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Manufacturing Exports and Institutional Qualities in Central Asian Countries

This paper evaluates the export values of manufactured goods for the Central Asian countries by using a gravity trade model, and investigates the roles of institutional qualities in manufacturing exports based on the World Governance Indicators. The findings of this study are summarized as follows. With Kazakhstan being a benchmark country, the remaining four Central Asian countries have downward deviations in manufacturing exports and institutional qualities. Then the institutional qualities such as control of corruption, government effectiveness and rule of law are identified to be the major factors to explain the differences in the manufacturing exports' performances.

Keywords: Central Asia; manufacturing exports; institutional qualities; World Governance Indicators; gravity trade model

Subject classification codes: F14, O53

Introduction

Central Asia (CA), which is composed of five countries—Kazakhstan, Kyrgyz, Tajikistan, Turkmenistan, and Uzbekistan—was born after the disintegration of the Soviet Union in 1991. Much of the existing literature has tended to treat the CA countries as relatively homogeneous. It is true that the countries enjoy commonalities of history, geographical closeness, culture, and language. From the perspective of economic performances, however, there are heterogeneities among the CA countries. Table 1 shows that there is a wide range in the levels of GDP per capita in 2018 from Kazakhstan (9,401 US dollars) to Tajikistan (826 US dollars) and that Kazakhstan and Turkmenistan belong to the upper-middle income class, while Kyrgyz and Uzbekistan are classified into the lower-middle income group and Tajikistan is classified into the

low income one, according to the World Bank Classification.[1] Regarding the Worldwide Governance Indicators that represent institutional qualities, the average indicators differ from Kazakhstan (-0.32) to Turkmenistan (-1.33). As for the Ease of Doing Business Ranking that reflects business environments, the ranking also varies from Kazakhstan (25) to Tajikistan (106), while Turkmenistan is out of ranking. Judging from all the above indicators, there seems to be a large gap in economic performances and structures between Kazakhstan as the top and Tajikistan as the bottom.

One of the serious challenges in the CA countries is to diversify their industrial structures with a focus on manufacturing sectors for sustainable economic growth by getting away from heavy dependences on natural-resource-based industries (e.g., Felipe and Kumar 2010). Table 1 again reveals the realities related to this issue as follows. The product concentration indices of exports[2] in the CA countries with the range of 0.26 – 0.64 are much higher than the average of emerging market countries in Asia, 0.11; the value added of manufacturing as a percentage of GDP in the CA countries with 10 % level is much lower than the average of East Asia and Pacific countries excluding high income countries, 27.62; and the natural resources rents[3] as a percentage of GDP in the

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[1] See the website: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519.

[2] The Product Concentration Indices are measured by a Herfindahl-Hirschmann Index. The indices are retrieved from UNCTAD Stat and are defined in UNCTAD Handbook of Statistics 2016.

[3] The natural resources rents are defined as "the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents" by the World Bank Open Data, and its estimates are based on sources and methods described in World Bank (2011).

CA countries with more than 5% are much higher than the average of East Asia and Pacific countries excluding high income countries, 1.86.

The strategic industries to be developed for resource-dependent economies, such as the CA countries, are "manufacturing" sectors. In this context, for instance, van der Ploeg (2011) argued that the traded (manufacturing) sector is the engine of growth and benefits most from "learning by doing" and other positive externalities. The learning by doing had been traditionally captured by future productivity of the traded sector increasing with current production of traded goods (van Wijnbergen 1984) or with cumulative experience (Krugman 1987). The empirical evidence on the learning by doing effects for manufacturing sectors has also been provided in the recent literature: e.g., Choi (2011) for foreign trade of manufacturing goods, Egelman et al. (2017) for multiproduct manufacturing, Levitt et al. (2013) for automobile assembly plant, Siebert (2010) for semiconductor industry, and Shee and Stefanou (2016) for food manufacturing industry.

