

Preliminary
June 3, 2002

Terrorism and Trade*

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Abstract

What is the effect of terrorism and warfare on international trade? We answer this question examining bilateral trade flows between more than 200 countries over the period from 1960 to 1993. Applying an augmented gravity model that includes several measures of terrorism and large-scale violence, we find compelling evidence that terrorist actions reduce the volume of trade; a doubling in the number of terrorist incidents is associated with a decrease in bilateral trade by about 6 percent.

* This paper was written for the DIW workshop on "The Economic Consequences of Global Terrorism". Opinions expressed in this paper do not necessarily represent the views of Bankgesellschaft Berlin.

JEL Code: F15, F19

Keywords: terrorism, conflict, warfare, trade, patterns, bilateral

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Terrorism and Trade

I. Introduction

In recent years, terrorism and large-scale violence has escalated (again). In quantitative terms, the number of terrorist attacks has strongly increased. According to the latest US government report on “Patterns of Global Terrorism” (US Department of State [2002]), there were about 390 attacks per year between 1999 and 2001, compared with a yearly average of about 291 attacks between 1996 and 1998. Similarly, the number of facilities that were struck by terrorist bombings rose by about 30 percent to 505. But there is not only an increase in the number of terrorist actions, also the intensity of terrorist attacks seems to have reached a new dimension. There is a much stronger focus on highly visible, high impact incidents, sometimes purely aimed to kill a very large number of innocent people (e.g., suicide bombings). As a result, the annual death toll from terrorism rose to a new record high of more than 3,500 in 2001, with 90 percent of the fatalities occurring in the September 11 attacks in the United States when hijacked airplanes hit the World Trade Center in New York and the Pentagon near Washington, D.C.

In this short paper, we discuss the impact of terrorism and warfare on international trade. To identify the effect of terrorism on trade empirically, we apply a gravity model of trade and add several measures of terrorist activity, internal instability and external conflict. We find that violence strongly affects the pattern of trade; countries that are plagued by a larger number of terrorist attacks trade significantly less with each other than otherwise similar countries that do not suffer from terrorism. This finding is robust for a number of modifications, including a large and diverse set of alternative violence measures.

The remainder of the paper is in four parts. Section 2 discusses the association between terrorism and trade. Section 3 describes the empirical approach and the data. Section 4 presents the results, and section 5 concludes.

II. Discussion on Terrorism and Trade

While the impact of terrorism on trade may vary across time and place, violence and warfare generally imply additional costs for transactions so that, if anything, we would expect a negative association between terrorist activity and the volume of trade. More specifically, there are at least three principle ways in which warfare may be a hindrance to international trade. First, terrorism leads to insecurity and thereby raises the costs of doing business. Alvin Buckelew (1984, p. 18) defines terrorism as “violent, criminal behavior *designed primarily to*

generate fear in the community, or in a substantial segment of the community, for political purposes” (emphasis added). Depending on the dimension of terrorist attacks, people may become increasingly confused, get nervous, or feel generally less safe. For instance, after “18 months of random violence that has killed close to 400 citizens, injured thousands, and distressed millions, ... the atmosphere in Israel [is] a mix of defiance and des The Economist, March 30, 2002). Also, the collapse of the twin towers on September 11, 2001 was a laming shock to the US economy. As a result, terrorism may even lead to a change in a country’s consumption and production patterns (e.g., Israelis now prefer malls instead of markets and walk in the streets instead of taking buses), thereby affecting the pattern of international trade. But terrorism-induced insecurity may also have a direct negative effect on trade. Since the economic impact of terrorist bombings and shootings are hardly predictable, existing business plans may quickly become obsolete so that firms generally face larger risks. This insecurity may reduce the attractiveness of this market for international producers.

Second, the typical response to an increase in terrorist activity is an increase in security measures. Stronger regulations, however, imply that trade becomes more expensive, e.g., by increasing delivery times. For instance, after the terrorist attacks on September 11, 2001, US borders were temporarily closed; trucks on the border between Canada and the US have had to wait up to 20 hours for a crossing that normally takes minutes. El Al, Israel’s airline, generally holds goods for a day for security checks (The Economist, September 22, 2001).

