Domestic institutions and export performance : evidence for Cambodia

Domestic Institutions and Export Performance: Evidence for Cambodia[1]

Reth Soeng[2] Ludo Cuyvers[3]

ABSTRACT

The paper analyzes the relevance of domestic institutions for export performance of Cambodia. Regulatory quality, control of corruption, rule of law, government effectiveness and political stability are introduced in an augmented gravity model with a panel data set over 1996-2015. The research is the first application to Cambodia, until 2015 a least developed country which is generally believed to have poorly developed institutions. Due to high multicollinearity among the variables, the institutional variables are introduced in the model one by one. Estimation is by the Hausman-Taylor method, which reduces or removes the correlation between the composite error terms and the included variables. All institutional variables show a highly significant positive relationship with Cambodia's exports, with rule of law having the largest impact. It is concluded that the government should give high priority to the further improvements of the legal environment and to strong enforcement of property rights and contracts.

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[2] Reth Soeng, PhD, Fulbright scholar-in-residence, Middlesex Community College, Massachusetts, USA; Research Fellow at Centre for ASEAN Studies, University of Antwerp, Belgium; and is currently at the American University of Phnom Penh, Cambodia. Mailing address: No. 50, St.315, Boeung Kok II, Toul Kork, Phnom Penh, Cambodia. Email: reth.soeng17@gmail.com

[3] Corresponding Author: Professor Emeritus of Economics and Director, Centre for ASEAN Studies, University of Antwerp, Belgium: Email: ludo.cuyvers@uantwerpen.be and Extraordinary Professor, North-West University (Potchefstroom Campus), South Africa.

1. Introduction

The effects of institutions have recently attracted substantial attention of both academics and practitioners of economic growth and development as they have reportedly played an increasingly important role in enhancing overall long-run economic performance. Aghion and Howitt (2009) indicate that poor countries could catch up rapidly with more advanced countries by introducing relevant, reliable institutions that are growth-enhancing.

Cambodia was until 2015 a least developed economy (LDC), based on the World Bank definition, but received lower middle income status in 2016, after two decades of high GDP growth. During this period both the country's institutional quality and international trade performance improved considerably. Being an LDC until recently and belonging to the poorest ASEAN member countries (the so-called CLMV) which show a "development gap" with the rest of the ASEAN members, the present paper attempts to assess the impact of the institutional quality in Cambodia on its export performance, thus showing the way to follow for LDCs and for the rest of the CLMV, particularly Laos and Myanmar.

Institutions are literally difficult to define as they refer to many different things (Acemoglu, 2009). Nobel laureate Douglass C. North (1989, 1990, 1991) defines institutions as "the humanly devised constraints that shape political, economic, and social interaction." They include both formal rules, such as constitutions, laws, regulations, property rights protection, and informal constraints, including a set of beliefs, ethics, and code of conduct. In turn, Anderson (2004) defines formal institutions as rules and procedures for enforcing the rules.

Acemoglu (2009) makes three important notes on the notion of institutions. First, institutions are about how societies make own choices with respect to their economic destinies. Second, they impose constraints on human behavior; that is, laws and regulations, and policies set 'traffic' rules for economic agents to follow. Third, constraints imposed upon the behavior of individuals shape their interactions and incentivize their exchanges. These rules of the game tend to reduce uncertainty in economic exchange, thus lowering the costs of transactions to economic agents concerned.

A number of studies have documented the positive effects of institutions on economic performance and development (North, 1990, 1991, 2005; Dollar and Kraay, 2003; Acemoglu,

2009; Acemoglu and Robinson, 2005, 2006, 2012; Rigobon and Rodrik, 2005; Rodrik, 2007; Aghion and Howitt, 2009; Efendic et al., 2011; Boubakri et al., 2015; Góes, 2016). These studies consistently establish that institutions are more important in enhancing economic growth and development than government policies. Aghion and Howitt (2009) indicate that countries with better institutions tend to grow faster at the initial stage of development, but may also continue to do so at a slower rate at the later stage.

Relatively less attention has been devoted to establishing theoretically and empirically the links between institutions and international trade. Recent work, however, suggests that institutions are instrumental to increasing international trade flows (Levchenko, 2007, 2011; Yu, 2010; Araujo et al., 2016). Intuitively, weak domestic institutions tend to hinder trade flows as they exert higher costs of transactions upon economic agents (Söderlund and Tingvall, 2014) and adversely affect the comparative advantage of countries with low quality of institutions (Nunn, 2007).

Using contract enforcement as a proxy for institutions, Nunn (2007) shows that institutions explain more of the global trade patterns than the physical and skilled labor combined do. Similarly, Ranjan and Lee (2007) find that contract enforcement affects the volume of trade in general, but larger impact is detected for trade in differentiated goods. Depken and Sonora (2005) show that exports of the United States are positively affected by the improved economic freedom of the rest of the world. Using the World Bank's Worldwide Governance Indictors as proxies for institutions, Briggs (2013) confirms for the United States that stronger domestic institutions of U.S. trading partners are associated with an increase of U.S. exports to the markets of its partners.

The present paper contributes to the existing literature on the crucial importance of institutions, especially for the developing and transitional economies, in a number of ways. First, we use a broader set of institutional quality to test their individual effects on Cambodia's export performance. Second, in contrast to many previous empirical studies that used a fixed-effects model to address the heterogeneity bias,[4] we also employ the Hausman-Taylor method that provides consistent estimates of both time-varying and time-constant

[4] The fixed-effects model effectively deals with the heterogeneity bias, but it removes all time-invariant variables such as geographical distance, border effects, and the like that have been reported to be important determinants of trade flows among countries.

explanatory variables (McPherson and Trumbull, 2008; Wooldridge, 2010; Greene, 2012). Third, for robustness checks we use the Correlated Random Effects (CRE) approach proposed by Mundlack (1978) that allows for correlations between the individual specific fixed effects and the regressors (Wooldridge, 2010). Fourth, it is the first research that looks into the effects of institutions on international trade for Cambodia, a lower middle income country, and its findings should offer important policy implications for the country and those with a similar institutional and economic development.

The remainder of the paper is organized as follows. Section 2 reviews the literature on the nexus between institutions and international trade, followed by some stylized facts of Cambodia's revolution of institutions and international trade in Section 3. Section 4 presents our econometric specification, the data, and the estimation techniques. Section 5 provides estimation results and a discussion of these results. Section 6 concludes and offers policy implications.

2. Institutions-Trade Nexus

According to neoclassical trade theory, countries trade because they are different. The Heckscher-Ohlin model, for instance, suggests that a country tends to export the products that in their production use relatively intensely the production factor the country is relatively well endowed with and to import the products that use relatively intensely the relative scarce factor. Thus, different resource endowments will give rise to the sources of comparative advantage and trade.

