, N., & Adhiambo, S. (2017). The relationship between exports and inflation in Kenya: An aggregated econometric analysis. *Asian Journal of Economics, Business and Accounting*, 3(1), 1-12. Available at: <https://doi.org/10.9734/AJEB/2017/33192>.
- Kim, Y. R. (2012). *The effect of aid for trade on export diversification of recipient countries*. Paper presented at the ETSG 2013 15th Annual Conference, Birmingham.
- Kim, Y. R. (2017). Does aid for trade diversify the export structure of recipient countries? *WINPEC Working Paper Series No. E1710*.
- Lee, H.-H., & Ries, J. (2016). Aid for trade and greenfield investment. *World Development*, 84, 206-218. Available at: <https://doi.org/10.1016/j.worlddev.2016.03.010>.
- Majeed, M. T., & Ahmad, E. (2006). Determinants of exports in developing countries. *The Pakistan Development Review*, 45(4II), 1265-1276. Available at: <https://doi.org/10.30541/v45i4iipp.1265-1276>.
- Molina, D., & Roa, M. (2014). The effect of credit on the export performance of colombian exporters. Munich Personal RePEc Archive, MPRA Paper No. 56137. Retrieved from: https://mpra.ub.uni-muenchen.de/56137/1/MPRA_paper_56137.pdf.
- Munemo, J., Bandyopadhyay, S., & Basistha, A. (2007). Foreign aid and export performance: A panel data analysis of developing countries. Federal Reserve Bank of St. Louis., Working Paper No. 023.
- Munemo, J. (2011). Foreign aid and export diversification in developing countries. *The Journal of International Trade & Economic Development*, 20(3), 339-355. Available at: <https://doi.org/10.1080/09638199.2011.538970>.
- Osakwe, P. (2007). Export diversification and the dilemma of African development. *Applied Econometrics and International Development*, 7(2), 143-154.
- Paudel, R. C., & Cooray, A. (2018). Export performance of developing countries: Does landlockedness matter? *Review of Development Economics*, 22(3), e36-e62. Available at: <https://doi.org/10.1111/rode.12389>.
- Pfaffermayr, M. (1996). Foreign outward direct investment and exports in Austrian manufacturing: Substitutes or complements? *Weltwirtschaftliches Archiv*, 132(3), 501-522. Available at: <https://doi.org/10.1007/bf02707510>.
- Porto, P. C., Canuto, O., & Morini, C. (2015). The impacts of trade facilitation measures on international trade flows. World Bank, Policy Research Working Paper # 7367.
- Portugal-Perez, A., & Wilson, J. S. (2012). Export performance and trade facilitation reform: Hard and soft infrastructure. *World Development*, 40(7), 1295-1307. Available at: <https://doi.org/10.1016/j.worlddev.2011.12.002>.
- Principal, S. B. (2014). *Estimating the benefits of cross-border paperless trade*. Paper presented at the Regional Capacity Building Workshop on Facilitation of Crossborder Paperless Trade. Bangkok: Economic and Social Commission for Asia and the Pacific.
- Souza, M. J., & Burnquist, H. L. (2011). Trade facilitation and impacts on bilateral trade. *Economic Studies*, 41(1), 91-118. Available at: <https://doi.org/10.1590/S0101-41612011000100004>.
- UNESCAP, & ADB. (2017). *Trade facilitation and better connectivity for an inclusive Asia and Pacific*. Manila, Philippines: Asian Development Bank.

Uysal, Ö., & Mohamoud, A. S. (2018). Determinants of export performance in East Africa countries. *Chinese Business Review*, 17(4), 168-178. Available at: <https://doi.org/10.17265/1537-1506/2018.04.002>.

Wagner, D. (2003). Aid and trade—an empirical study. *Journal of the Japanese and International Economies*, 17(2), 153-173.

Wilson, J. S., Mann, C. L., & Otsuki, T. (2005). Assessing the benefits of trade facilitation: A global perspective. *The World Economy*, 28(6), 841-871. Available at: <https://doi.org/10.1111/j.1467-9701.2005.00709.x>.

