Senior Project
Department of Economics

"An Assessment of Corruption on Bank Lending"

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Abstract

This study seeks to examine the impact of corruption on economic growth. Bank lending is said to have a positively significant causal effect on economic growth. Data from the World Development Indicators is used from 2001-2010 to form two consecutive 5-year business cycles, 2001-2005 and 2006-2010, which is consistent with previous literature. The data from these years are averaged to form a panel study. I utilize OLS estimation techniques to capture the effects of corruption on bank lending in over 160 countries.[1]

[1] I would like to sincerely thank Dr. Renna for his dedication and assistance during not only this semester, but also my 2 years in the Economic program.

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I. Introduction

Corruption is said to range from bribe paying to civil servants and theft of a wallet to a wide array of various political and economical practices in which business people, politicians, and public office officials enrich themselves (Amundsen, 2000). The definition of corruption is the abuse of power for personal gain.[2] This paper examines the role of corruption on bank lending for over 150 countries. Bank lending is said to both directly and indirectly affect economic growth. This paper is motivated by clear evidence that illustrates how bank lending has both beneficial and detrimental effects on economic growth. In line with this evidence, the large amount of research done analyzing the determinants of bank lending conclude that law enforcement and legal origin play major roles (Djankov et al., 2007).

Prior to Weill (2011) no research had been compiled to determine the impact of corruption on bank lending. However, there has been a significant amount of research that assesses the relationship of corruption on financial growth and economic development. There is said to be a strong connection between corruption and law enforcement; therefore, the limited research involving bank lending does not come as a surprise. The main objective of this paper is to compare the effects of corruption on bank lending in Weill (2011) with more recent data from 2006-2010.

The remainder of this study continues by replicating the blueprint that Weill (2011) has established using data from the years 2001-2005 and comparing it with new data from 2006-2010. This study will examine the significance of corruption on bank lending for two different 5-year business cycles.

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[2] World Bank Definition

II. Literature Review

There is a significant amount of academic research that has been conducted over the last forty years debating the effects of corruption on economic growth. The majority of collected research examining the corruption-growth relationship commonly found a negative association. This is evident in both the long and short run and supports the findings of Weill (2011), which explains how corruption induces banks to lend less.

Weill (2011) examines how corruption effects bank lending at both the country and bank levels. Consistent with previous literature from Levine (1999) and Djankov et al. (2007), Weill's results showed similar effects of corruption hampering bank credit. However, he uses only OLS estimation techniques to examine the corruption effect at both the country and bank levels. In the country level estimation, Weill (2011) uses five different regression models. The first estimation includes the variables, *inflation, latititude, and trade.* The second and third estimations additionally add *legal origin* variables and an economic development variable of *GDP per capita,* respectively. For the final country level estimation, Weill (2011) separates his sample countries into *developed* and *developing* nations.

After country level estimations, Weill (2011) looked deeper into the data and ran bank level estimations. Analysis at the bank level suggests, the separation of development shows that countries with greater risk aversion reduce the negative effect of corruption on bank lending. Furthermore, bank level estimations show that when risk aversion is quite high, corruption can foster and have a positive effect on bank lending. Barth et al. (2007) also provides significant literature that helps provide a basis of understanding the effects of corruption on lending. Barth et al. (2007) enumerates

that findings in the WBES, reports 20-30% of banks state that corruption plays a moderate to major negative impact on lending decisions (Weill 2011).

Svennson (2005) reports that corruption is an outcome of a nations legal, political, and economic institution. Weill (2011) articulates that corruption can arise from bad policies or inefficiencies using corruption as the route that individuals seek to get around them (Djankov, LaPorta, Lopez-de-Silanes and Shleifer, 2003). Many have tried to capture the corruption phenomena but have not found a perfect way in which to do so.

Bribing, the most common style of corruption, is used to gain an advantage during lend seeking relationships. This study is more closely looking at how legal institutions and how the application of laws by public administration leads to increased levels of corruption. Borrowers can use bribery to enhance the chances of approval on a lending situation. According to past literature the only positive effect of corruption on bank lending is when risk aversion is taken into account. Corruption can positively favor bank credit by using a "grease the wheels" approach for bank lending Weill (2011). As observed by Tasic (2007), countries that extend long-term credit see enhanced economic growth.