Third, there is the risk of a direct destruction of traded goods. While most terrorist attacks do not aim to cause direct economic damage, there is also a growing tendency to cripple countries economically. Terrorists then often target a country’s trade because countries appear to be particularly vulnerable to the disruption of industry supply chains or the destruction of particular transport modes. For instance, according to the terrorism database of the US State Department (2002), there were not less than 178 bombings against a multinational oil pipeline in Colombia in 2001 alone.

Despite these clearly identifiable channels, the overall magnitude of the effect of terrorism on trade remains a priori unclear. In fact, it is even possible that terrorism has almost no measurable effect on trade since the overwhelming majority of terrorist actions are operations with only local implications. Also, terrorists do rarely target freight directly and physical destructions are, at least in principle, insurable.

In the next sections, we explore the association between terrorist activity and international trade empirically.

III. Methodology and Data

Our empirical approach to identify the effect of terrorism on trade can be summarized as follows:

$$(1) \quad Trade_{ij} = \alpha + \beta Terror + \gamma Z + e$$

where we regress (the log of) bilateral trade between countries i and j ($Trade_{ij}$) on our measure of terrorist activity ($Terror$) and a set of other conditioning variables Z that have the potential to affect the bilateral volume of trade, with ϵ being a well behaved residual.

The control variables in vector Z are borrowed from the gravity equation which is a long-established and empirically highly successful framework to model trade flows. Hence, our basic regression framework is fairly conventional:¹

$$(2) \quad Trade_{ij} = \alpha + \beta Terror + \gamma_1 D_{ij} + \gamma_2 Y_i Y_j + \gamma_3 Y_i Y_j / Pop_i Pop_j + \gamma_4 Language \\ + \gamma_5 Border + \gamma_6 Colonizer + \gamma_7 Nation + \gamma_8 Colony + e$$

where D is distance, Y is real GDP, Pop is population (all in natural logs), $Language$ is a dummy that takes the value of one if i and j share a common language, $Border$ is a common border dummy, $Colonizer$ is a common colonizer dummy, $Nation$ is a common nation dummy, and $Colony$ takes the value of one if i colonized j or vice versa.²

Our data come from a number of different sources. The data for the Z variables are taken from Reuven Glick and Andrew Rose (2002).³ Glick and Rose have constructed a very comprehensive data set that covers (real) bilateral trade between 217 countries and territories

¹ Our approach is also very similar to other recent work in empirical international trade where augmented gravity models have been applied to identify the impact of regional trading blocs (e.g., Frankel [1997]), national borders (e.g., McCallum [1995]), and currency unions (e.g., Rose [2000]) on trade.

² Note that our dependent variable is the total volume of bilateral trade so that we are unable to distinguish between an exporting and an importing country and our explanatory variables enter the regression jointly for country i and j (usually as a product). So, to be more precise, also our terrorism variable takes the form $Terror_i Terror_j$.

³ The data set is graciously provided by Andrew Rose on his website (<http://faculty.haas.berkeley.edu/arose>). In our actual analysis, we use different subsets of this large (>400,000 observations) panel data set according to the availability of data for our variable of interest.

between 1948 and 1997 and also provide information on all the other standard gravity variables.

To this data set, we add four types of controls for *Terror*. In a first exercise, we explore direct measures of terrorism. Edward Mickolus (1980) provides a detailed chronology of terrorist events around the world for the period from 1968 to 1979. Based on this information, we construct three variables of terrorist activity: the yearly number of terrorist events, the total number of terrorist events between 1968 and 1979, and a dummy variable that takes the value of one for at least one terrorist action. Table 1 shows the five countries that, according to these measures, suffered most strongly terrorism.

In a second set of controls, we analyze structural variables that aim to capture the extent to which a country's resources are devoted to the reduction of military conflicts. In particular, we use defense expenditures as a share of GDP (*Defense*) taken from the International Monetary Fund's Government Financial Statistics and the size of armed forces as a fraction of the country's total population (*Military*) obtained from William Easterly and Mirvat Sewadeh (2002).

A third group of variables focuses on measures of internal instability other than terrorism. These measures include the number of politically motivated murder or attempted murder of a high government official or politician (*Assassinations*), the number of any armed activity, sabotage, or bombings carried on by independent bands of citizens or irregular forces and aimed at the overthrow of the present regime (*Guerrilla activity*), the number of any systematic elimination by jailing or execution of political opposition within the ranks of the regime or the opposition (*Purges*), the number of any violent demonstration or clash of more than 100 citizens involving the use of physical force (*Riots*), and the number of any illegal or forced change in the top governmental elite, any attempt at such a change, or any successful or unsuccessful armed rebellion whose aim is independence from the central government (*Revolutions*). The original source for this information is Arthur Banks (1979), but the data are also available in an updated version from Easterly and Sewadeh (2002).

