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Are corrupt acts contagious? Evidence from the United States

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Abstract

This paper adds to the literature by shedding new light on the causes of corruption. Specifically, we provide evidence on the extent to which corruption might be contagious. In other words, what is the extent to which a demonstration effect is at play at inducing corrupt acts? Using state-level U.S. data over the 1995–2004 period, the results show that the effect of neighboring corruption is positive and statistically significant in all cases, implying that corruption does appear to be contagious. Specifically, a 10% increase in corruption in neighboring states appears to increase corruption in a state by about 4–11%. Of the different types of government activity, the size of defense and non-defense federal sectors in a state seem to have opposite effects on corruption, with the former contributing to corruption and the latter serving as a deterrent. The size of the state and local governments does not seem to be relevant. Of the variables controlling for detection and punishment of corrupt individuals, greater corrections employment reduces corruption, while greater judicial employment seems to increase corruption. Changes in the police force do not seem to have a statistically significant impact. These findings generally hold when we control for the disproportionate effects of the Washington, DC area and when a pooled data set is estimated. Contagion effects are also found for other crimes. Policy implications are discussed.
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1. Introduction

Corruption as a social and economic problem has persisted since time immemorial. However, concerted efforts to combat the issue have only materialized in recent years. These efforts have been at all levels of government. A noteworthy development in this context is the often-cited World Bank President James Wolfensohn's 1996 speech where corruption was dubbed a cancer.[1] This speech highlighted the importance of controlling corruption globally.

Almost concurrently with the 1996 speech there has been a flurry of research on the topic, stemming from greater awareness of the issue among researchers and the availability of relevant data. These studies have examined the social and economic causes (see Treisman, 2000) and effects of corruption (Salinas-Jiménez & Salinas-Jiménez, in press; also Salvatore, 2007) focusing on various jurisdictions and at varying levels of detail. Some of the determinants of corruption have unambiguous effects, while the effects of others are less clear (see Jain, 2001; Lambsdorff, 2005). Strictly speaking, some of the economic factors affecting corruption are more readily quantifiable than some of the social influences (see, for example, Knack & Keefer, 1995).

This paper adds to the literature by shedding new light on the causes of corruption. Specifically, we provide evidence to examine the extent to which corruption is indeed a malice and might be contagious. In other words, what is the extent to which a demonstration effect is at play at inducing corrupt acts? In this manner, the effort here may be viewed as providing additional insights into the social interactions that might lead to corrupt practices. Potential bribe takers and bribe givers might become more "bold" and engage in corrupt acts when they observe others also engaging in similar activities. In the parlance of standard economics, the contiguous influences might be seen as working both from the demand and supply sides (Miller, 2006). Contagion effects might increase the demand for corruption as potential rent-seekers perceive additional opportunities for rent seeking. Further, the supply of corruption might increase as potentially corrupt public officials could induce lax enforcement and lesser punishment from the presence of corruption. There might also be some learning effects on how to engage in corrupt practices (see Andvig & Moene, 1990; Wirl, 1988).[2] An example of this may be in international trade when one of the trading countries may be corrupt, while the other may be "clean". Over time, firms in the clean countries doing business with a corrupt country might learn the (corrupt) ways of doing business. Yet another possibility is that states generally have substantial trade with their neighbors. Then corrupt neighbors have an effect on their relatively "clean" neighbors and make them more corrupt over time.

The economics literature has not heretofore focused on the contagion aspect of corruption.[3] A secondary contribution of this work may also be seen as providing recent evidence on the causes of corruption in the United States.

In our data set spanning U.S. states over 1995–2004, the five largest states with the most corruption convictions over this period were the District of Columbia, North Dakota, Mississippi, Louisiana and Alaska. By contrast, the states with the least convictions over the same time period

[1] http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:20190202~menuPK:34457~pagePK:34370~piPK:34424~theSitePK:4607,00.html.

[2] Some recognition of the contagion effects has also come to the popular literature (see, for instance, Gladwell, 2000).