Using the literature provided above, the background information has been presented that shows a great deal of the corruption-growth relationship. Similarly, there also exists research that provides the data of how bank lending increases economic growth. However, only recently has research begun to appear assessing the effects of corruption on bank credit. This paper will seek to add to the literature that provides an

analysis of the relationship of corruption on bank lending. From the above literature, I present and test the following hypothesis:

H1. The effects of corruption in the years 2006-2010 affect bank Lending more than in the years 2001-2005.

This hypothesis will test to see if lending decisions are more affected by corruption during the financial crisis, which occurs during the years 2006-2010. I would expect with decreased amounts of lending during a time of financial crisis to increase the amount of corruption in the bank sector especially. This hypothesis is consistent with the views of Weill (2011) but with an extension of time frame.

III. The Model

The theory that drives my study is the corruption of bureaucrats which helps explain the corrupt acts of appointed individuals and their dealings with the public or superiors. (Jain 2001). According to Jain (2001), there is a negative influence between bribery or incidence of corruption in a country and economic growth, thus fails to support a "grease the wheels" hypothesis but rather a "sand in the machine" hypothesis.

To assess the strength of the link between bank credit and corruption, determinants of bank credit are controlled for. Earlier studies help to determine which variables are needed to assess this relationship. Inflation is used in connection with Boyd et al. (2001) that study the effect of inflation on financial development. This is explained as the logged consumer price index growth rate. Latitude as used in Beck et al (2003) shows how it explains financial development. This is defined as the distance from

the equator. Openness is taken into account with the use of ratio of trade to GDP, *Trade.* Economic development is accounted for with the inclusion of GDP per capita, defined as the logarithm of GDP per capita. The estimated equation takes the general form:

$$Bank\ Lending_i = f(Inf_i, Trade_i, Lat_i, lngdp_i, Corruption_{ik})$$

Where

$i = 1.....160$ *countries*

k= *CPI-WB, CPI-TI*

The empirical model is as follows:

$$(1)\quad Bank\_Credit = \alpha + \beta_1 Corr + \beta_2 INF + \beta_2 TRADE + \beta_3 GDP\_PC + \beta_4 LAT + \beta_5 Dummy + \varepsilon i$$

The above model has an explained variable of bank credit, which is determined by the variables of corruption, inflation, trade, GDP per capita, and several dummy variables that take into account country legal origin. *Corr* is used for each of the corruption index that is used in the testing of this model. The dummy variables that are used in this model are used to explain the legal origin of the countries. The dummy variable is added to assess the roles of laws and legal enforcement. All variable are computed as part of one of the 5-year averages (2001-2005) and (2006-2010) to smooth out for business cycle effects with the exception of the constant variables, latitude and legal origin.[3] The final term in the empirical model is the unexplained error term that exists in the model. I will

[3] Refer to Table 4.1 for Variable Description.

use OLS estimation techniques to test the model replicating the works of Weill (2011).

IV. Data Analysis and Methodology

For each of the 5-year business cycles, this study utilized OLS estimation techniques for both corruption indexes. The tables above each include four separate regressions. The first regression models *Bank Credit* with the main explanatory variables of *corruption, inflation, latitude,* and *trade.* This is done simply to estimate using the financial development variables. The second regression models *Bank Credit* with the same explanatory variables but also adding in the dummy variable for legal origin. According to La Porta et al. (1997), legal origin has a significant influence on financial development. The third regression models *Bank Credit* with the main explanatory variables but also adding the variable for economic development, the logarithm of GDP per capita. The final regression utilizes all variables at once. These individual estimations are done to account for omitted variable bias regarding to corruption.

After the country regressions, this study ran estimations that divided the data set into nations that are developed and developing nations.

V. Interpretation of Results

Tables 4.3 and 4.4 examine the estimation results for the years 2001-2005. The explanatory variable of interest, corruption, ranges from -12.40 to -19.09 and is

statistically significant across all estimations. A one-unit increase in corruption would decrease bank lending by the parameter estimate.

Tables 4.5 and 4.6 are the results for the years 2006-2010. The corruption variable ranges from -16.41 to -40.62 and is statistically significant for all estimations indicating that a unit increase in corruption would result in a decrease in bank lending by the respective amounts.

Tables 4.7 & 4.8 are estimations where countries are split into developed and developing nations. In the years 2001-2005, the corruption variable ranges from -11.40 to -50.72 between developing and developed nations respectively. They are statistically significant and indicate that for each additional unit increase in corruption, bank lending would decrease by those respective amounts.

If we recall my hypothesis was as follows:

H1. The effects of corruption in the years 2006-2010 affect bank Lending more than in the years 2001-2005.