Finally, we explore measures of external conflict. In this respect, Robert Barro and Jong-Wha Lee (1994) provide two variables that appear to be particularly appropriate to identify the impact of warfare on trade and are therefore used in our analysis: a dummy variable for countries that participated in at least one external war over the period 1960-85 and the fraction of time over 1960-85 involved in external war.

Descriptive statistics for the data and bivariate correlations are provided in the appendix.

IV. Results

We begin our investigation by estimating equation (2), augmented with our measures of terrorist activity. The results are presented in table 2. For the sake of completeness, we report the estimates on the entire set of regressors, but later we will focus exclusively on our variables of interest, since all coefficients on the standard gravity variables take the expected sign and are statistically and economically significant. In a first exercise, we enter the (log interacted) number of terrorist attacks as (an additional) explanatory variable for the bilateral volume of trade. The estimated β coefficient is indeed negative and, with a t-statistic of over 8, statistically highly significant. The point estimate of -0.06 implies that a doubling in the number of terrorist incidents (a rise by 100 percent) is associated with a decrease in bilateral trade by about 6 percent, holding all other things constant.

In the next two columns of table 2, we explore two alternative measures of terrorist activity and find similar results. The coefficient on the (additively linked) dummy of at least one terrorist action (that can take values of 0, 1, or 2) implies that the first terrorist incident in a country pair reduces bilateral trade by about 8 percent; a pair of countries in which one country suffers from terrorist attacks trades only about 92 percent ($\exp[-0.08]=0.92$) of what the two countries would trade if they were completely free from acts of terrorism. Also, replacing the number of terrorist actions per year with the total number of terrorist actions over a 12-year period has very little effect on the results. The estimated β coefficient is only marginally smaller.

The final column of table 2 gives the results for the jointly estimated terrorism measures. It turns out that the total number of terrorist actions is the clearly dominant variable; all β coefficients remain negative, but only the estimate on the total number of attacks is statistically significant. This finding suggests that it is mainly the long-run average of terrorist activities that affects international trade rather than some brief periods of isolated attacks or the fact that a country has suffered any terrorist action.

To summarize, there is compelling evidence that terrorist activities affect bilateral trade flows. Countries targeted by terrorism trade significantly less with each other than countries unaffected by terrorism.

In the following, we explore the effect of other measures of internal and external conflict on international trade. We begin with two structural variables that should capture the potential risk of military conflict. Armed forces that make up a relatively large share of a country's total population as well as defense expenditures that represent a large fraction of

GDP could both be indications of a country's higher propensity to conflicts and warfare (including terrorism).

Our results appear in table 3. In line with our intuition, the relative size of the military has a negative effect on bilateral trade. The coefficient is statistically and economically significant, implying that countries with large armed forces trade significantly less with each other than otherwise similar countries with relatively small armies. For defense expenditures, however, the estimated coefficient is positive and also highly significant – a finding that survives extensive robustness checks (as do all our findings reported in this paper) such as including the (log product of the) land areas as additional explanatory variable or splitting the sample into OECD and Non-OECD countries. A potential explanation for this result is that large expenditures may indeed provide better security. If both variables enter our regression jointly, the results are essentially unchanged from the default specifications.

In table 4, we examine direct measures of internal instability. For each of the five main variables *Assassinations*, *Guerrilla activities*, *Purges*, *Riots*, and *Revolutions*, we construct three separate measures. A first measure gives the actual number of relevant incidents for each year. We consider this test to be very strong since a significant coefficient on this variable would imply that any additional incident per year has a measurable effect on trade already in the same year. A more reliable measure therefore might be the average number of relevant incidents, our second variable. Finally, we have constructed frequency measures, based on the number of years in which relevant incidents have occurred.

Reviewing the results, most of the coefficient estimates on our internal instability measures are indeed negative and statistically highly significant (recorded in bold). Most notably, assassinations have a very strong negative effect on the volume of trade (across all three measures). But also for the other variables, at least our frequency measure is significantly negative, suggesting that the more frequent occurrence of internal violence strongly inhibits trade. There is one exception, however. We find no significant effect for *Riots* on trade; in our interpretation, this result further strengthens our empirical findings for the other variables.