The institutional qualities also matter for economic development for resource-dependent economies. There have been a significant number of empirical studies examining the effect of institutional qualities on economic development in general (e.g., North 1990, Rodrik et al. 2002, Lee and Kim 2009, Vaal and Ebben 2011, and Flachaire et al. 2014). The direct linkage between the qualities of institutions and manufactured exports has also been empirically studied as in Meon and Sekkat (2004). Based on their econometric analyses focused on the economies in the Middle East and North Africa, they suggested that the improvements in the qualities of institutions such as corruption control, government effectiveness, and rule of law result in a significant increase in manufactured exports. More importantly, the institution-manufacturing nexus is a vital issue in a resource-dependent economy. Van der Ploeg (2011), for instance, argued that

a good institution transforms a resource-dependent economy from a resource curse to a blessing: if an institution is strong and encourages productive entrepreneurship, less people engage in rent seeking and more engage in productive activities, such as manufacturing with economies of scale. As one of the empirical studies to support this argument, Amiri et al. (2019) constructed the panel regression model for 2000 – 2016 with 28 countries with rich natural resources and different levels of institutional quality and found that the efficient institutional structure in natural resource-based countries, through alleviating the effects of the natural resource curse phenomenon, improves the manufacturing sector's performance in these economies. Based on their estimation results, they finally suggested that enhancements in institutional qualities allow for more effective utilization of a country's rich natural resources in strengthening the manufacturing sector.

Although the CA countries belong to resource-dependent economies, the empirical evidence on the quantitative linkage between the performance in manufacturing exports and the institutional qualities in the CA countries has been missing in the body of the literature in this field. The evidence would help arguing that the institutional qualities are one of the key factors for maximizing a resource blessing with the support for manufacturing, the engine of growth, in the CA countries.

This paper aims to investigate the quantitative roles of institutional qualities in expanding manufacturing exports for the CA countries, to fill the gap in the empirical literature. This study applies a gravity trade model as a methodology, because the model provides a gravity trade standard as a benchmark to evaluate the performance of manufacturing exports, and makes it possible to quantify the contributions of institutional qualities to the manufacturing exports' performance. Then, the specific research questions are to what extent the governance indicators represented by the

World Governance Indicators could explain the deviation of manufacturing exports from the benchmark country's (Kazakhstan's) gravity trade standard, and which governance indicators among the six could best describe the difference in manufacturing exports' performances among the CA countries.

Regarding the literature related to the empirical analyses of gravity trade models, there have been a limited number of the studies targeting the CA countries' trade among its vast literature: Felipe and Kumar (2012) examining the relationship between gravity trade flows and logistics performances for the CA countries; Mazhikeyev et al. (2015) investigating gravity trade flows and classifying the CA countries into the more isolationist countries (Tajikistan, Turkmenistan, and Uzbekistan) and the more open, reform-minded economies (Kazakhstan and Kyrgyzstan); and Huang et al. (2020) examining gravity trade flows from China to the CA countries for forecasting China's future export growth potential under the background of the Belt and Road Initiative. Compared to these previous studies, this study's contribution is to uncover explicitly the nexus between the CA countries' manufacturing exports and their institutional qualities in a gravity trade analysis.

The remainder of the paper is structured as follows. The next section conducts empirical analyses of the CA countries' manufacturing exports by applying a gravity trade model, and the last section summarizes and concludes the paper.

Empirical Analysis

This section conducts an empirical analysis of the CA countries' manufacturing exports by applying a gravity trade model. The section starts with the methodology and data for the gravity trade estimation, followed by the estimation outcomes and their discussions.

Specification of Gravity Trade Model

This study applies the augmented version of the gravity trade model with per capita income levels for both exporters and importers proposed by Bergstrand (1989) and the theoretically motivated model with the multilateral price resistance term presented by Anderson and van Wincoop (2003). Since this study concerns the linkage between manufacturing exports and institutional qualities, the estimation model equips two types of additional variables: the CA country-specific dummies and the institutional variables denoted by the World Governance Indicators (the details will be explained later). Then the analytical question is to what extent the difference in institutional qualities could explain the country-specific properties to create the difference in the performances of manufacturing exports. The equations for the estimation are specified as follows:

$$\ln(EXt) = \alpha_0 + \alpha_1*\ln(YEt*YMt) + \alpha_2*\ln(YPCEt*YPCMt) + \alpha_3*\ln(DIS) + \alpha_4*\ln(REXt) + \alpha_5*D_{CA} + \varepsilon t \quad (1)$$

$$\ln(EXt) = \alpha_0 + \alpha_1*\ln(YEt*YMt) + \alpha_2*\ln(YPCEt*YPCMt) + \alpha_3*\ln(DIS) + \alpha_4*\ln(REXt) + \alpha_5*WGI_{CA} + \varepsilon t \quad (2)$$