The new trade theories, on the other hand, explain trade between countries on the basis of increasing returns to scale and similarities in terms of resource endowments and technology. Countries benefit from international trade with each other even if they have identical tastes, technology, and factor endowments. Helpman and Krugman (2002) show that international specialization and trade would persist even though countries have identical relative factor endowments. When each country specializes in producing one or a few varieties of goods, larger-scale production may take place, giving rise to specialization as a result of the use of more specialized labor and other inputs. This will lead to an increase in factor productivity and in trade of each country.

The source of comparative advantage is also affected by domestic institutions (Nunn, 2007). It has been shown that institutions are quantitatively at least as important sources of comparative advantage as the traditional sources such as factor endowments or technology (Levchenko, 2007; Ferguson and Formai, 2013; Nunn and Trefler, 2014). Levchenko (2007) is probably the first to model theoretically the interactions between domestic institutions and trade performance. Based on the incomplete contracts literature, his model predicts that countries with the highest quality of institutions which are the source of their comparative advantage, tend to benefit the most from international trade. This is an expected result as the production of goods and services requires good institutions that support the production process (Nunn and Trefler, 2014).

Nunn and Trefler (2014) provide a comprehensive review of the relationships between domestic institutions and the sources of comparative advantage. They conclude that institutions play a critical role in shaping the patterns of comparative advantage and international trade, and that the causation may run bi-directionally.

Inspired by the pioneering work of Levchenko (2007) and Nunn and Trefler (2014), Araujo et al. (2016) develop a theoretical model to explain how the dynamics of exporting firms are affected by the institutional differences. They show that firms tend to start with a higher volume of exports and serve the destination countries with better institutions for a longer period. However, firms' export growth is higher to the destinations with weaker institutions.[5] This suggests that the dynamics of exporters are affected by the differences of the quality of institutions, export experiences, and the marginal cost of exporting that tends to change over time (Araujo et al., 2016).

There is a growing body of empirical literature on the effects of institutions on international trade. Using a gravity model and a data set from 48 countries, Anderson and Marcouiller (2002) reported that, quantitatively, international trade flows were adversely affected by weak institutions as much as tariffs did. Inadequate institutional quality reduced exports. Likewise, Anderson (2004) indicated that imperfect contract enforcement negatively affect trade as it may serve as tariffs on trade flows. Using a panel data set from almost 60 countries over 1990-2000, Méon and Kekkat (2008) employed six aspects of governance as proxies for

[5] With export experience gained over time, exporters may seek to mitigate the problem of incomplete information by building private relationships with the importers (Araujo et al., 2016)

institutional quality to assess the impacts of these institutional factors on exports. They made a distinction between the exports of manufactured goods and non-manufactured goods. Their estimation results suggested that defective institutions significantly reduce exports of manufactured goods. However, no evidence was found with regards to the associations between institutions and non-manufactured goods.

Söderlund and Tingvall (2014) used firm-level data from Swedish exporters to analyze how institutions in destination countries affect exports by Swedish firms. They found that weak institutions in destination countries hampered the Swedish firms' exports to these countries. Their results also revealed that, through learning experience, exports were less dependent on the quality of institutions in the destination economies over time. This finding suggests that exporters are less affected by the institutions in the destination countries as they successfully establish relationships with their importing partners in the foreign markets.

Söderlund and Tingvall's results are confirmed by a recent study by Araujo et al. (2016). Using firm-level data of Belgian exporters that served foreign markets over 1995-2008 to test their theoretical model, Araujo et al. (2016) find strong support for the predictions of their theoretical model that firms enter into a new export market with higher sales, the stronger the institutions in the importing country, and that a firm's export growth to a foreign market is higher, the lower the effectiveness of the institutions of the foreign destination.

3. Some Stylized Facts of Cambodia's Institutions[6] and Trade

Cambodia, a highly open economy, experienced dramatic regime changes brought about by the French colonial rule of 90 years and later by *coups d'état*. The country was also dragged into the French-Indochina war (1947-1954), was subsequently severely affected by the U.S. bombardments during the U.S.-Vietnam war (1955-1975). More recently, Cambodia suffered dramatically from the genocidal *Khmer Rouge* regime (1975-1979) during which time nearly two million people were killed or died of starvation, forced overwork or disease. This brutal *Khmer Rouge* rule and the enduring civil wars caused enormous destructive damage, not only to the Kingdom's basic infrastructures, many institutions, and financial and health systems, but, more importantly, to the country's human capital and human resources,

[6] This section draws largely on Soeng et al. (2017).

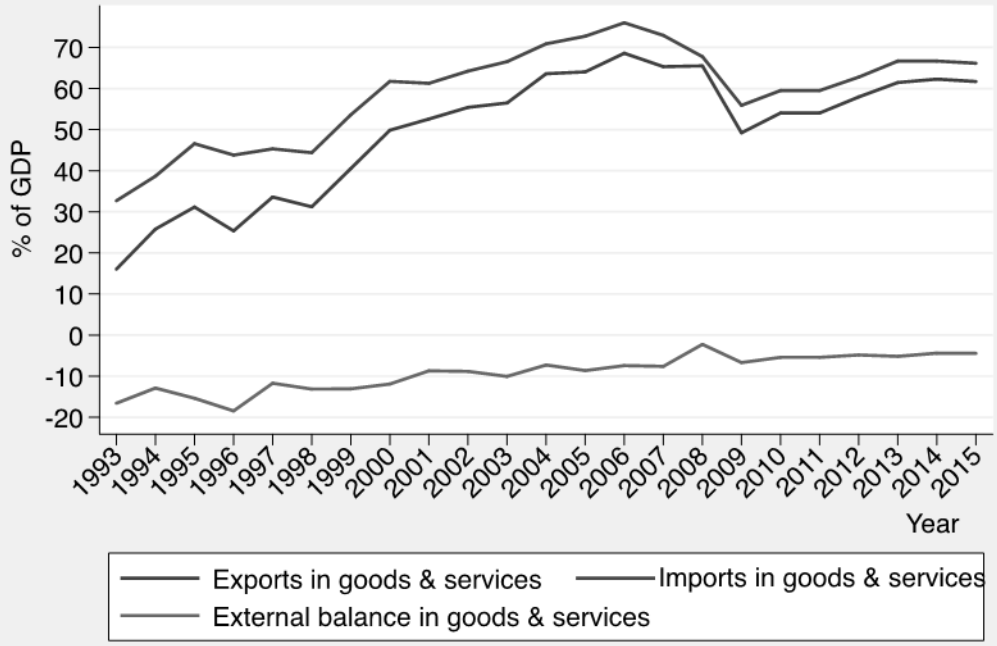
which are indispensable for the post-conflict reconstruction and development of the conflicts-ridden country.