Zhu, S., & Fu, X. (2013). Drivers of export upgrading. *World Development*, 51, 221-233. Available at: <https://doi.org/10.1016/j.worlddev.2013.05.017>.

APPENDIX

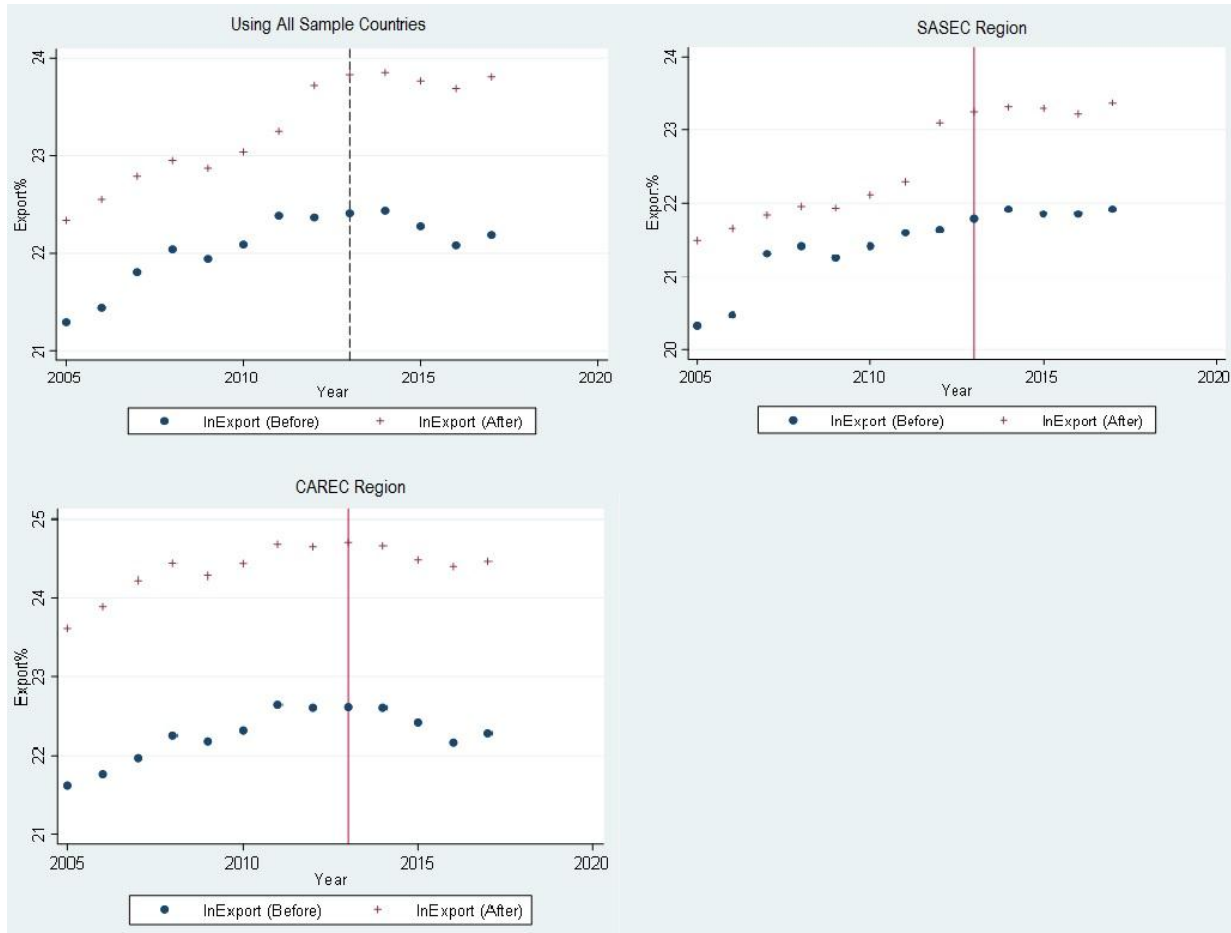


Figure-A.1. Test of parallel trend assumption.

Views and opinions expressed in this article are the views and opinions of the author(s), Asian Development Policy Review shall not be responsible or answerable for any loss, damage or liability etc. caused in relation to/arising out of the use of the content.