Impact of Foreign Political and Institutional Instability on U.S. Agricultural Trade

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Abstract

Very little research exists on the potential impact of political and institutional instability on agricultural trade. This paper evaluates the effects of political instability on U.S. agricultural exports. Relative to effects of political instability measures, we found that the economic variables are more significant determinants of bilateral agricultural trade.

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1. Introduction

Although there is an extensive empirical literature on the role of economic variables in explaining bilateral trade, the relationship between political variables and trade has been relatively ignored. Just as macroeconomic and financial variables affect the level of bilateral trade flows and consequently, economic growth, the existence and stability of political institutions also matter for growth in bilateral trade among nations. The role of macroeconomic and financial variables such as prices, income and exchange rate fluctuations have been analyzed extensively in the literature. Many previous studies have generated various trade elasticities with respect to other economic variables such as prices, level of income, and exchange rates. However, very little research has been done on the potential impact and magnitude of the fluctuations in political and institutional instability and risk on exports of U.S. agricultural products.

The literature on the economic impact of political instability (PI) can be divided into two parts. One group of studies focuses on the relationship between political instability and aggregate economic growth, while the second group of studies examines the impact of political instability on bilateral trade. However, most of the previous analyses of the role of political instability have focused on its impact on economic growth. Political instability can be defined generally as the propensity for government change, which may include any type of insurrection and revolution, and military-led coups. More specifically, political instability is also defined in terms of the frequency of events that increase the likelihood of social and political unrests. Examples of such indicators of political instability includes the number of politically motivated assassinations, number of people

killed as a result of domestic mass violence, number of successful coups, number of anti-government demonstrations and general strikes, etc. Given the implications of recent news events, political instability definition can also include the effect of terrorist activities that may serve to undermine the stability of governments. Countries that have been reliably stable in the past can quickly become unstable after a substantial terrorist attack domestically or in neighboring nations.

It is important to address the question of how U.S. agricultural exports would be affected in the event of political and social unrest in foreign countries such as the Middle East, Russia, and Southeast Asia? For example, political and institutional instability in Russia, the largest importer of U.S. poultry meat, is expected to have significant repercussions on U.S. poultry exports and potentially harm American poultry producers. It can also be surmised that war and other forms of political instability in the Middle East would affect U.S. poultry producers, even though Brazilian poultry exports dominate the Middle Eastern market. Socio-political unrest and instability in the Persian Gulf can affect U.S. poultry meat trade indirectly because political turmoil in the Gulf region will lead to reduced transportation access to the region, which consequently shrinks Brazilian poultry market access. In order to find alternative outlets for excess poultry meat production capacity, due to reduced access to its traditional export market, Brazil may then encroach on U.S. markets in Russia and Asia via dumping practices. The ensuing price wars may hurt U.S. poultry producers along with higher production costs that may be caused by energy price increases. These hypothetical, but realistic, scenarios emphasize the need for empirical investigation of the role of political instability in determining the direction and magnitude of U.S. agricultural trade.

The purpose of this paper is to analyze the impact of political instability on agricultural trade

in a selection of U.S. trading partner countries over the period 1990 to 2000. Recent advances in dynamic panel data modeling techniques were employed for the analysis of the trade and political instability nexus in ninety-one importing counties of U.S. agricultural products. Table 1 contains the list of importing countries of U.S. agricultural products included in this study. The results from the current analysis provide some evidence in support of the view that some forms of political instability are significant determinants of agricultural trade. The remainder of this paper is organized as follows. Section 2 contains a brief discussion of previous studies on the relationship between political variables and various determinants of economic growth, including trade. Then section 3 discusses the econometric methodology and specification issues while section 4 presents estimation and empirical results based on panel regression models. The last section contains the concluding remarks.

2. Economic Impacts of Political Instability

The subsequent literature review is divided into two parts: studies focusing on relationship between political instability and economic growth and studies focusing on political instability and bilateral trade. Then a critical assessment of the contributions and limitations of previous studies are provided.

Political Instability and Economic Growth

The relationship between political instability and economic performance has been a subject of increasing interest to researchers and policymakers. Many observers suggest that political instability and uncertainty are important determinants of economic growth and performance (Barro,

1991, Fosu, 1992, Alesina, Ozler, Roubini and Swagel, 1996, Easterly and Levine, 1997). Most arguments trace the link between political instability and economic growth via a transmission variable such as income inequality and investment. Alesina and Rodrik (1994) and Persson and Tabellini (1994) argue that income inequality stimulates political instability, which in turn harms capital accumulation (investment) and economic growth. Alesina and Perotti (1996), in a study of 71 countries for the period 1960-1985, concludes that "income inequality, by fueling social discontent, increases socio-political instability. The latter, by creating uncertainty in the politico-economic environment reduces investment."   Consequently, lower level of investment impedes economic growth.