where EXt denotes manufacturing exports of the CA countries to their major trading partners (importers) in year t; YEt and YMt are economic sizes represented by Gross Domestic Product (GDP) of exporters and importers, respectively; $YPCEt$ and $YPCMt$ are per capita GDP of exporters and importers, respectively; DIS is a geographical distance between the capital cities of exporters and importers; $REXt$ is a bilateral real exchange rate of exporters against importers; D_{CA} is the country-specific dummy of each CA country; WGI_{CA} is the World Governance Indicators of the CA countries that represent their institutional qualities; ε is an error term; $\alpha_{0...5}$ are a constant term and the coefficients of explanatory variables; and "ln" denotes a logarithm form, which is set to avoid scaling issues.

The detailed description of each variable is shown as follows. Regarding the explained variable of *EX*, manufacturing exports of the CA countries, the data are retrieved from UNCTAD Stat[4] by the series of the "Manufactured goods (SITC 5 to 8 less 667 and 68)" of "Merchandise trade matrix–product groups, exports in thousands of United States dollars, annual".

The variables of *YE*, *YM*, *YPCE* and *YPCM*, GDP and per capita GDP of exporters and importers utilize the data taken from the World Economic Outlook (WEO) database (April 2020) of the International Monetary Fund (IMF) by the series of "current prices US dollars."[5] The per capita GDP of exporters and importers, based on the augmented version of the gravity trade model proposed by Bergstrand (1989), reflects the exporters' capital-labor endowment effects and importers' taste preference effects, respectively. Theses variables are expressed by the joint products of GDP (*YE***YM*) and per capita GDP (*YPCE***YPCM*) of exporters and importers. Both coefficients, α_1 and α_2, are expected to have positive signs.

The *DIS*, the geographical distance between the capital cities of exporters and importers, applies the data from the Great Circle Distance Between Cities on Map (Fromto).[6] The coefficient α_3 is expected to have a negative sign.

The *REX*, a bilateral real exchange rate, is introduced as a multilateral time-varying price resistance term, which is required by the gravity trade model with recent theoretical foundations. Anderson and van Wincoop (2003) suggested the use of country-specific fixed effects as the method to account for the multilateral price term in

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[4] See the website: https://unctadstat.unctad.org/EN/.

[5] See the website: https://www.imf.org/en/Data.

[6] See the website: https://www.distancefromto.net/.

the cross-section. In a panel setting, however, the multilateral price term would be time varying. One way to control for price changes is to introduce, similarly to Rose (2000) and Vandenbussche and Zanardi (2010), the bilateral real exchange rate that varies over time and tracks price changes. The *REX* is computed by using consumer prices (*CPI*) and bilateral nominal exchange rates (*ER*), which are retrieved from the WEO, as follows.

$$(CPI_{\text{exporter}} / ER_{\text{host c. currency per US Dollar}}) / (CP_{\text{importer}} / ER_{\text{importer currency per US Dollar}})$$

The coefficient of the *REX* α_4 is expected to have a negative sign.

The last variables with the greatest concern, D_{CA} in Equation (1) and WGI_{CA} in Equation (2), are set as follows. The D_{CA} is the country-specific dummy of each CA country representing the country-specific properties to create the difference in the performances of manufacturing exports. The dummy variable taking a value of 1 (and 0 otherwise) is created by each CA country as an exporter (Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan) with Kazakhstan being a benchmark country. Since Kazakhstan appears to show the best performance in manufacturing exports, each dummy coefficient in Equation (1) is supposed to have a negative sign.

The WGI_{CA}, on the other hand, represents the institutional qualities of the CA countries as exporters. The data come from the Worldwide Governance Indicators (2019 Update) of the World Bank[7] and contains the following six kinds of indicators: government effectiveness (denoted by *G_GVE* as a variable), regulatory quality (*G_REQ*), rule of law (*G_RUL*), control of corruption (*G_COC*), voice and accountability (*G_VOA*) and political stability and absence of violence/terrorism (*G_POS*). The study also computes the average of the six indicators above as a total

[7] See the website: https://info.worldbank.org/governance/wgi/.