In conclusion, H1 can be accepted as *Corruption* has more of an affect on lending decisions in 2006-2010.

VI. Limitations and Future Work

This study examined two 5-year consecutive business cycles with the span of 2006-2010 being encapsulated by the financial crisis. The main objective was to compare the effects of corruption on bank lending regardless of the financial issues that

may have existed. A significant find in this study pointed out that corruption increased throughout the financial crisis. Separately, it was evident that countries that were developed were more affected by corruption than countries that were only developing. This could be due to the fact that developed countries could be part of the European Union which made bank lending much more strict in the wake of the financial crisis.

One of the main limitations of this study was the lack of access to the Bankscope database. This database is used to attain the data for the bank level estimations. In recent years, this database was free to use but has since been added to WRDS database, which is very costly. After contacting both Weill and Universities across Ohio, the answer was consistently familiar about expense.

The future of this study will continue to be more in-dept given accessibility of recent materials. I also believe a more explanatory study could be done to look at the time periods prior, during, and following a financial crisis to truly compare the affects of corruption over time.

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Appendix

Table 4.1

Variable	Variable Definitions	Data Sources
Bank_Credit	Ratio of credit issued to private enterprises by deposit money banks and other financial institutions to GDP, avg. for 2001-05 & 2006-2010	WDI
CPI_TI	Corruption Perception Index from Transparency International rescaled from 0 (most corrupt) to 10 (least corrupt), avg. for 2001-05 & 2006-2010	Corruption Perception Index from Transparency International
CPI_WB	Corruption Perception Index from World Bank rescaled from 0 (most corrupt) to 10 (least corrupt), avg. for 2001-05 & 2006-2010	Corruption Perception Index from World Bank
INF	Consumer Price Index growth (in%) avg. for 2001-05 & 2006-2010	WDI
TRADE	Ratio of Trade to GDP (in%) avg. for 2006-2010	WDI
LAT	Country distance from equator (in km)	WDI
GDP_PC	Logarithm of GDP per capita at PPP in 2006 avg. values for 2006-2010	WDI
French_Origin	Dummy variable equal to 1 if country is of legal French Origin	CIA
German_Origin	Dummy variable equal to 1 if country is of legal German Origin	CIA
Scandinavian_Origin	Dummy variable equal to 1 if country is of legal Nordic Origin	CIA
Socialist_Origin	Dummy variable equal to 1 if country is of legal Socialist Origin	CIA

Table 4.2

Summary Statistics				
Explanatory Variable	N	Mean	Std Dev.	Variable
CPI_TI	150	4.04	2.15	CPI_TI
INF	148	9.01	22.68	INF
TRADE	157	86.94	48.13	TRADE
CPIWB	159	4.91	1.99	CPIWB
GDP_PC	158	7979.01	12172.06	GDP_PC
BankCredit	157	56.17	52.23	BankCredit
French_Origin	159	0.37	0.48	French_Origin
German_Origin	159	0.09	0.29	German_Origin
Scandinavian_Origin	159	0.08	0.27	Scandinavian_Ori
Socialist_Origin	159	0.03	0.16	Socialist_Origin
Lat	159	2974.20	1910.58	Lat
lngdp	158	7.83	1.62	lngdp

Table 4.3

Country Regression with Corruption-TI Years 2001-2005				
Explanatory Variable	**Parameter Estimate**			
	1	**2**	**3**	**4**
Intercept	-3.71	-2.23	-54.08**	-45.24**
	(0.6827)	-0.8304	(0.0107)	(0.0370)
Corruption	-17.72***	-17.20***	-12.40***	-12.47***
	<(.0001)	<(.0001)	<(.0001)	<(.0001)
Latitude	0.000	0.001	-0.002	-0.001
	(0.7989)	(0.8144)	(0.3332)	(0.7960)
Inflation	0.07	0.07	0.11	0.10
	(0.6305)	(0.6465)	(0.4150)	(0.4703)
Trade	-0.11*	-0.11*	-0.14**	-0.14**
	(0.0919)	(0.0979)	(0.0370)	(0.0420)
French Legal Origin	-	-3.39	-	-5.02
		(0.6469)		(0.4980)
German Legal Origin	-	11.40	-	7.06
		(0.3717)		(0.5799)
Socialist Legal Origin	-	-22.64	-	-20.72
		(0.2814)		(0.3193)
Scandinavian Legal Origin	-	-23.17	-	-21.29
		(0.1061)		(0.1338)
GDP per capita (lngdp)	-	-	9.95***	8.75**
			(0.0085)	(0.0230)
R^2	0.4949	0.5185	0.5195	0.5364
Adjusted R^2	0.4798	0.4888	0.5013	0.5038
F-Statistic	32.82	17.50	28.55	16.46
N	159	159	159	159