After the demise of the *Khmer Rouge* regime, Cambodia continued to suffer from the international imposition of embargo and isolation. This came to an end after the conclusion of the 1991 Paris Peace Accord which paved the way for the arrival of the United Nations Transitional Authority (UNTAC). The Kingdom held its first general election in 1993 under the auspices of the United Nations, with the formation of a legitimate coalition government with two prime ministers.[7] Since then, Cambodia has widely liberalized its economy by adopting a highly open outward-oriented policy towards trade with the rest of the world, making Cambodia one of the most open economies in the Asia-Pacific region (Hill and Menon, 2014). Cambodia's volume of international trade as a percentage of GDP reached almost 150% in 2015.

Cambodia's merchandise trade has increased substantially since the very early 1990s. Merchandise exports, measured in current U.S. dollars, has risen by more than 300-fold over just two and half decades (International Monetary Fund, 2017). Similarly, total merchandise imports from the rest of the world have also increased sharply, to almost a 300-fold over the same period. Figure 1 depicts the total international flows of trade in goods and services over 1993-2015. In percentage terms, total exports of Cambodia have increased over time, from around 16% of GDP in 1993 to almost 62% in 2015. Over the same period, its imports have risen from around 33% in 1993 to more than 66% in 2015. Like many other countries, Cambodia experiences chronic deficits in its external balance of goods and services, despite a decrease over time to about 4.43% of GDP.

[7] Prince Norodom Ranariddh, President of FUNCINPEC Party, served as the first Prime Minister and the second prime ministerial position went to Samdech Techo Hun Sen, the current Prime Minister of the Kingdom of Cambodia.

Figure 1: Cambodia's International Trade Flows, 1993-2015



Source: World Bank's World Development Indicators

The improvements in its external balance may be attributed to several factors. First, Cambodia's export products and markets have been diversified. The share of its exports to the U.S. market has declined over time from 66.5% of total exports in 2001 to about only 24% in 2015, while its exports to the European Union, ASEAN, Japan and other markets have expanded (Ministry of Economy and Finance and Asian Development Bank, 2016). Thus, it is less affected by external shocks in the world economy. Second, Cambodia is beneficiary of the EU's preferential treatment of its export products under the EU's '*Everything But Arms (EBA)*' and it has signed bilateral trade agreements with other developed countries and emerging economies including Japan and China. Third, being a member of the WTO, Cambodia has undergone far-reaching trade reforms and streamlined as well as improved the effectiveness of customs operations to facilitate international trade flows (Baker, 2016). Time to exports has also fallen noticeably by more than 15 days to around 21 days in 2014 (Baker, 2016).

Table 1 reports for CLMV (Cambodia, Lao PDR, Myanmar and Vietnam) the governance quality, which is often used as proxy for institution quality. Since 1996, global governance indicators have been assessed for the World Bank's member countries, covering six aspects of governance, namely control of corruption, regulatory quality, governance effectiveness,

rule of law, political stability and absence of violence or terrorism, and voice and accountability. Each country is ranked, using percentiles, for each governance dimension.

Table 1: Governance Indicators for CLMV (Percentile Ranks, %)

	1996	*2000*	*2004*	*2008*	*2012*	*2013*	*2014*	*2015*
Cambodia								
Control of Corruption	17	21	14	7	14	16	13	13
Government Effectiveness	19	19	18	16	23	20	25	25
Political Stability	14	20	30	32	41	40	45	44
Regulatory Quality	50	43	32	37	41	40	37	35
Rule of Law	14	19	9	12	17	15	18	17
Voice and Accountability	21	24	23	21	20	21	18	19
Lao PDR								
Control of Corruption	36	25	9	6	15	20	25	20
Government Effectiveness	28	20	13	18	22	27	39	37
Political Stability	54	26	26	45	47	49	60	60
Regulatory Quality	11	7	9	14	23	23	22	24
Rule of Law	18	21	14	22	23	26	27	25
Voice and Accountability	20	16	7	5	6	5	4	4
Myanmar								
Control of Corruption	3	4	1	1	11	12	17	17
Government Effectiveness	6	8	4	3	3	5	9	10
Political Stability	10	7	18	14	18	13	11	10
Regulatory Quality	4	3	0	0	2	5	6	7
Rule of Law	7	10	3	4	6	10	9	8
Voice and Accountability	1	0	0	0	4	7	9	13
Vietnam								
Control of Corruption	40	32	24	26	36	36	38	39
Government Effectiveness	35	39	41	47	45	46	52	55
Political Stability	58	58	51	50	55	55	44	49
Regulatory Quality	28	22	30	30	28	29	30	34
Rule of Law	37	42	38	41	39	40	45	46
Voice and Accountability	17	12	9	8	9	12	10	11

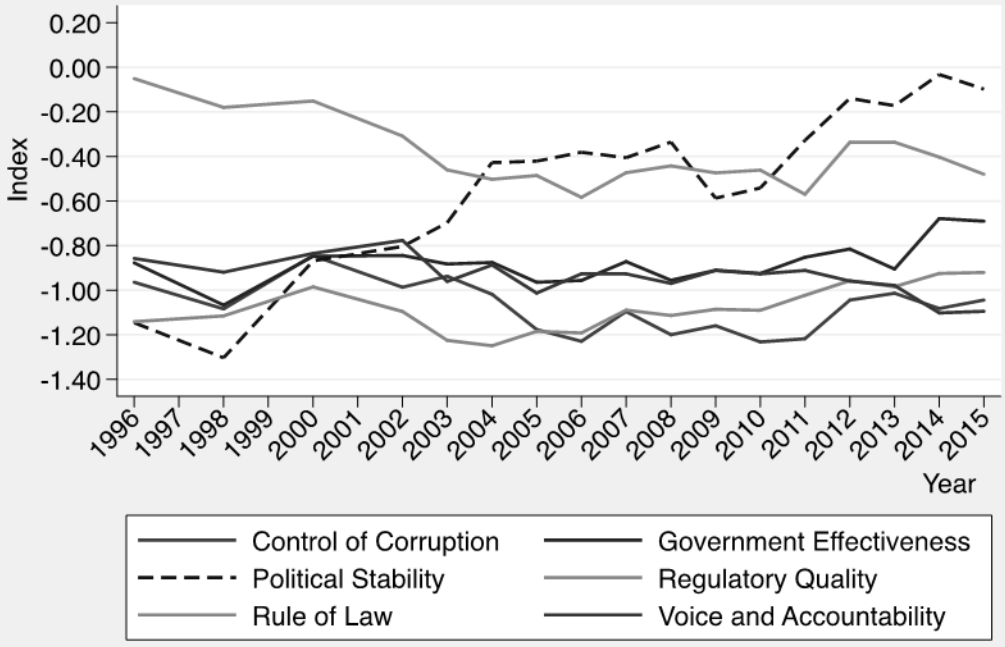
Note: The data are each country's percentile ranks, with a score of 100% being the highest.
Source: World Bank's Worldwide Governance Indicators.