index (*G_AVE*). The index takes the number ranging from -2.5 (weak governance) to 2.5 (strong governance) with the world average being approximately zero. In the subsequent estimation of Equation (2), each governance indicator is separately inserted as an independent regressor since there is a multicollinearity problem among indicators. According to the variance inflation factor (VIF) measuring the level of collinearity between the regressors, the pre-estimation with the *EX* being regressed by the full-set of six indicators produces the values of VIF that are far beyond (or close to) the criteria of collinearity, namely, ten points: 322.3 in *G_GVE*, 248.6 in *G_REQ*, 281.8 in *G_RUL*, 182.9 in *G_COC*, 141.8 in *G_VOA* and 10.0 in *G_POS*. Since this study hypothesizes that the improvement in institutional qualities should accelerate manufacturing exports, each indicator's coefficient α_5 in Equation (2) is expected to have a positive sign.

Then the analytical question here is to what extent the governance indicators could explain the deviation of manufacturing exports from the benchmark country's (Kazakhstan's) gravity trade standard and which governance indicators among the six ones could best describe the difference in manufacturing exports' performances among the CA countries.

Sample and Method for Estimation

The sample economies and period are set as follows. The exporters consist of the five CA countries: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan. Their trade partners are selected to 27 countries containing the top ten trade partners of each CA country in 2018: Afghanistan, Algeria, Armenia, Azerbaijan, Belarus, Belgium, Bulgaria, Canada, China, France, Georgia, Germany, India, Indonesia, Iran, Italy, Japan, Poland, Russian Federation, Turkey, Ukraine, United Arab Emirates, United States of America, and four CA countries except an exporter. Table 2 reports the top ten partners of the CA countries and reveals that their major common partners are

Russian Federation, China, and themselves. Table 2 also shows that the manufacturing export values to the total 27 sample partners covers more than 90% out of those to the world in each CA country. The sample period is the one from 1996 to 2018, confined by the data availability of the Worldwide Governance Indicators. The study then constructs panel data for 20 years with the combinations between the five CA countries and their 27 trade partners (a total number of data is 23 * 5 * 27 = 3,105) for the estimation.

The estimation method this study applies is a pooled censored regression model (Tobit model) to avoid the problem of sample selection bias in the panel data. The Ordinary Least Square supposes that a dependent variable be observed as a continuous and unrestricted scale. The manufacturing exports as a dependent variable that this study samples, however, are only partially observed at positive values or zero value. Thus, this study adopts the Tobit model with a dependent variable left-censored at zero and with the normal distribution for the error term.

Estimation Outcomes and Discussions

Table 3 reports the estimation outcomes of gravity trade model. The outcomes contain the following nine cases of the estimation: the case (1) of the simple augmented version of gravity trade model with a multilateral time-varying price resistance term; the case (2) adding the country-specific dummy of each CA country except Kazakhstan, the benchmark country; the cases from (3) to (9) containing the Worldwide Governance Indicators instead of the country-specific dummies: the average of indicators and six individual indicators (government effectiveness, regulatory quality, rule of law, control of corruption, voice and accountability, and political stability and absence of violence/terrorism).

Regarding the case (1), all the explanatory variables but the product of per capita GDP have conventionally significant coefficients with expected signs: the coefficient of

the product of GDP (*YE*YM*) is significantly positive; the one of the geographical distances (*DIS*) is significantly negative; and the one of the bilateral real exchange rates (*REX*) is significantly negative. The product of per capita GDP (*YPCE*YPCM*) does not have a significant effect, namely, a capital-labor endowment effect, probably because the manufactured goods for exports of the CA countries are not necessarily capital-intensive goods. The result of the case (1) estimation suggests the validity of an ordinary gravity trade model for the CA countries.

In the case (2) adding the country-specific dummies, all their coefficients are negatively significant, though their magnitudes are different. It means that the four CA countries' manufacturing exports are well below the gravity trade standard of Kazakhstan, the benchmark country: exp.(-1.312) = 0.269 in Kyrgyzstan, exp.(-2.475) = 0.084 in Tajikistan, exp.(-1.907) = 0.149 in Turkmenistan, and exp.(-0.554) = 0.575 in Uzbekistan as the downward deviations from the Kazakhstan's standard. As for the cases from (3) to (9) containing the Worldwide Governance Indicators (*G_AVE*, *G_GVE*, *G_REQ*, *G_RUL*, *G_COC*, *G_VOA* and *G_POS*), all their coefficients are significantly positive. It implies that institutional factors of the CA countries affect their manufacturing exports. Both results on the country-specific dummies and the governance indicators lead to the question on the degree of the contributions of institutional factors to manufacturing exports' performances for the CA countries.