Note: *Statistical significance at the 10%, 5%, and 1% levels are denoted by *, **, and ***, respectively.*

Table 4.4

Country Regression with Corruption-WB Years 2001-2005				
Explanatory Variable	**Parameter Estimate**			
	1	**2**	**3**	**4**
Intercept	-28.34***	-26.42**	-69.51***	-64.24***
	<(.0001)	(0.0196)	(0.0002)	(0.0008)
Corruption	-19.09***	-18.36***	-13.59***	-13.18***
	<(.0001)	<(.0001)	<(.0001)	<(.0001)
Latitude	0.00	0.00	-0.001	-0.001
	(0.8099)	(0.6528)	(0.3551)	(0.9534)
Inflation	0.17	0.16	0.19	0.17
	(0.2266)	(0.2642)	(0.1768)	(0.2179)
Trade	-0.11(	-0.11	-0.14**	-0.14**
	(0.0828)	(0.1109)	(0.0291)	(0.0416)
French Legal Origin	-	-3.31	-	-4.32
		(0.6424)		(0.5429)
German Legal Origin	-	6.03	-	3.16
		(0.6262)		(0.7972)
Socialist Legal Origin	-	-18.80	-	-17.91
		(0.3664)		(0.3833)
Scandinavian Legal Origin	-	-26.24*	-	-25.28*
		(0.0504)		(0.0561)
GDP per capita (lngdp)	-	-	9.52***	8.94***
			(0.0085)	(0.0138)
R^2	0.4950	0.5161	0.5188	0.5365
Adjusted R^2	0.4808	0.4878	0.5015	0.5056
F-Statistic	34.55	18.26	29.98	17.36
N	159	159	159	159

Note: *Statistical significance at the 10%, 5%, and 1% levels are denoted by *, **, and ***, respectively.*

Table 4.5

Country Regression with Corruption-TI Years 2006-2010				
Explanatory Variable	**Parameter Estimate**			
	1	**2**	**3**	**4**
Intercept	-16.49*	-18.76	-41.58747*	-45.41*
	(0.0944)	(0.1028)	(0.0941)	(0.0708)
Corruption	-20.15***	-18.78***	-18.00***	-16.41***
	<(.0001)	<(.0001)	<(.0001)	<(.0001)
Latitude	0.004*	.01***	0.00327	0.01***
	(0.0714)	(0.0063)	(0.1597)	(0.0142)
Inflation	0.05	0.04	0.05247	0.05
	(0.2401)	(0.2694)	(0.1951)	(0.2192)
Trade	-0.15*	-0.13*	-0.15771**	-0.14*
	(0.0545)	(0.0936)	(0.0404)	(0.0694)
French Legal Origin	-	-0.11	-	-0.57
		(0.9890)		(0.9446)
German Legal Origin	-	-5.95	-	-7.17
		(0.6707)		(0.6089)
Socialist Legal Origin	-	-39.31**	-	-34.76
		(0.0117)		(0.1476)
Scandinavian Legal Origin	-	-33.47	-	-40.03**
		(0.1633)		(0.0103)
GDP per capita (lngdp)	-	-	4.41	4.72
			(0.2699)	(0.2317)
R^2	0.5320	0.5581	0.5360	0.5626
Adjusted R^2	0.5189	0.5326	0.5196	0.5341
F-Statistic	40.63	21.94	32.80	19.73
N	159	159	159	159

Note: *Statistical significance at the 10%, 5%, and 1% levels are denoted by *, **, and ***, respectively.*