Our final exercise aims to identify the impact of external conflict on trade. As shown in table 5, there is strong evidence that a country's participation in an external war reduces its volume of international trade. The estimated β coefficients are negative and statistically and economically significant. The most interesting result, however, is recorded in the final column of table 5. When estimated jointly, the coefficient on the fraction of time involved in external

Wars is (significantly) positive, suggesting that it is mainly the fact whether a country has ever participated in a war that matters and not the length nor the frequency of wars.

V. Conclusions

It is plausible to assume that terrorism and large-scale violence has a negative effect on international trade. Higher risks, additional security measures and direct destructions raise the costs for transactions and should thereby lower the volume of international trade. In this paper, we have presented evidence confirming this intuitive claim. Applying an augmented gravity model and analyzing bilateral trade flows between more than 200 countries over the period from 1960 to 1993, we find compelling evidence that terrorist actions reduce the volume of trade; this result is robust to alternative measures of political instability and military conflict. Our lower bound estimate of the direct effects (ignoring the reduction in trade due to a terrorism-induced fall in GDP) suggests that a doubling in the number of terrorist incidents is associated with a decrease in bilateral trade by about 6 percent.

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Table 1: Description of the Data

Five Countries with largest Number

a) Number of Terrorist Actions

Country	Year	Number
<u>United States</u>	1975	41
United States	1976	35
<u>United Kingdom</u>	1974	34
<u>Argentina</u>	1973	34
Argentina	1976	33
<u>France</u>	1976	31
Argentina	1974	31
United States	1978	30
United States	1977	29
United States	1974	28
United States	1968	27
United States	1979	27
France	1975	27
<u>Italy</u>	1976	26
Argentina	1970	26

b) Total Number of Terrorist Actions

Country	Number
United States	288
Argentina	192
France	163
United Kingdom	149
Israel	135

Table 2: The Impact of Terrorism on Trade

Dependent variable: (Log) Bilateral Trade				
Period: 1968-1979				
	(1)	(2)	(3)	(4)
(Log Product) 1+Number of Terrorist Actions	-0.059** (0.007)			-0.014 (0.009)
(Sum Dummy) At least one Terrorist Action, 1968-79		-0.080** (0.018)		-0.024 (0.021)
(Log Product) 1+Total Number of Terrorist Actions, 1968-79			-0.057** (0.005)	-0.035** (0.007)
(Log) Distance	-1.057** (0.010)	-1.056** (0.010)	-1.057** (0.010)	-1.058** (0.010)
(Log Product) Real GDP	0.808** (0.004)	0.799** (0.004)	0.821** (0.004)	0.814** (0.004)
(Log Product) Real GDP per capita	0.529** (0.006)	0.544** (0.006)	0.539** (0.006)	0.550** (0.006)
Common Language	0.317** (0.020)	0.314** (0.020)	0.321** (0.020)	0.318** (0.020)
Common Land Border	0.339** (0.047)	0.365** (0.047)	0.343** (0.047)	0.364** (0.047)
Common Colonizer	0.749** (0.031)	0.771** (0.031)	0.735** (0.031)	0.757** (0.031)
Same Nation	1.323** (0.277)	1.246** (0.280)	1.275** (0.279)	1.260** (0.281)
Colonial Relationship	1.856** (0.044)	1.809** (0.044)	1.871** (0.043)	1.859** (0.044)
No. of observations	61,013	59,780	61,013	59,780
S.E.R.	1.85	1.85	1.85	1.85
Adj. R2	0.63	0.63	0.63	0.63

Notes: OLS estimation. White heteroskedastic-consistent standard errors are in parentheses.
 ** denotes significant at the 1% level. Constant not reported. Data sources are described in the text.

Table 3: The Impact of Military Personnel and Defense Expenditures on Trade

Dependent variable: (Log) Bilateral Trade

Period: 1972-1982

(Log Product) Size of Military/Population	-4.029** (0.996)		-14.102** (1.853)
(Log Product) Defense Expenditures/GDP		0.142** (0.011)	0.212** (0.015)
No. of observations	46,105	16,394	13,876
S.E.R.	1.87	1.71	1.62
Adj. R2	0.64	0.71	0.72

Notes: OLS estimation. Other regressors not shown in the table: constant, log Distance, log GDPs, log per capita GDPs, Common Language, Common Border, Common Colonizer, Colonial Relationship. White heteroskedastic-consistent standard errors are in parentheses.