According to the percentile rankings, CLMV on average scored below the 50% percentile rank for almost all dimensions over 1996-2015. Cambodia has improved in terms of political stability, rule of law, and government effectiveness. For political stability, Cambodia's percentile ranks have steadily increased from 14% in 1996, to 20% in 2000, to 32% in 2008,

reaching 44% in 2015. Compared to CLMV, Cambodia enjoyed far more political stability compared to Myanmar that was ranked well below the CLMV average for all dimensions, but less than its Indochina neighbors, Lao PDR and Vietnam. Similarly, in 1996 Cambodia's percentile rank for rule of law was 14% and 19% for government effectiveness and its percentile ranks increased to 17% and 25% for these two dimensions respectively, in 2015. Interestingly, the rankings for voice and accountability for Cambodia have not improved over 1996-2015, but the Kingdom was ranked well above Lao PDR, Myanmar and Vietnam, but below the more advanced ASEAN member states. Singapore was ranked the highest among the World Bank's memberships for all dimensions, except voice and accountability.

Figure 2 depicts the evolution of Cambodia's institutional quality over 1996-2015. The estimated score for each dimension ranges from -2.5 to +2.5, with a score of 2.5 representing the strongest institutions. Although Cambodia scored below the median score of -2.5 to 2.5 for all aspects of governance indicators, it has performed better on some of the governance dimensions—political stability, rule of law, and government effectiveness—during the period under investigation. However, regulatory quality and control of corruption experienced downward trends over 1996-2015, with the latter being identified as the most problematic factor for doing business (Hill and Menon, 2013, 2014; World Economic Forum, 2016, 2017).

Figure 2: Evolution of Cambodia's Institution Quality, 1996-2015



Source: World Bank's Worldwide Governance Indicators

4. Specification, Estimation Techniques and Data

In the light of the conceptual discussion presented above, the institution-augmented gravity equation to investigate the relationship between exports and domestic institutions in Cambodia is modelled as follows:

$$LEXP_{cit} = \beta_0 + \beta_1 Linstitution_{ct} + \beta_2 LPOP_{it} + \beta_3 LGDPCAP_{it} + \beta_4 LDIST + \beta_5 Border + \beta_6 WTO\_C + \beta_7 WTO\_B + \beta_8 GSP + \beta_9 ASEAN + \varepsilon_{it} \quad (1)$$

$$where\ i = 1, 2, 3, \dots, N\ and\ t = 1, 2, 3, \dots, T\ (1996\ to\ 2015, inclusive)$$

The subscripts c, i and t refer to Cambodia, trading partner, and time, respectively. ε_{cit}, denoting a composite error term, is equal to $\alpha_i + u_{cit}$, where α_i is country-specific, accounting for the unobserved heterogeneity among trading partners, and u_{cit} is a white noise error term. Equation (1) suggests that Cambodia's exports are influenced by Cambodia's domestic institutions (*Linstitution*), population of trading partners (*LPOP*), GDP per capita of trading partners (*LGDPCAP*),[8] distance between Cambodia and trading partner countries (*LDIST*), land border between Cambodia and partners (*Border*), Cambodia being member of WTO (*WTO_C*), Cambodia and trading partners both being members of WTO (*WTO_B*), Cambodia being the beneficiary of the Generalized Systems of Preferences (*GSP*), and *ASEAN* which denotes Cambodia and trading partners both being members of the ASEAN bloc. *L* denotes values in natural logarithm (also see Appendix A for details).

Due to the inappropriateness and inefficiency of estimation with time series and cross-sectional estimation alone, it was decided to opt for a panel data set, i.e. the data containing time series of a number of individuals, in the estimations of econometric specification (1). Panel data sets allow us to use three estimation procedures: pooled OLS, fixed-effects (FE), or random effects (RE) estimations. If the assumption holds that the unobservable individual country-specific effects are not very different, pooled OLS estimations are the most efficient and simplest method. The FE estimator takes into account the unobservable country heterogeneity, and is always less efficient than the RE estimator, but the latter may suffer from endogeneity bias (based on the Hausman test) so that the FE estimator is preferred in that case. However, the use of a fixed-effects model will drop the time-invariant variable, and will make FE estimations less preferred to the RE estimation alternative. Like the FE model, RE estimations take into consideration the unobservable heterogeneity effects, but

[8] Per-capita GDP and population of importing countries are used to respectively capture the effects of income (purchasing power) and country size of trading partners on the Cambodia's exports to these countries in our export specification (1). Higher income and larger size of importing countries, ceteris paribus, lead to higher imports from Cambodia.

incorporate these effects into the error terms, which are assumed to be uncorrelated with the explanatory variables.

To choose the most appropriate model for the panel data set from these three competing models, three statistical tests are available (Plasmans, 2006): the F-test, the Hausman specification test (Hausman, 1978), and the Lagrange multiplier test (LM test) (Breusch and Pagan, 1980). The F-test is used to carry out a test for the FE model against the pooled OLS. The null hypothesis of the F-test is that all individual effects are equal (pooled regression), or algebraically, $H_0: \alpha_1 = \alpha_2 = \alpha_3 = \cdots = \alpha_N = \bar{\alpha}$, with the F-test statistic for the joint significance of the individual effects. The rejection of the null hypothesis will be in favor of the FE model. The Hausman test is for testing the appropriateness of the FE model against the RE model. A large value of the Hausman test statistic ψ_H (Verbeek, 2004) leads to the rejection of the null in favor of the fixed effects model. To choose the pooled OLS model against the RE model, the Breusch and Pagan (1980) test is carried out. A large value of the LM test statistic will reject the null hypothesis in favor of the RE model.

The alternative approach to either FE or RE models is the Hausman-Taylor (H-T) method, which was proposed by Hausman and Taylor (1981). The H-T method combines the FE and RE estimation strategies and allows the estimations of both time-constant and time-varying explanatory variables that appear in our econometric specification. The H-T model takes the following form (McPherson and Trumbull, 2008):

$$y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \alpha_1 Z_{1i} + \alpha_2 Z_{2i} + u_i + \epsilon_{it}, \quad (2)$$

where ϵ_{it} is white noise error term and u_i is country specific effects. Hausman and Taylor (1981) define four sets of variables: X_{1it} are variables that are time-varying and are uncorrelated with u_i; Z_{1i} are variables that are time-constant and are uncorrelated with u_i; X_{2it} are variables that are time-varying and are correlated with u_i; and Z_{2i} are variables that are time-constant and are correlated with u_i. The presence of X_{2it} and Z_{2i} that are correlated with u_i is the root cause of biased results in the random-effects method.