Alternatively, some argue that the negative effect of political instability on economic growth can be explained through its disruption of the domestic production process.   Production inefficiencies generated by political instability, such as disruption of production schedules, during periods of labor strikes and political unrest would reduce the marginal products of the production inputs. The production inefficiency argument was empirically supported by findings of several researchers. For instance Alesina and Tabellini (1989) examine the effect of political instability and uncertainty on investment and capital flight. They argue that the possibility of government change to a new leader prone to tax capital and productive activities implies a substitution of productive domestic investments in favor of consumption and capital flight, which implies a reduction of domestic production. Other variables, shown by previous studies, that are affected by political instability includes: inflation (Cukierman et al, 1992), budget deficits (Roubini (1991), external borrowing (Ozler and Tabellini, 1991), exchange rate regime (Collins, 1996) and property rights (Svensson, 1998).

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Political Instability and Bilateral Trade

In the trade literature, the relationship between political instability and risk on bilateral trade flows remains largely unexplored. The few attempts to integrate political variables into standard trade models have focused primarily on total trade with no explicit attention to the potential impact of political instability in foreign markets on U.S. agricultural exports. Srivastava and Green (1986) used an econometric model to study the determinants of trade flows among 45 exporting countries and 82 importing countries and found that "stable nations tend to be the higher level exporters when bilateral trade are examined. Conversely, there is very little effect of the instability of the importing nation on the intensity of trade (p. 635)." They also found that former colonial status, membership in the same economic union and cultural similarities are key determinants of bilateral trade.

Similar to Srivastava and Green (1986), a recent study on the political determinants of international trade was conducted by Morrow Siverson, and Tabares (1998). They tested alternative hypotheses on the effect of international politics on trade flows and found that democratic government structure and political alliances increase bilateral trade. Their emphasis was more on politics and political arrangements than on political instability. In another paper, Summary (1989) also tests for the role of political variables in trade and concludes from the empirical results that "pure economic variables which reflect market forces are not the only factors affecting U.S. bilateral trade. Semi-economic and international political factors are also important (p. 179)."

Political instability can have direct and/or indirect effect on international trade flows in two ways. First, political instability can *directly* affect the level of exports because domestic production may be negatively affected by increasing level of political and economic uncertainty. Such potential

disruptions from political instability create political risk for economic agents involved in international trade. The higher the potential for political instability, the more profitable the trade must be to compensate for the risk of future disruption and loss of export revenue. Also, the potential threat of future government action to restrict trade can lead to reduction in the current volume of international trade (Pollins, 1989, Dixon and Moon, 1993, Morrow, et al 1998).

Second, political instability can *indirectly* affect the level of imports demanded by the importing nation via the impact of political uncertainty on economic growth and other macroeconomic variables such as domestic prices, income, interest rates, unemployment, and exchange rates (Cukierman et al, 1992, Roubini, 1991, Collins, 1996). Political instability increases financial capital flight and reduces the incentive for the accumulation of physical capital that ultimately leads to reduction in economic growth. Lower economic growth rate implies lower national income and decline in the ability to pay for imports. Thus, the demand for imports of U.S. agricultural products may decline due to political instability. Alternatively, political instability in the importing country may lead to increase demand for U.S. agricultural products in an effort to use imports as substitute for lower domestic production caused by the disruptive effects of political instability on domestic production processes.

Political Instability and Agricultural Trade

Although the papers reviewed have explored the role of political variables in economic growth and bilateral trade, these studies also have important limitations that will be addressed in this paper. First, all these studies focused on total exports and not specifically on the agricultural sector. Due to its relatively larger percentage share (about 90% of overall exports) in the composition of overall U.S. trade flows, the level of industrial product (non-agricultural) exports tend to

overshadow the effect of the explanatory variables on agricultural exports. Furthermore, Srivastava and Green (1986) notes that "a few major countries (e.g., China, the Soviet Union, and the Eastern Block nations) are not included" in their study because of data unavailability. Similarly, the study by Morrow, et al (1998) excluded several major agricultural trading partners and competitors of the U.S. since they only examined six nations (U.S., Germany, U.K., France, Russia, and Italy). Other major agricultural exporters and importers that need to be investigated include Argentina, Australia, Brazil, Canada, Colombia, Japan, Mexico, and the Netherlands, among others.