** denotes significant at the 1% level. Data sources are described in the text.

Table 4: The Impact of Internal Instability on Trade

Dependent variable: (Log) Bilateral Trade
Period: 1960-1993

	(1)	(2)	(3)	(4)	(5)	(6)
(Log Product) 1+Number of Assassinations	-0.101** (0.011)					
(Log Product) 1+Average Number of Assassinations, 1960-93	-0.283** (0.026)					-0.576** (0.024)
(Log Product) 1+Number of Years with at least one Assassination, 1960-93	-0.048** (0.008)					
(Log Product) 1+Number of Guerrilla Activities		0.038** (0.012)				
(Log Product) 1+Average Number of Guerrilla Activities, 1960-93		-0.061 (0.042)				0.811** (0.032)
(Log Product) 1+Number of Years with at least one Guerrilla Activity, 1960-93		-0.059** (0.008)				
(Log Product) 1+Number of Purges			0.446** (0.015)			
(Log Product) 1+Average Number of Purges, 1960-93			-0.497** (0.054)			-0.857** (0.031)
(Log Product) 1+Number of Years with at least one Purge, 1960-93			-0.119** (0.010)			
(Log Product) 1+Number of Riots				0.012 (0.008)		
(Log Product) 1+Average Number of Riots, 1960-93				0.004 (0.015)		0.148** (0.012)
(Log Product) 1+Number of Years with at least one Riot, 1960-93				0.017* (0.008)		
(Log Product) 1+Number of Revolutions					-0.092** (0.019)	
(Log Product) 1+Average Number of Revolutions, 1960-93					0.421** (0.080)	-1.293** (0.039)
(Log Product) 1+Number of Years with at least one Revolution, 1960-93					-0.268** (0.012)	
No. of observations	148,565	148,565	127,107	127,107	127,107	127,107
S.E.R.	2.17	2.17	2.09	2.10	2.08	1.85
Adj. R2	0.60	0.60	0.63	0.62	0.63	0.63

Notes: OLS estimation. Other regressors not shown in the table: constant, log Distance, log GDPs, log per capita GDPs, Common Language, Common Border, Common Colonizer, Colonial Relationship. White heteroskedastic-consistent standard errors are in parentheses.

** and * denote significant at the 1% and 5% level, respectively. Data sources are described in the text.

Table 5: The Impact of War on Trade

Dependent variable: (Log) Bilateral Trade			
Period: 1960-1985	(1)	(2)	(3)
(Sum Dummy) Participation in at least one External War, 1960-85	-0.365** (0.010)		-0.397** (0.012)
(Log Product) 1+Fraction of Time Involved in External War, 1960-85		-0.431** (0.030)	0.159** (0.036)
No. of observations	95,187	95,187	95,187
S.E.R.	1.87	1.88	1.87
Adj. R2	0.61	0.61	0.61

Notes: OLS estimation. Other regressors not shown in the table: constant, log Distance, log GDPs, log per capita GDPs, Common Language, Common Border, Common Colonizer, Colonial Relationship. White heteroskedastic-consistent standard errors are in parentheses.