Hausman and Taylor (1981) have proposed the estimation strategy that uses only the information already contained within the model to serve as instruments for X_{2it} and Z_{2i}. As the H-T approach does not require the use of external instruments, the difficulties of finding the most suitable instruments can therefore be avoided (McPherson and Trumbull, 2008;

Greene, 2012). The instruments can be constructed by taking deviations of the time-varying variables X_{1it} and X_{2it} from their group means. The transformation to deviations from the group means removes the part of disturbance that is correlated with X_{2it}, which is similar to the fixed-effects estimator (Greene, 2012). Since Z_{1i} variables are uncorrelated with the disturbances, they can also serve as instruments. Likewise, X_{1it} variables, by definition, are uncorrelated with disturbances, so their group means are also uncorrelated with the disturbances, and they can thus be used as instruments in the H-T estimator. The H-T approach was used in a number of previous studies on international trade flows (McPherson and Trumbull, 2008; de Jong and Bogmans, 2011). A competing approach is the correlated random effects (CRE) model which is the alternative to the fixed effects model and allows the correlation between the unobserved effects and the observed explanatory variables (Wooldridge, 2010). The CRE strategy is also applicable to the estimations of models with both time-variant and time-invariable variables.

The econometric specification (1) is estimated by using a panel data set covering 1996-2015. Data for the dependent variable (exports) are taken from the IMF's direction of trade statistics, while data on population and GDP per capita are from the United Nations. Institution data are from the World Bank's Worldwide Governance Indictors database online.[9] GSP data are from the Cambodia's Ministry of Commerce.

The World Bank's worldwide governance indicators provide six dimensions of governance, covering more than 200 countries and territories since 1996.[10] The six aspects of good governance include voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. Kaufmann et al. (2010) define the six governance indicators as follows: *voice and accountability (VA)*, measuring perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and free media; *political stability and absence of violence (PS)*, measuring perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically motivated violence and terrorism;

[9] The global governance index is between -2.5 and 2.5, with a higher score indicating better governance quality. Since the logarithm of a negative value is not defined, we transform the index to one on a 0-10 scale.

[10] The worldwide governance indictors have been made available on a biannual basis over 1996-2002, and from 2003 onwards on an annual basis.

government effectiveness (GE), measuring the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies; *regulatory quality (RQ)*, capturing perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development; *rule of law (RL)*, capturing perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence; and *control of corruption (CC)*, measuring perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests. Following Ranjan and Lee (2007), we exclude *voice and accountability* from our analysis as it mainly captures the democratic character of the political process through which those in power are chosen and replaced.

Geographical distance between Cambodia and its trading partners and WTO membership data are from the *CEPII's GeoDist* database and the *CEPII's* gravity database, respectively[11]. The definitions of all included variables and descriptions of the data, as well as their sources are provided in Appendix A. Trading partners included in our sample are given in Appendix B.

5. Empirical Results and Discussion

Table 2 presents basic statistics and VIF values for the included all explanatory variables. The average scores for all institutional variables over the period under study are well below the median score of 5 on the 0-10 scale. The panel unit root test based on Im et al. (2003), known as the IPS test, is used to test the time-varying variables, namely LPOP and LGDPCAP.[12] The results show that these variables are stationary. Following the empirical literature, only institutional variables are instrumented using the H-T methodology, whereas other variables are safely treated as exogenous variables. The variance inflation factor (VIF) values for some institutional variables are relatively high, indicating that there is high multicollinearity among

[11] The data are available at http://www.cepii.fr

[12] Unit root test based on Im et al. (2003) was carried out for time-variant variables, LPOP and LGDPCAP. The test statistics for LPOP and LGDPCAP are -68.02 and -2.53 respectively, which are highly significant at the 1% level. These results suggest that these variables are stationary.

the included variables[13]. These high inter-correlations affect the estimation results as they pose difficulty in identifying statistically the influence of specific institutional factors on Cambodia's exports. To circumvent this high correlation issue, we include the institutional variables one by one in our estimations.

Table 2: Basic statistics and unit root test results

Variable Name	IPS test	VIF	Mean	Minimum	Maximum
LPOP	-68.02***	1.42	16.32	12.50	21.04
LGDPCAP	-2.53***	2.05	9.02	4.85	11.67
LDIST		2.10	8.85	6.28	9.89
Border		1.47	0.033	0	1
WTO_C		12.78	0.71	0	1
WTO_B		4.56	0.64	0	1
GSP		1.73	0.21	0	1
ASEAN		2.26	0.09	0	1
CC		4.83	2.84	2.54	3.31
GE		3.36	3.25	2.87	3.64
RQ		5.66	4.21	3.83	4.90
RL		3.24	2.84	2.50	3.16
PS		13.11	3.98	2.39	4.94

Notes: *LPOP* is log of population of trading partners; *LGDPCAP* is log of GDP per capita of trading partners; LDIST is log of distance between Cambodia and partner countries; *Border* refers to a land border between Cambodia and partners; WTO_C is Cambodia being member of WTO; WTO_B represents Cambodia and trading partners both being members of WTO; GSP is generalized systems of preferences; ASEAN denotes trading partners being members of ASEAN; *RQ* denotes regulatory quality; *PS* represents political stability and absence of violence or terrorism; *CC* is control of corruption; *GE* is government effectiveness; *RL* is rule of law.

Before discussing the empirical results, we summarize the statistical tests to choose the most appropriate method for the estimations of our econometric specification. The test results are reported along with the estimates of the included explanatory variables, presented in Tables 3-7. Tests for heteroskedasticity show that the null hypothesis of homoscedasticity is strongly rejected at the 1% level. This suggests that heteroskedasticity is present in the data set. Likewise, the autocorrelation test statistics are also significant, indicating the presence of autocorrelation issues. Therefore, our econometric specification above is estimated with serial correlation and heteroskedasticity robust standard errors.

The LM statistics are highly significant at the 1% level, suggesting that the random-effects model is statistically superior to the pooled OLS approach. By excluding the time-invariant

[13] It is often accepted that VIF>5 indicates the severity of multicollinearity (Studenmund, 2014).

variables, we also carried out the Hausman test to choose between fixed-effects vs. random-effects models. The Hausman statistics are highly significant at the 1% significance level, providing evidence that there is correlation between the explanatory variables and the error terms. The fixed-effects technique, therefore, appears to be statistically more appropriate than the random-effects model.

As discussed in the section 3, the use of the fixed-effects approach will drop all the time-constant variables, such as distance and border effects variable. To retain these variables, we report the estimates by the Hausman-Taylor method, the instrumental variable technique that reduces or removes the correlation between the composite error terms and the included variables. For robustness checks, we also present the estimation results of the corrected random-effects technique.