Furthermore, the time frame of analyses needs to be updated to reflect more current issues and dynamics of global agricultural trade. For instance, the study by Srivastava and Green (1986) covered only the "Cold War" period while Summary (1989) used data prior to 1983, and Morrow, et al (1998) data extended only to 1990. But many of the nations analyzed have experienced major political and economic changes with major implications for global agricultural trade and U.S. agricultural export competitiveness. Srivastava and Green (1986) also acknowledged another limitation of their study due to the inadequacy of their measure of political instability used in the model. They stated that the "measures primary limitation is that it measured instability for a period that ended 10 years prior to the year for which trade statistic have been analyzed. Some nations that were unstable during the earlier period had attained relative stability by 1977 and vice versa (p. 636)." This study tackles these issues and extends previous research by incorporating three alternative measures of political instability into an export demand function for U.S agricultural trade. Also, we emphasized post-Cold War activities by analyzing data set for several countries over 1990 to 2000.

3. Analytical Framework and Methodological Issues

Early empirical formulations tried to capture the relationship between political instability and exports growth by incorporating measures of political instability in an export growth equation which captures both the demand-side and supply-side influences (Srivasta and Green, 1986; Summary 1989). Political instability is assumed to influence export demand as shown below. Exports demand is assumed to respond to income growth (GDP per capita) and population growth positively, but responds negatively to price (real exchange rate) and measures of political instability.[1] Accordingly, the export demand function is expressed as:

$$X = F(Y, N, E) \tag{1}$$

where X represents real exports growth and Y, N, and E represent importing countries' real GDP per capita (income), population growth, and real exchange rate (price of imports), respectively.

Taking logs of the variables in equation (1) and including proxies for PI , time and country-specific effects gives the following export demand equation:

$$x_{it} = \alpha + \alpha_t + \alpha_i + \beta_1 y_{it} + \beta_2 n_{it} + \beta_3 e_{it} + \beta_4 PI_{it} + \beta_5 x_{it-1} + \varepsilon_{it} \tag{2}$$

where $\alpha_i + \alpha_t$ represent the country and time-specific fixed effects (the i and t indices denote importer country and year, respectively), and political instability denotes political instability measures, and x_{it-1} is the lagged exports which captures the potential partial dynamic adjustments in the panel data of a cross-section of importing countries over time.

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1 PI can also affect U.S. agricultural exports positively if foreign importers increase demand for foreign food imports in order to make up for reduced domestic production due to PI.

Measures of Political and Institutional Instability

Three measures of political instability are used in this study. The first is a measure of executive transition in national government (ExecPI), the second measure of political instability summarizes the frequency of social unrest (SocPI), and the third political instability variable measures the frequency of the occurrence of violent political unrest (VioPI). Each of the three proxies for political instability are indices constructed using the method of principal components as described below.

To capture political instability due to *executive instability*, a proxy measure of political instability will be constructed using the approach first suggested by Cukierman, et al, (1992) and also adopted by other authors such as Alesina, Ozler, Roubini and Swagel, (1996) and Alesina and Perotti (1996). Propensity of government change is modeled as a function of both economic and political variables. According to Jodice and Taylor (1988), a regular government change is a change in the office of national executive from one leader or ruling group to another that is accomplished through conventional legal or customary procedures. We assume that a high propensity to executive changes implies policy uncertainty and potential threat to property rights (Alesina and Perotti, 1996). Note that the propensity to executive change, which can be estimated with a probit regression, is not the same as actual frequency of changes. A probit model specification using time series cross-section pooled data is given as:

$$C^* = \beta X_1 + \varepsilon \tag{3}$$

where: C^* denotes a latent variable such as that when $C^* = 1$ we observe the occurrence of a government change, and $C^* = 0$ otherwise. X_1 denotes variables (economic and political) designed

to capture the likelihood of imminent government change. The political variables would include yearly observations on regular and irregular (i.e. coups), government transfers, unsuccessful coup attempts, executive adjustments, and other political events" (Cukierman, et al, 1992). ε denotes normally distributed error term with mean zero. The probit model specification yields estimates that represent probabilities of government change that varies over time from nation to nation. Next, the political instability index is obtained by averaging the estimated probabilities of government change for each country over the relevant time period.