** denotes significant at the 1% level. Data sources are described in the text.

Appendix 1: Descriptive Statistics

Variable	Mnemonic	Period	Sample	Mean	Std. Dev.	Min	Max
(Log Product) 1+Number of Terrorist Actions	TER	1969-78	111,243	1.00	1.16	0.00	7.11
(Sum Dummy) At least one Terrorist Action	TERD	1969-78	76,441	1.58	0.57	0.00	2.00
(Log Product) 1+Total Number of Terrorist Actions	TERT	1969-78	111,243	3.41	2.31	0.00	10.93
(Log Product) Defense Expenditures/GDP	DEF	1972-93	89,684	0.01	0.01	0.00	0.08
(Log Product) Size of Military/Population	MIL	1960-82	35,465	1.67	1.36	-6.00	15.30
(Log Product) 1+Number of Assassinations	ASN	1960-93	178,551	0.21	0.50	0.00	5.97
(Log Product) 1+Average Number of Assassinations	ASNA	1960-93	199,430	0.31	0.34	0.00	2.39
(Log Product) 1+Number of Years with at least one Assassination	ASNY	1960-93	219,315	1.92	1.29	0.00	5.60
(Log Product) 1+Number of Guerrilla Activities	GUE	1960-93	178,551	0.28	0.48	0.00	5.50
(Log Product) 1+Average Number of Guerrilla Activities	GUEA	1960-93	199,430	0.38	0.32	0.00	1.86
(Log Product) 1+Number of Years with at least one Guerrilla Activity	GUEY	1960-93	219,315	2.39	1.63	0.00	6.77
(Log Product) 1+Number of Purges	PUR	1960-93	178,551	0.14	0.38	0.00	5.16
(Log Product) 1+Average Number of Purges	PURA	1960-93	174,011	0.22	0.19	0.00	1.42
(Log Product) 1+Number of Years with at least one Purge	PURY	1960-93	191,622	1.80	1.20	0.00	5.12
(Log Product) 1+Number of Riots	RIO	1960-93	178,551	0.49	0.79	0.00	7.43
(Log Product) 1+Average Number of Riots	RIOA	1960-93	174,011	0.71	0.62	0.00	4.23
(Log Product) 1+Number of Years with at least one Riot	RIOY	1960-93	191,622	2.92	1.39	0.00	6.77
(Log Product) 1+Number of Revolutions	REV	1960-93	178,551	0.20	0.38	0.00	2.89
(Log Product) 1+Average Number of Revolutions	REVA	1960-93	174,011	0.25	0.22	0.00	2.35
(Log Product) 1+Number of Years with at least one Revolution	REVY	1960-93	191,622	2.05	1.36	0.00	6.04
(Sum Dummy) Participation in at least one External War	WARD	1960-85	137,570	0.75	0.68	0.00	2.00
(Log Product) 1+Fraction of Time Involved in External War	WART	1960-85	137,570	0.15	0.23	0.00	2.00
(Log of) Bilateral Trade	TRAD	1960-93	319,944	10.67	3.70	-16.12	23.67
(Log of) Distance	DIST	1960-93	235,552	8.14	0.83	3.68	9.42
(Log of) Real GDP	GDP	1960-93	174,716	47.82	2.67	35.39	57.49
(Log of) Real GDP per capita	GDPC	1960-93	174,716	16.06	1.44	11.52	20.90
Common Border Dummy	BORD	1960-93	319,944	0.02	0.14	0.00	1.00
Common Language Dummy	LANG	1960-93	319,944	0.16	0.37	0.00	1.00
Common Colonizer Dummy	COL	1960-93	319,944	0.07	0.25	0.00	1.00
Colony Dummy	CLNY	1960-93	319,944	0.02	0.12	0.00	1.00
Current Colony		1960-93	319,944				