Table 4 analyzes the institutional effects on manufacturing exports' performances: the line (a) re-displays the coefficients of country-specific dummies; the lines (c), (e), (g), (i), (k), (m), and (o) show the deviations of the four CA countries' governance indicators from Kazakhstan's indicators; the deviations of the indicators are multiplied by the coefficients of the indicators estimated in the case (3)–(9) in Table 3, which represent the institutional effects on manufacturing exports shown in the line (d), (f),

(h), (j), (l), (n), and (p); and then the contributions of institutional effects to the downward deviations of the four CA countries' manufacturing exports from the Kazakhstan's standard are computed by (d)/(a), (f)/(a), (h)/(a), (j)/(a), (l)/(a), (n)/(a), and (p)/(a). The results show that the contribution of the average of the six governance indicators (d)/(a) has the wide range from 0.344 in Kyrgyzstan to 1.661 in Uzbekistan. Looking at the individual governance indicators, the largest contributor to manufacturing exports' performances is "control of corruption" (all of (l)/(a)>1), followed by "government effectiveness" (all of (f)/(a)>0.6) and "rule of law" (all of (j)/(a)>0.5).

The estimation outcomes are, overall, summarized as follows. The institutional qualities, such as control of corruption, government effectiveness, and rule of law, could be the major factors to affect the manufacturing exports' performances for the CA countries. With Kazakhstan being a benchmark country of gravity trade standard, the remaining four CA countries have large deviations in manufacturing exports and governance indicators. That implies that there would be much room for the CA countries to expand manufacturing exports if they improved their institutional qualities. This study's outcomes are consistent with those of Felipe and Kumar (2012) and Mazhikeyev et al. (2015), since these previous studies also argued that trade performances differ among the CA countries and that the institutional factors, such as logistics performances and transition reforms matter for their trade performances.

Looking at the individual governance indicators, the government effectiveness and the rule of low are the key factors to enhance the public financial management for the resource allocation to manufacturing sectors in resource-dependent economies including the CA countries. As Sachs (2007) argued, the good institution would make it possible for the government to utilize and allocate resource-earnings for public investment for

economic infrastructure and to raise the productivities of manufacturing sectors. As for the control of corruption, this study's result of its largest contribution to manufacturing exports should be carefully interpreted due to the indicators' interaction, because the impact of the qualities of institutions may also depend on corruption and the size of government (see Aidt et al, 2008; Mendez and Sepulveda, 2006; Dzhumashev, 2014 and 2016).

Concluding Remarks

This paper evaluated the export values of manufactured goods for the CA countries by using a gravity trade model and investigating the roles of institutional qualities in manufacturing exports for them based on the World Governance Indicators. This study contributed to the literature in that the linkage between the manufacturing exports and institutional qualities was clarified for the first time in the literature.

The main findings of this study are summarized as follows. With Kazakhstan being a benchmark country of gravity trade standard, the remaining four CA countries (Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan) had downward deviations in manufacturing exports and institutional qualities, though there were the differences in their magnitudes. Then the institutional qualities, such as control of corruption, government effectiveness, and rule of law, were identified to be the major factors to explain the differences in the manufacturing exports' performances for the CA countries. Thus, the implication of this study is that there would be much room for the CA countries to expand manufacturing exports if they improved their institutional qualities.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Table 1 Profile of Central Asia Countries

Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan
Population (thousand, 2018)				
18,320	6,304	9,101	5,851	32,476
Surface Area (thousand sq. km)				
2,725	200	141	488	447
GDP per capita (USD, 2018)				
9,401	1,293	826	7,065	1,550
Income Classification (2018)				
upper middle	lower middle	low	upper middle	lower middle
Worldwide Governance Indicator (average of six indicators, 2018)				
-0.32	-0.63	-1.21	-1.33	-0.95
Ease of Doing Business Ranking (out of 190, 2020)				
25	80	106	-	69
Product Concentration Indice of Exports (2018)				
0.60	0.36	0.26	0.64	0.34
Emerging Markets in Asia: 0.11				
Manufacturing, Value Added (% of GDP, 2018)				
11.43	15.16	10.50	-	16.34
East Asia & Pacific (excluding high income): 27.62				
Natural Resources Rents (% of GDP, 2017)				
16.19	8.45	5.69	17.42	14.69
East Asia & Pacific (excluding high income): 1.86				