Table 3: Estimation Results for Control of Corruption

Variable	RE	FE	H-T	CRE
Constant	-23.57*** (3.30)	-40.31*** (11.51)	-28.33*** (3.95)	5.12 (43.48)
Institution	1.52*** (0.20)	1.44*** (0.21)	1.49*** (0.22)	1.47*** (0.22)
LPOP	1.25*** (0.07)	1.57** (0.72)	1.38*** (0.12)	1.05*** (0.10)
LGDPCAP	1.95*** (0.13)	2.69*** (0.27)	2.26*** (0.10)	2.72*** (0.13)
LDIST	-0.64*** (0.24)	—	-0.62* (0.33)	-0.38 (0.26)
Border	4.67*** (0.79)	—	5.46*** (1.31)	3.42*** (0.84)
WTO_C	1.75*** (0.45)	1.07** (0.46)	1.48*** (0.26)	1.10*** (0.27)
WTO_B	-0.68 (0.45)	-0.59 (0.46)	-0.63*** (0.24)	-0.59** (0.25)
GSP	0.24 (0.26)	0.35 (0.30)	0.22 (0.18)	0.34* (0.19)
ASEAN	-0.75** (0.33)	-1.51*** (0.35)	-1.08*** (0.39)	-1.47*** (0.42)
No. of Observations	1,438	1,438	1,438	1,438
Overall R^2	0.6820	0.5238		0.7120
Wooldridge test for autocorrelation	46.57***			
Wald test for heteroskedasticity	4884.88***			
Breusch-Pagan test	1382.43***			

Hausman test	FE vs. RE: 117.74***

Notes:

1. L denotes values in logarithm.
2. *, **, and *** denote that the slope parameter estimates are statistically significant at the levels of 10%, 5%, and 1%, respectively.
3. Standard errors are serial correlation and heteroskedasticity robust standard errors in parentheses.

Tables 3-7 present the estimates of individual effects of the institutional variables on export performance of Cambodia. We estimated the impact of each institutional variable, controlling for other determining factors that may affect exports, by using different but related estimation approaches, namely random-effects, fixed-effects, corrected random-effects and Hausman-Taylor estimators, to check the robustness of our results. The control variables include population of trading partners, GDP per capita of trading partners, distance between Cambodia and partner countries and a set of binary variables, which are widely used in the empirical literature to study trade flows between countries (Rose, 2005; Söderlund and Tingvall, 2014). The empirical results for the institutional variables—control of corruption, government effectiveness, political stability, regulatory quality, and rule of law—are reported in Tables 3-7, respectively.

The estimates on gravity variables have the expected signs and are highly significant. Population and GDP per capita of trading partners both have positive, significant impacts on Cambodia's exports while geographical distance is, as expected, negatively correlated with trade flows. The model explains the data variation quite well, with R^2 being well above 50%. The estimated coefficient of the common border variable is positive and retains both high statistical and economic significance. This implies that countries sharing land borders trade more with each other.

We are also interested in the effects of Cambodia's membership in international organizations, such as ASEAN and the World Trade Organization (WTO). Our estimates suggest that, as expected, Cambodia's membership of the WTO did promote the country's exports. The impact is strong both statistically and economically (Tables 3-7). A somewhat surprising result is found with respect to the binary variable ASEAN, which suggests that, controlled for differences in control of corruption, Cambodia exported less to ASEAN

member states over the period under investigation. As will be seen below, the same result is found when controlling for the other institutional factors. This finding is confirmed by the data on Cambodia's exports. Over the past decades, the top five foreign markets for Cambodia's exports were the United States, Hong Kong, United Kingdom, Germany, and Canada (Asian Development Bank, 2016; International Monetary Fund, 2017), not the other ASEAN countries. A tentative explanation that can be suggested is that Cambodia's producers and exporters are only poorly participating in international production sharing networks and have weak linkages to the industrial value chains that ASEAN-5 countries are deeply involved in (Chen et al., 2011).

When controlling for regulatory quality and rule of law, the parameter estimates of GSP show the expected positive sign and are statistically significant. When controlling for control of corruption, political stability and government effectiveness, they are, however, not significantly different from zero. This is most likely attributable to regulatory quality being directly relevant for exporting, and because GSP benefits are often made conditional on rule of law by the GSP granting country.

Our main interest in the present paper is in the individual effects of different aspects of the institutional variables on Cambodia's export performance. Table 3 reports the result for control of corruption. It is highly significant at the 1% level for all different estimation strategies. This confirms that the improvement in the control of corruption will enhance exports as better control of corruption tends to reduce the costs associated with trade. Our result is consistent with a number of previous empirical studies on the effects of institutions on international trade (Méon and Kekkat, 2004, 2008; de Jong and Bogmans, 2011; Faruq, 2011; Briggs, 2013; Francois and Manchin, 2013).

The estimate on government effectiveness, another proxy for institutional quality, is positive and retains very high statistical significance for all estimators (Table 4). This finding is expected, as better quality of public services, policy formulation and implementation, as well as government's commitment to these policies creates a better environment for business transactions and exchanges, leading to a reduction in trade costs. This result is also in line with the previous empirical studies by Méon and Kekkat (2008) and Briggs (2013). Political stability, which is indispensable for the development for many countries, is also found to be an important determinant of Cambodia's exports (Table 5).

Table 4: Estimation Results for Government Effectiveness

Variable	RE	FE	H-T	CRE
Constant	-24.44*** (3.24)	-27.15** (11.31)	-26.66*** (3.78)	10.28 (45.65)
Institution	2.47*** (0.19)	2.29*** (0.21)	2.38*** (0.20)	2.26*** (0.21)
LPOP	1.19*** (0.07)	0.75 (0.70)	1.25*** (0.12)	1.01*** (0.10)
LGDPCAP	1.82*** (0.12)	2.36*** (0.26)	2.02*** (0.10)	2.35*** (0.13)
LDIST	-0.68*** (0.24)	—	-0.69** (0.32)	-0.40 (0.25)
Border	4.53*** (0.76)	—	5.09*** (1.26)	3.41*** (0.84)
WTO_C	1.28*** (0.42)	0.89** (0.43)	1.13*** (0.23)	0.88*** (0.25)
WTO_B	-0.75* (0.42)	-0.68 (0.43)	-0.72*** (0.23)	-0.68*** (0.24)
GSP	0.17 (0.26)	0.15 (0.29)	0.11 (0.18)	0.16 (0.19)
ASEAN	-0.93*** (0.33)	-1.59*** (0.34)	-1.25*** (0.38)	-1.60*** (0.41)
No. of Observations	1,438	1,438	1,438	1,438
Overall R^2	0.6962	0.4126		0.7210
Wooldridge test for autocorrelation	46.30***			
Wald test for heteroskedasticity	5857.30***			
Breusch-Pagan test	1543.14***			
Hausman test	FE vs. RE: 85.59***			

Notes:

1. L denotes values in logarithm.
2. *, **, and *** denote that the slope parameter estimates are statistically significant at the levels of 10%, 5%, and 1%, respectively.
3. Standard errors are serial correlation and heteroskedasticity robust standard errors in parentheses.