Appendix 2: Simple Bivariate Correlations

	TER	TERD	TERT	DEF	MIL	ASN	ASNA	ASNY	GUE	GUEA	GUEY	PUR	PURA	PURY	RIO	RIOA	RIOY	REV	REVA	REVY	WARD	WART	TRAD	DIST	GDP	GDPC	BORD	LANG	COL	CLNY
TER	1.00																													
TERD	0.23	1.00																												
TERT	0.80	0.49	1.00																											
DEF	0.13	0.14	0.17	1.00																										
MIL	0.19	0.23	0.31	0.50	1.00																									
ASN	0.18	0.09	0.29	0.01	0.04	1.00																								
ASNA	0.27	0.18	0.49	-0.02	0.02	0.51	1.00																							
ASNY	0.31	0.21	0.51	0.15	0.13	0.38	0.82	1.00																						
GUE	0.26	0.15	0.24	0.10	-0.04	0.34	0.36	0.30	1.00																					
GUEA	0.19	0.24	0.38	0.14	-0.02	0.28	0.62	0.65	0.52	1.00																				
GUEY	0.19	0.26	0.33	0.19	0.04	0.28	0.57	0.67	0.52	0.91	1.00																			
PUR	0.10	0.02	-0.02	0.12	0.12	0.06	0.08	0.14	0.16	0.13	0.13	1.00																		
PURA	0.02	0.14	0.07	0.25	0.18	0.14	0.30	0.45	0.14	0.50	0.45	0.39	1.00																	
PURY	0.00	0.08	0.02	0.17	0.08	0.19	0.38	0.47	0.25	0.59	0.59	0.32	0.87	1.00																
RIO	0.17	0.08	0.17	0.06	0.07	0.31	0.42	0.41	0.30	0.38	0.35	0.19	0.26	0.28	1.00															
RIOA	0.28	0.16	0.42	0.20	0.15	0.28	0.60	0.74	0.23	0.59	0.58	0.15	0.40	0.35	0.48	1.00														
RIOY	0.24	0.16	0.42	0.16	0.16	0.27	0.59	0.76	0.27	0.65	0.70	0.19	0.56	0.58	0.44	0.82	1.00													
REV	0.05	-0.06	0.00	0.14	0.02	0.26	0.08	0.09	0.38	0.23	0.23	0.39	0.23	0.24	0.18	0.07	0.11	1.00												
REVA	0.02	-0.06	-0.05	0.25	-0.06	0.08	0.24	0.33	0.35	0.58	0.61	0.20	0.47	0.52	0.19	0.23	0.35	0.38	1.00											
REVY	0.02	-0.14	-0.09	0.25	-0.02	0.12	0.27	0.38	0.35	0.60	0.66	0.21	0.50	0.58	0.26	0.29	0.43	0.37	0.93	1.00										
WARD	0.09	0.12	0.10	0.38	0.15	0.04	0.27	0.45	0.17	0.46	0.52	0.12	0.40	0.45	0.16	0.32	0.35	0.18	0.56	0.59	1.00									
WART	0.12	0.11	0.18	0.26	0.01	0.10	0.15	0.19	0.24	0.33	0.33	0.14	0.23	0.20	0.01	0.10	0.06	0.26	0.46	0.34	0.50	1.00								
TRAD	0.30	0.32	0.58	0.08	0.15	0.17	0.19	0.13	0.05	0.05	0.01	-0.06	-0.06	-0.13	0.11	0.31	0.19	-0.08	-0.26	-0.29	-0.19	-0.11	1.00							
DIST	-0.06	0.07	-0.04	-0.04	-0.11	-0.05	0.05	0.13	0.00	0.08	0.14	0.04	0.05	0.09	-0.01	0.08	0.11	-0.02	0.02	0.01	0.06	-0.02	-0.28	1.00						
GDP	0.34	0.41	0.70	0.06	0.06	0.23	0.38	0.36	0.15	0.29	0.25	-0.02	0.13	0.08	0.24	0.56	0.46	-0.05	-0.12	-0.14	-0.05	-0.04	0.77	0.01	1.00					
GDPC	0.21	0.37	0.53	-0.10	0.30	0.06	0.03	-0.06	-0.14	-0.29	-0.30	-0.15	-0.31	-0.39	-0.10	-0.05	-0.09	-0.24	-0.58	-0.62	-0.49	-0.31	0.61	-0.05	0.53	1.00				
BORD	0.02	-0.01	0.01	-0.03	-0.06	0.01	-0.01	-0.04	0.01	0.00	-0.02	-0.03	-0.03	-0.01	0.01	0.01	-0.04	0.00	-0.03	-0.04	-0.03	-0.04	0.16	-0.44	0.06	-0.01	1.00			
LANG	-0.04	-0.16	-0.12	0.09	0.00	-0.04	-0.05	0.02	-0.06	-0.07	-0.03	-0.01	-0.07	-0.12	0.03	0.09	0.00	-0.03	-0.01	0.01	0.03	-0.05	0.02	-0.04	-0.06	-0.08	0.09	1.00		
COL	-0.11	-0.07	-0.19	0.06	0.03	-0.06	-0.06	-0.02	-0.01	0.05	0.04	-0.05	-0.05	-0.04	0.03	0.01	-0.07	-0.04	0.02	0.07	0.12	0.00	-0.15	-0.13	-0.25	-0.22	0.07	0.22	1.00	
CLNY	0.12	0.03	0.15	0.00	-0.01	0.10	0.14	0.16	0.13	0.14	0.14	-0.03	-0.02	-0.01	0.11	0.13	0.14	0.03	0.05	0.07	-0.07	-0.05	0.17	0.00	0.13	0.07	0.01	0.26	-0.04	1.00