Table 4.6

Country Regression with Corruption-WB Years 2006-2010				
Explanatory Variable	**Parameter Estimate**			
	1	**2**	**3**	**4**
Intercept	-63.52***	-55.24***	-12.99	-2.91
	<(.0001)	<(.0001)	(0.6815)	(0.9269)
Corruption	-40.62***	-37.47***	-34.17***	-30.64***
	<(.0001)	<(.0001)	<(.0001)	<(.0001)
Latitude	.004***	0.01***	0.00	.01***
	(0.0344)	(0.0027)	(0.1369)	(0.0105)
Inflation	0.06	0.06	0.06	0.06
	(0.1499)	(0.1804)	(0.1123)	(0.1381)
Trade	-0.12	-0.11	-0.14	-0.13
	(0.1043)	(0.1673)	(0.0609)	(0.1001)
French Legal Origin	-	-0.08	-	-0.74
		(0.9926)		(0.9298)
German Legal Origin	-	-6.60	-	-8.23
		(0.6444)		(0.5631)
Socialist Legal Origin	-	-38.80	-	-39.62
		(0.1124)		(0.1025)
Scandinavian Legal Origin	-	-38.73	-	-39.85
		(0.1152)		(0.1020)
GDP per capita (lngdp)	-	-	6.63	6.87
			(0.0909)	(0.0759)
R^2	0.5120	0.5390	0.5218	0.5494
Adjusted R^2	0.4984	0.5125	0.5050	0.5200
F-Statistic	37.52	20.31	30.99	18.70
N	159	159	159	159

Note: *Statistical significance at the 10%, 5%, and 1% levels are denoted by *, **, and ***, respectively.*

Table 4.7

Country Regressions Developed Vs. Developing 01-05				
Explanatory Variable	**Parameter Estimate**			
	CPI-TI		**CPI-WB**	
	Developing	**Developed**	**Developing**	**Developed**
	1	**2**	**3**	**4**
Intercept	-9.49	-41.56	-34.14***	-24.05***
	(0.4017)	(0.2408)	(0.0003)	<(.0001)
Corruption	-11.40***	-19.87***	-20.7946***	-50.72***
	<(.0001)	<(.0001)	<(.0001)	<(.0001)
Latitude	0.00	-0.01	0.00	-0.01
	(0.5891)	(0.2745)	(0.5178)	(0.1278)
Inflation	0.15	-0.19	0.19*	0.06
	(0.1511)	(0.7683)	(0.0649)	(0.9303)
Trade	-0.13*	-0.36***	0.14*	-0.37***
	(0.0823)	(0.0058)	(0.0522)	(0.0027)
French Legal Origin	4.12	-4.00	3.57	-1.62
	(0.4905)	(0.8306)	-0.5305	(0.9279)
German Legal Origin	-	18.93	-	16.99
		(0.3867)		(0.4077)
Socialist Legal Origin	-17.7094	-6.81	-13.84	12.00
	(0.2796)	(0.9020)	-0.3915	(0.8236)
Scandinavian Legal Origin	-	-53.3105*	-	-55.07**
		(0.0914)		(0.0343)
R^2	0.2350	0.4624	0.2357	0.5154
Adjusted R^2	0.1797	0.3549	0.1842	0.4208
F-Statistic	4.25	4.30	4.57	5.45
N	90	52	90	52

Note: *Statistical significance at the 10%, 5%, and 1% levels are denoted by *, **, and ***, respectively.*

Table 4.8

Country Regressions Developed Vs. Developing 06-10				
Explanatory Variable	**Parameter Estimate**			
	CPI-TI		**CPI-WB**	
	Developing	**Developed**	**Developing**	**Developed**
	1	**2**	**3**	**4**
Intercept	-8.12	-5.99	-16.85	-14.76
	(0.6641)	(0.8247)	(0.3950)	(0.6198)
Corruption	-6.32	-19.24***	-2.03	-20.03***
	(0.2957)	<(.0001)	(0.6663)	<(.0001)
Latitude	0.01***	0.01	0.01***	0.01
	(0.0033)	(0.1500)	(0.0020)	(0.1304)
Inflation	0.05*	-1.89	0.05*	-2.04
	(0.0743)	(0.2489)	(0.0863)	(0.2116)
Trade	-0.17	-0.18*	-0.17	-0.17
	(0.1538)	(0.0826)	(0.1565)	(0.1137)
French Legal Origin	11.51	-10.43	-11.33	-10.47
	(0.1186)	(0.4539)	(0.1282)	(0.4538)
German Legal Origin	-	-10.28	-	-10.89
		(0.5774)		(0.5557)
Socialist Legal Origin	-32.12	-13.44	-31.11	-16.82
	(0.1393)	(0.7417)	(0.1553)	(0.6797)
Scandinavian Legal Origin	-	-53.08**	-	-52.08**
		(0.0171)		(0.0197)
R^2	0.2313	0.5264	0.2184	0.5235
Adjusted R^2	0.1474	0.4772	0.1331	0.4740
F-Statistic	2.76	10.70	2.56	10.57
N	70	89	70	89

Note: *Statistical significance at the 10%, 5%, and 1% levels are denoted by *, **, and ***, respectively.*