Table 5: Estimation Results for Political Stability

Variable	RE	FE	H-T	CRE
Constant	-19.94*** (3.21)	-23.08* (11.75)	-21.76*** (3.67)	-12.63 (18.05)
Institution	1.19***	1.12***	1.17***	1.11***

	(0.11)	(0.14)	(0.10)	(0.11)
LPOP	1.21***	0.78	1.26***	1.01***
	(0.07)	(0.72)	(0.11)	(0.10)
LGDPCAP	1.82***	2.29***	1.98***	2.28***
	(0.13)	(0.28)	(0.10)	(0.13)
LDIST	-0.73***	—	-0.76**	-0.40
	(0.25)		(0.30)	(0.25)
Border	4.64***	—	5.12***	3.39***
	(0.75)		(1.22)	(0.84)
WTO_C	-0.02	-0.28	-0.12	-0.28
	(0.44)	(0.44)	(0.25)	(0.26)
WTO_B	-0.68	-0.61	-0.65***	-0.61**
	(0.42)	(0.43)	(0.23)	(0.24)
GSP	-0.04	-0.11	-0.12	-0.10
	(0.27)	(0.30)	(0.18)	(0.19)
ASEAN	-1.25***	-1.97***	-1.59***	-1.98***
	(0.35)	(0.36)	(0.39)	(0.42)
No. of Observations	1,438	1,438	1,438	1,438
Overall R^2	0.6904	0.4026		0.7192
Wooldridge test for autocorrelation	45.48***			
Wald test for heteroskedasticity	9447.62***			
Breusch-Pagan test	1519.43***			
Hausman test	FE vs. RE: 91.57***			

Notes:

1. L denotes values in logarithm.
2. *, **, and *** denote that the slope parameter estimates are statistically significant at the levels of 10%, 5%, and 1%, respectively.
3. Standard errors are serial correlation and heteroskedasticity robust standard errors in parentheses.

Table 6 presents estimation results for regulatory quality, which measures the government's ability to formulate and implement sound policies and regulations. As is the case for other aspects of institutions, regulatory quality is statistically different from zero at the 1% significance level, implying that an increase in regulatory quality tends to enhance exports. The institutional factor that is the largest contributor to increasing exports of Cambodia is, as expected, the rule of law. It has the largest estimated coefficient and retains very high statistical significance at the 1% level for all estimation strategies. A unit increase in the score for the rule of law is estimated to result in an increase of exports by almost 300% (Table 7).

To summarize, our empirical results show that all institutional aspects have a positive, significant impact on the export performance of Cambodia. According to our estimations, rule of law is the most significant contributor followed by government effectiveness, control of corruption, political stability and regulatory quality. These findings provide evidence that domestic institutions have played a critically-important role in enhancing Cambodia's exports to its trading partners' markets.

Table 6: Estimation Results for Regulatory Quality

Variable	RE	FE	H-T	CRE
Constant	-23.14***	-42.89***	-28.30***	4.71
	(3.31)	(11.43)	(4.13)	(36.47)
Institution	0.95***	0.74***	0.85***	0.76***
	(0.21)	(0.22)	(0.20)	(0.20)
LPOP	1.22***	1.82**	1.38***	1.07***
	(0.07)	(0.72)	(0.13)	(0.10)
LGDPCAP	1.90***	2.63***	2.23***	2.68***
	(0.13)	(0.27)	(0.10)	(0.13)
LDIST	-0.55**	—	-0.52	-0.39
	(0.23)		(0.34)	(0.25)
Border	4.45***	—	5.28***	3.46***
	(0.79)		(1.37)	(0.84)
WTO_C	1.65***	0.88*	1.31***	0.92***
	(0.46)	(0.47)	(0.26)	(0.28)
WTO_B	-0.72	-0.62	-0.67***	-0.61**
	(0.46)	(0.47)	(0.24)	(0.25)
GSP	0.48*	0.58*	0.47**	0.58***
	(0.26)	(0.31)	(0.19)	(0.20)
ASEAN	-0.31	-1.04***	-0.62	-0.97**
	(0.34)	(0.36)	(0.40)	(0.43)
No. of Observations	1,438	1,438	1,438	1,438
Overall R^2	0.6844	0.5580		0.7085
Wooldridge test for autocorrelation	46.67***			
Wald test for heteroskedasticity	3206.80***			
Breusch-Pagan test	1358.15***			
Hausman test	FE vs. RE: 97.69***			

Notes:

1. L denotes values in logarithm.
2. *, **, and *** denote that the slope parameter estimates are statistically significant at the levels of 10%, 5%, and 1%, respectively.
3. Standard errors are serial correlation and heteroskedasticity robust standard errors in parentheses.

Table 7: Estimation Results for Rule of Law

Variable	RE	FE	H-T	CRE
Constant	-21.14***	-9.63	-20.03***	-33.80
	(2.94)	(11.30)	(4.69)	(30.05)
Institution	2.96***	2.98***	2.90***	2.83***
	(0.24)	(0.27)	(0.19)	(0.20)
LPOP	1.08***	-0.07	1.02***	0.98***
	(0.07)	(0.70)	(0.15)	(0.10)
LGDPCAP	1.56***	1.77***	1.66***	1.76***
	(0.12)	(0.26)	(0.11)	(0.14)
LDIST	-0.62***	—	-0.71*	-0.42
	(0.22)		(0.40)	(0.25)
Border	4.08***	—	4.43***	3.40***
	(0.74)		(1.63)	(0.84)
WTO_C	1.41***	1.38***	1.36***	1.30***
	(0.40)	(0.41)	(0.23)	(0.25)
WTO_B	-0.90**	-0.90**	-0.90***	-0.89***
	(0.40)	(0.42)	(0.23)	(0.24)
GSP	0.52**	0.41	0.44***	0.42**
	(0.25)	(0.27)	(0.17)	(0.18)
ASEAN	-0.66**	-1.07***	-1.00***	-1.16***
	(0.32)	(0.33)	(0.37)	(0.40)
No. of Observations	1,438	1,438	1,438	1,438
Overall R^2	0.7179	0.2299		0.7297
Wooldridge test for autocorrelation	41.33***			
Wald test for heteroskedasticity	5826.33***			
Breusch-Pagan test	1709.85***			
Hausman test	FE vs. RE: 50.38***			

Notes:

1. L denotes values in logarithm.
2. *, **, and *** denote that the slope parameter estimates are statistically significant at the levels of 10%, 5%, and 1%, respectively.
3. Standard errors are serial correlation and heteroskedasticity robust standard errors in parentheses.