Sources:

Population: UNCTAD Stat, https://unctadstat.unctad.org/EN/
Surface Area: World Bank Open Data, https://data.worldbank.org/
GDP per capita: UNCTAD Stat, https://unctadstat.unctad.org/EN/
World Bank Classification, https://datahelpdesk.worldbank.org/knowledgebase/articles/906519
Worldwide Governance Indicators: World Bank, https://info.worldbank.org/governance/wgi/
Ease of Doing Business Ranking: World Bank, https://www.doingbusiness.org/en/rankings
Product Concentration Indice of Exports: UNCTAD Stat, https://unctadstat.unctad.org/EN/
Manufacturing, Value Added: World Bank Open Data, https://data.worldbank.org/
Natural Resources Rents: World Bank Open Data, https://data.worldbank.org/

Table 2 Destination for Manufacturing Exports in Central Asia Countries

Kazakhstan		Kyrgyzstan		Tajikistan		Turkmenistan		Uzbekistan	
Top 10 partners in 2018, million USD									
Russia	2,156	Russia	126	Afghanistan	59	China	443	Russia	1,543
China	1,569	Uzbekistan	116	Algeria	54	Turkey	233	Turkey	418
Japan	572	Kazakhstan	93	Russia	29	Russia	57	Kazakhstan	361
Uzbekistan	544	China	33	Turkey	21	Afghanistan	56	Afghanistan	257
United States	284	Tajikistan	23	Italy	14	Iran	37	Kyrgyzstan	154
Germany	268	Turkey	16	China	9	United States	34	Ukraine	135
Kyrgyzstan	256	Belgium	8	Kyrgyzstan	5	Georgia	22	Indonesia	69
Ukraine	154	Belarus	6	Uzbekistan	4	India	15	Poland	66
Canada	147	UAE	5	Kazakhstan	3	Armenia	9	Belarus	43
France	134	United States	4	Iran	3	Bulgaria	8	Azerbaijan	40
Total sample partners (27 countries) in 2018, million USD (a)									
6,822		449		205		943		3,177	
Exports to the world in 2018, million USD (b)									
7,509		458		209		972		3,310	
Sample coverage in 2018, (a)/(b), %									
90.9		97.9		98.3		97.0		96.0	

Sources: UNCTAD Stat, https://unctadstat.unctad.org/EN/

Table 3 Estimation Outcomes of Gravity Trade Model

	(1)	(2)	(3)
Const.	19.574 ***	19.763 ***	21.324 ***
	(0.649)	(0.625)	(0.731)
ln(YE*YM)	0.659 ***	0.522 ***	0.691 ***
	(0.026)	(0.027)	(0.029)
ln(YPCE*YPCM)	-0.033	-0.002	-0.009
	(0.035)	(0.036)	(0.039)
ln(DIS)	-2.023 ***	-1.822 ***	-2.156 ***
	(0.073)	(0.072)	(0.080)
ln(REX)	-0.240 ***	0.006	0.228 *
	(0.093)	(0.102)	(0.129)
G_AVE			1.473 ***
			(0.159)
Dummy: Kyrgyzstan		-1.312 ***	
		(0.137)	
Dummy: Tajikistan		-2.475 ***	
		(0.140)	
Dummy: Turkmenistan		-1.907 ***	
		(0.145)	
Dummy: Uzbekistan		-0.554 ***	
		(0.140)	
Number of observations	2,935	2,935	2,476

	(4)	(5)	(6)
Const.	20.704 ***	20.340 ***	21.513 ***
	(0.711)	(0.715)	(0.733)
ln(YE*YM)	0.650 ***	0.701 ***	0.667 ***
	(0.029)	(0.029)	(0.029)
ln(YPCE*YPCM)	0.009	0.030	0.004
	(0.039)	(0.039)	(0.039)
ln(DIS)	-2.100 ***	-2.232 ***	-2.129 ***
	(0.080)	(0.081)	(0.080)
ln(REX)	0.395 ***	0.277 **	0.188
	(0.133)	(0.137)	(0.127)
G_GVE	1.518 ***		
	(0.145)		
G_REQ		0.635 ***	
		(0.080)	
G_RUL			1.691 ***
			(0.175)
Number of observations	2,476	2,476	2,476