In contrast to the first measure of political instability, the second approach is based upon indicators of *social unrest and political violence*. Socio-political instability is measured by constructing an index that incorporates information from various variables that capture social unrest. Following Barro (1991), and Alesina and Perotti (1996), three indices of socio-political instability was constructed by applying the method of principal component to several commonly used indicators of political instability, as shown below:

ExecPI = 0.611*(Revolutions) + 0.585*(Coups d'Etat) + 0.535*(Government Crises)   (4a)

VioPI = 0.607*(Guerrilla Warfare) + 0.513*(Assassinations)   (4b)

SocPI = 0.621*(Riots) + 0.611*(Anti-Gov Demonstrations) + 0.492*(General Strikes)   (4c)

Preliminary Data

The explanatory variables are divided into two broad categories: (a) economic variables designed to measure the recent national economic trends, and (b) political variables that capture the significant political events that may signal future political disruptions. The full data set used covers 91 countries that imported U.S. agricultural products over the post Cold War sample period of 1990

to 2000. The control economic variables are real GDP in millions of constant U.S. dollars (importing countries), total population, in millions of people, and the bilateral exchange rates. The dependent variable is the value of exports from nation the U.S. to nation i, in time t, in millions of constant U.S. dollars. The data set was constructed from several different sources. The data on per capita GDP, population and exchange rates were obtained from The Penn World Tables 6.1 (Summers and Heston). Agricultural exports data were obtained from USDA's Economic Research Service (ERS) and Foreign Agricultural Service (FAS).

4. Empirical Estimation and Results

To control for unobserved heterogeneity bias common to cross-section OLS studies, the model specification includes country-specific fixed effects in the panel regression. Furthermore, endogeneity bias is possible since the causal link between exports growth and the independent variables can go in both directions. For example, while exports growth may affect bilateral exchange rate movements, the reverse is also possible. The endogenity issue can be addressed by employing instrumental variable estimator such as two-stage lesast squares (2SLS). Therefore three alternative panel estimation approaches were used to estimate equation (2). The first is the estimation of a static panel OLS model which does not account for the country-specific fixed effects. However, Hsiao (1986) argue that OLS estimates will be biased and inconsistent because of the omission of unobserved time invariant country-specific effects in a panel data model. This implies that the OLS estimates may be biased upward (Hsiao, 1986, pp. 76-78).

The second estimation approach used is the within groups (fixed effects) estimator, which accounts for the unobserved country-specific effects. This model requires the transformation of equation (2) so that each variable for each country is demeaned in such a way that the time-invariant

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country-specific effects are removed. Relative to the dynamic OLS estimates, fixed effects may be

biased downward. Both the dynamic OLS and dynamic fixed effect estimators do not account for

the endogenity of the lagged dependent variable; therefore, an alternative estimator based on

instrumental variable is needed. In order to account for potential simultaneity bias from the previous

two estimators, a third estimation approached was also applied by estimating an instrumental

variable version of the dynamic fixed effect model using two-stage least squares. Also, the

econometric model was checked for model adequacy and potential specification problems such as

multicollinearity, heteroskedasticity, and serial correlation. Then proper econometric procedures

were employed to correct for identified data and model specification problems.

Empirical Results

Table 2 contains the results for the three alternative dynamic panel regression estimators.

Column (2) presents the static panel OLS (Static OLS) estimates, while columns (3) and (4) report

estimates from dynamic fixed effect (FE) and dynamic fixed effect based on 2SLS (FE-IV) models,

respectively. All coefficients have expected signs except for population. Across all three model

specifications, foreign income and population were found to be significant economic determinants

of demand for U.S. agricultural exports over the post-Cold War time period. This finding and the

range of elasticity estimates are consistent for previous analysis of U.S. agricultural trade. Exchange

rates is only marginally significant for the less preferred static OLS model.

Although the models included three measures of political instability, only the most severe

case of violent political instability (VioPI) is significant for the first and third model specification.

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Just focusing on the dynamic FE-IV model in column (4), the coefficient on VioPI is quite significant and suggests that an increase in the average level of violent PI index in a foreign U.S. trade partner country by one over a decade will increase the demand for U.S. agricultural exports by approximately 2.7 percent. This is plausible if the domestic increase political instability disrupts domestic production of agricultural products, but communication and transportation channels are still functional so that foreign products can still come into the country. Interestingly, though the less severe measures of political instability (ExecPI and SocPI) have a negative impact on trade, they are not statistically significant.