6. Concluding Remarks

This current paper examines the impacts of domestic institutions on trade flows between Cambodia and its trading partners, using the institution-augmented gravity model with a

panel data set from 1996 to 2015, inclusive. We controlled for the widely-used gravity masses, such as market size proxied by population in partner countries, income per capita, geographical distance, and a set of binary variables that are believed to affect Cambodia's exports to the rest of the world.

Our results provide strong support for the important role of institutions in Cambodia. They provide evidence that Cambodia's exports are positively influenced by all aspects of institutions, namely rule of law, control of corruption, government effectiveness, political stability, and regulatory quality. Of these institutional quality variables, rule of law is found to be the most significant contributor to shaping Cambodia's total exports. The findings appear to be consistent with the achievements made by Cambodia in building up and rejuvenating its domestic institutions that were completely destroyed during the more than three years of Khmer Rouge rule. Over the past years, despite still being confronted with some challenges that need to be addressed, Cambodia has gradually improved many of these institutional factors (see Figure 2). Similarly, the World Economic Forum (2017) reports recently that, among the Asian countries, Cambodia is improving most its global competitive index score from 3.5 to 4.0 since 2007.

Our findings offer some policy implications for Cambodia whose basic institutions were completely destroyed by the more than three years of Khmer Rouge rule in the late 1970s. These findings may also apply to other low income countries, as well as to the poorer ASEAN member countries. Since rule of law is found to have the largest impact on export performance, high priority should be given to the further improvements of the legal environment, such as the legal and judicial system, and strong enforcement of property rights and contracts, which is expected to not only positively affect international trade, but also build more private investment confidence. Like in many other low income countries (Ugur & Dasgupta, 2011), judicial independence is often compromised in Cambodia, by institutional weakness, such as limited resources, low salaries, lack of skilled personnel, and low intra-institutional cooperation (McCarthy & Un, 2017). Likewise, more efforts should be made to further undertake administrative reform to improve the efficiency and effectiveness of public services delivery. In addition, as corruption is often identified as the most problematic factor for doing business in Cambodia (Hill and Menon, 2013, 2014; World Economic Forum, 2017, Transparency International, 2017), further addressing this issue with the existing anti-corruption law will consequently improve the overall business environment perceptions for

Cambodia. Institutional reforms incur short-run costs as indicated by Angkinand and Chiu (2011); their long-run economic impacts, however, are significant for sustaining long-run economic performance and enhancing international trade and private investment, both domestic and foreign.

Constant improvements of all aspects of domestic institutions are also expected to further improve the competitiveness of Cambodia and to enhance its exports that are believed to generate ripple effects on income for the Cambodian people, poverty reduction, and inequality, to mention a few. This lesson is also highly relevant for other low income countries (see e.g. Grindle, 2004), as well as for other poor ASEAN member countries. Successfully addressing poverty and inequality issues has been reported to have played an important part in resolving social issues as well as contributing to social cohesion and harmonization in the globalized society.

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APPENDIX A: Definitions of variables and their sources

Variable	***Definitions***	***Sources***
LEXP	Logarithm of Cambodia's exports to each partner	IMF's Direction of Trade Statistics
LPOP	Logarithm of population of trading partners	The United Nations
LGDPCAP	Logarithm of GDP per capita of trading partners	The United Nations
Border	Binary variable which is unity if Cambodia and trading partner share a land border	Authors
LDIST	Logarithm of distance between Cambodia and its trading partners. Distance is measured in kilometers and is taken from the Centre D' etudes *Prospectives et d' Informations Internationales* (CEPII).	*CEPII's GeoDist database*
WTO	Binary variable which is unity when Cambodia is WTO member at time *t* and 0 otherwise	CEPII's gravity database
WTO_B	Binary variable which is unity if both Cambodia and a trading partner are members of WTO at time *t* and 0 otherwise	CEPII's gravity database
GSP	Binary variable which is equal to 1 if Cambodia is the beneficiary of generalized system of preferences of a trading partner at time *t* and 0 otherwise	Cambodia's Ministry of Commerce
ASEAN	Binary variable which is equal to 1 if a trading partner is a member of ASEAN at	ASEAN Secretariat

	time *t* and 0 otherwise	
Control of Corruption (CC)	Logarithm of regulatory quality index, which ranges from -2.5 to 2.5, with a score of 2.5 representing the strongest institutions. The index is rescaled to between 0 and 10, in order for logarithm to be meaningful.	World Bank's Worldwide Governance Indicators
Regulatory Quality (RQ)	Logarithm of regulatory quality index, which ranges from -2.5 to 2.5, with a score of 2.5 representing the strongest institutions. The index is rescaled to between 0 and 10, in order for logarithm to be meaningful.	World Bank's Worldwide Governance Indicators
Government Effectiveness (GE)	Logarithm of regulatory quality index, which ranges from -2.5 to 2.5, with a score of 2.5 representing the strongest institutions. The index is rescaled to between 0 and 10, in order for logarithm to be meaningful.	World Bank's Worldwide Governance Indicators.
Rule of Law (RL)	Logarithm of regulatory quality index, which ranges from -2.5 to 2.5, with a score of 2.5 representing the strongest institutions. The index is rescaled to between 0 and 10, in order for logarithm to be meaningful.	World Bank's Worldwide Governance Indicators
Political Stability (PS)	Logarithm of regulatory quality index, which ranges from -2.5 to 2.5, with a score of 2.5 representing the strongest institutions. The index is rescaled to between 0 and 10, in order for logarithm to be meaningful.	World Bank's Worldwide Governance Indicators

APENDIX B: Cambodia's Trading Partners in the Sample

Afghanistan	Colombia	Israel	Nicaragua
Albania	Costa Rica	Italy	Norway
Algeria	Cote d'Ivoire	Japan	Pakistan
Angola	Croatia	Kazakhstan	Paraguay
Argentina	Cyprus	North Korea	Peru
Armenia	Czech Republic	South Korea	Philippines
Australia	Denmark	Kuwait	Poland
Austria	Dominican Republic	Laos	Portugal
Bahrain	Egypt	Latvia	Qatar
Belarus	El Salvador	Lebanon	Romania
Belgium	Estonia	Lithuania	Russian Federation
Bolivia	Finland	Luxembourg	Saudi Arabia
Brazil	France	Macedonia	Singapore
Brunei	Germany	Malaysia	Slovak Republic
Bulgaria	Ghana	Malta	Slovenia
Cameroon	Greece	Mauritius	South Africa
Canada	Hungary	Moldova	Spain
Chile	Iceland	Morocco	Sweden
Hong Kong	India	Myanmar	Switzerland
Macao	Indonesia	Netherlands	Thailand
China	Ireland	New Zealand	Trinidad and

			Tobago
Turkey	Ukraine	United Arab Emirates	United Kingdom
United States	Uruguay	Vietnam	Taiwan