	(7)	(8)	(9)
Const.	22.574 ***	20.328 ***	19.901 ***
	(0.745)	(0.736)	(0.725)
ln(YE*YM)	0.653 ***	0.707 ***	0.686 ***
	(0.029)	(0.030)	(0.029)
ln(YPCE*YPCM)	0.081 **	0.032	-0.029
	(0.039)	(0.040)	(0.042)
ln(DIS)	-2.206 ***	-2.235 ***	-2.099 ***
	(0.079)	(0.083)	(0.084)
ln(REX)	0.121	-0.070	-0.283 **
	(0.122)	(0.127)	(0.120)
G_COC	3.014 ***		
	(0.259)		
G_VOA		0.451 ***	
		(0.103)	
G_POS			0.262 ***
			(0.085)
Number of observations	2,476	2,476	2,476

Note: Standard errors are in parentheses. ***, ** and * denote statistical significance at 99%, 95%, and 90% level, respectively.
Source: Author's estimation

Table 4 Analysis of Institutional Effects on Manufacturing Exports

Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan
		Country Dummies: (a)		
-	-1.312	-2.475	-1.907	-0.554
		Deviation Ratio from Kazakhstan: exp.(a) = (b)		
-	0.269	0.084	0.149	0.575
		G_AVE (average of six governance indicators) in 2018		
-0.324	-0.630	-1.210	-1.334	-0.949
		G_AVE - Kazakhstan G_AVE: (c)		
-	-0.306	-0.886	-1.010	-0.625
		(c) * 1.473 (G_AVE coefficient): (d)		
-	-0.451	-1.305	-1.488	-0.920
		(d) / (a)		
-	0.344	0.527	0.780	1.661
		G_GVE (Government Effectiveness) in 2018		
0.022	-0.612	-1.098	-1.044	-0.547
		G_GVE - Kazakhstan G_GVE: (e)		
-	-0.633	-1.119	-1.066	-0.569
		(e) * 1.518 (G_GVE coefficient): (f)		
-	-0.961	-1.699	-1.618	-0.863
		(f) / (a)		
-	0.733	0.687	0.848	1.559
		G_REQ (Regulatory Quality) in 2018		
0.141	-0.350	-1.049	-1.999	-1.103
		G_REQ - Kazakhstan G_REQ: (g)		
-	-0.491	-1.189	-2.139	-1.244
		(g) * 0.635 (G_REQ coefficient): (h)		
-	-0.312	-0.755	-1.358	-0.790
		(h) / (a)		
-	0.237	0.305	0.712	1.425
		G_RUL (Rule of Law) in 2018		
-0.432	-0.908	-1.283	-1.452	-1.074
		G_RUL - Kazakhstan G_RUL: (i)		
-	-0.476	-0.851	-1.021	-0.642
		(i) * 1.691 (G_RUL coefficient): (j)		
-	-0.805	-1.439	-1.726	-1.086
		(j) / (a)		
-	0.614	0.581	0.905	1.960
		G_COC (Control of Corruption) in 2018		
-0.502	-0.954	-1.415	-1.358	-1.069
		G_COC - Kazakhstan G_COC: (k)		
-	-0.453	-0.913	-0.856	-0.567
		(k) * 3.014 (G_COC coefficient): (l)		
-	-1.364	-2.753	-2.580	-1.709
		(l) / (a)		
-	1.040	1.112	1.353	3.085
		G_VOA (Voice and Accountability) in 2018		
-1.172	-0.374	-1.689	-2.144	-1.616
		G_VOA - Kazakhstan G_VOA: (m)		
-	0.798	-0.518	-0.972	-0.444
		(m) * 0.451 (G_VOA coefficient): (n)		
-	0.360	-0.233	-0.438	-0.200
		(n) / (a)		
-	-0.274	0.094	0.230	0.362
		G_POS (Political Stability and Absence of Violence/Terrorism) in 2018		
0.000	-0.582	-0.724	-0.007	-0.283
		G_POS - Kazakhstan G_POS: (o)		
-	-0.582	-0.725	-0.007	-0.284
		(o) * 0.262 (G_POS coefficient): (p)		
-	-0.153	-0.190	-0.002	-0.074
		(p) / (a)		
-	0.116	0.077	0.001	0.134

Source: Author's estimation