5. Concluding Remarks

Although many previous studies have examined the relationship between socio-political instability and economic growth (and its components), very little research exist that investigate the role of political instability as a determinant of bilateral trade. The few existing studies on focused on aggregate trade among few industrialized nations. The potential effect of political instability on agricultural trade needs to be investigated. This paper examines the potential impact of foreign political instability on U.S. agricultural exports by analyzing a panel data sample that included ninety-one importer-countries of U.S. agricultural products over 1990 -2000. The following three alternative measures of political instability were used in this study: a measure of executive transition in national government (ExecPI), a measure of the frequency of social unrest (SocPI), and a measure the frequency of the occurrence of violent political unrest (VioPI). Each of the three proxies for

political instability indices was constructed using the method of principal components. Economic variables such as income, exchange rates, and population were included in the equations as controls.

The empirical results show that only the measure of violent political instability is statistically significant, but with a positive sign. This suggests that the most severe case of political instability can actually increase the foreign export demand for U.S. agricultural products. This finding is only plausible if we assume that domestic political instability disrupt local agricultural production, but does not cut off communication and transportation routes necessary for imports of food and other agricultural products. Furthermore, in consistency with previous authors, we also find that U.S. agricultural exports demand is also significantly affected by economic variables such as foreign income, population, and price changes. Potential fruitful extension of this analysis can be done by future studies that explore disaggregated data to examine how specific agricultural commodities respond to foreign political instability. In addition, future research could investigate if alternative measures of political instability will yield similar results as presented in this study.

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Table 1. List of Countries

Argentina	Ecuador	Israel	Niger	Switzerland
Australia	Egypt	Italy	Nigeria	Syria
Austria	El Salvador	Jamaica	Norway	Taiwan
Bangladesh	Ethiopia	Japan	Pakistan	Tanzania
Belgium	Finland	Jordan	Panama	Thailand
Benin	France	Kenya	Papua New Guinea	Togo
Bolivia	Gabon	Korea	Paraguay	Trinidad
Botswana	Germany	Madagascar	Peru	Tunisia
Brazil	Ghana	Malawi	Philippines	Turkey
Cameroon	Greece	Malaysia	Poland	Uganda
Canada	Guatemala	Mali	Portugal	United Kingdom
Chad	Guyana	Mauritius	Rwanda	Uruguay
Chile	Haiti	Mexico	Senegal	Venezuela
China	Honduras	Morocco	Sierra Leone	Zambia
Colombia	Iceland	Mozambique	Singapore	Zimbabwe
Costa Rica	India	Nepal	South Africa	
Cote d'Ivoire	Indonesia	Netherlands	Spain	
Denmark	Iran	New Zealand	Sri Lanka	

Table 2. U.S .Agricultural Trade Patterns, 2001

Top Importers from U.S.		*Top Exporters to U.S.*	
Country	Ag. Imports	Country	Ag. Exports
JAPAN	8,883,064,592	CANADA	9,889,072,295
CANADA	8,121,418,053	MEXICO	5,270,352,667
MEXICO	7,403,937,204	AUSTRALIA	1,786,109,408
KOREA, REP.	2,588,193,097	NETHERLANDS	1,608,770,742
TAIWAN	2,009,462,627	ITALY	1,564,909,000
CHINA, P.R.	1,938,543,564	FRANCE	1,356,453,381
NETHERLANDS	1,364,378,595	NEW ZEALAND	1,259,149,899
HONG KONG	1,226,766,242	BRAZIL	1,048,102,595
UNITED KINGDOM	1,062,020,223	CHILE	1,025,758,997
EGYPT	1,022,219,596	COLOMBIA	926,030,703
Others	18,038,254,920		13,801,063,266
Total	53,658,258,713		39,535,772,953
% of Total (Top 10 nations	66%		65%

Table 3. Effects of political instability on U.S. agricultural exports

Variable	Static OLS	Dynamic FE	Dynamic FE-IV
Income	1.25	0.15	0.31
	(27.50) ***	(5.26) ***	(2.46) **
Exch_Rates	-0.03	-0.01	-0.03
	(1.72) *	(0.96)	(0.58)
Population	0.82	0.10	0.37
	(24.28) ***	(4.71) ***	(2.66) ***
Exec_PI	0.05	0.06	-0.30
	(0.41)	(1.09)	(1.08)
Social_PI	0.04	0.01	-0.03
	(1.23)	(0.61)	(0.39)
Violent_PI	0.36	0.05	0.27
	(4.93) ***	(1.37)	(2.66) ***
Exports(t-1)		0.88	0.77
		(57.55) ***	(11.53) ***
Adjusted R^2	0.61	0.92	0.92

Note: Numbers in parentheses are t-statistics.
*** indicates significance at the 1% level.
** indicates significance at the 5% level.
* indicates significance at the 10% level.