[3] A notable exception is Sandholtz and Gray (2003) where the authors examine inter-country corruption spillovers in the context of studying the effect of international integration on corruption. Also see (Case, Rosen, & Hines, 1993).

included Oregon, Nebraska, Iowa, New Hampshire and Arizona.[4] Examining the border effects, at least three clusters of corruption appear to exist in the United States over the decade long period from 1995 to 2004.[5] These are the Washington area, including the District of Columbia, Virginia and Maryland; the five southern states of Alabama, Arkansas, Kentucky, Louisiana and Tennessee; and Pennsylvania and West Virginia (also bordering Kentucky). However, it is unclear a priori whether these clusters of corruption are due to a systematic contagion effect of corruption, or their existence is purely coincidental. This work will formally examine the presence of a corruption contagion effect.[6]

Evidence regarding the existence of contagion effects in corruption has implications for public policy. For instance, if the demonstration effect is at work in corruption, then it indicates that there may be positive externalities associated with the prosecution of corruption in any given area. Lawmakers should therefore recognize these potential benefits when they make decisions on resource allocations to the law enforcement agencies that fight such crime.[7] Such resources may not only deter corruption in the local area where the funds are received, but in neighboring jurisdictions as well. Beyond this, greater focus on cross-border regional initiatives to combat corrupt activity may also be warranted.

2. Model, data and results

Generally speaking, the theoretical foundations for models of rent-seeking can be seen to draw from the seminal work of Becker (1968) where "rational" bribe-takers and bribe-givers weigh the relative costs and benefits from engaging in corrupt acts. The costs and benefits of corruption are tied to rent-generating (e.g., discretionary government spending) and rent avoiding (e.g., detection and punishment) influences, although there seem to be large gray areas in each case (i.e., some rent avoiding activities might present opportunities for rent generation) (see Shleifer & Vishny, 1993).

The general form of the estimated equation is the following

$$CONVpc_i = f(BORDERconv_i,\ GSPfederal_i,\ GSPdefense_i,\ GSPstate_i,\ UN_i,\ INCOMEpc_i,\ RelWAGE_i,\ Corrections_i,\ Judicial_i,\ Police_i)$$

$$i = 1, ..., 50 \tag{1}$$

The dependent variable is the average convictions for corruption in the *i*th state over the 1995–2004 period, weighted by population.[8] Empirical studies of corruption, however, are handicapped by the fact that true corruption is unobservable. Some studies have used the actual incidence of corruption (Fisman & Gatti, 2002; Goel & Nelson, 1998), while others have used perceptions

[4] One should bear in mind, however, that the number of convictions is not a totally precise measure of the prevalence of corruption. A single large corruption scandal might, for instance, result in a number of convictions.

[5] Our sample does not enable us to account for cross-country corruption contagion effects (i.e., the influence of Canada and Mexico on corruption in the U.S.).

[6] Corruption might also have some inertia and could persist over time (Mishra, 2006).

[7] In the U.S. the responsibility of fighting and prosecuting corruption by officials at all levels of government primarily rests with federal state's attorney's offices (Corporate Crime Reporter, 2004).

[8] Ideally, the dependent variable should include all the individuals who engaged in corruption, whether convicted or not. However, given the associated moral hazard problems, only convictions are observed. The corrupt officials who were not convicted might have either escaped detection or were not punished.

Table 1
Variable definitions, summary statistics and data sources

Variable	Definition (mean; S.D.)	Source
CONVpc	Average federal public corruption convictions over the 1995–2004 period per 100,000 population (0.308; 0.18)	U.S. Department of Justice (2004)
BORDERconv	Unweighted average of average *CONVpc* in contiguous states (0.336; 0.29)	U.S. Department of Justice (2004)
GSPfederal	Gross State Product originating from federal civilian activities in a state, per capita year 2000 (811.949; 423.67)	http://www.bea.gov/bea/regional/gsp/
GSPdefense	Gross State Product originating from federal defense activities in a state, per capita year 2000 (416.410; 435.80)	http://www.bea.gov/bea/regional/gsp/
GSPstate	Gross State Product originating from the state-local public sector in a state, per capita year 2000 (2944.747; 367.56)	http://www.bea.gov/bea/regional/gsp/
UN	Average state unemployment rate over the 1995–2004 period (%) (4.76; 0.88)	http://data.bls.gov/cgi-bin/dsrv
INCOMEpc	Per-capita income, 2000 (28334.820; 4413.05)	http://www.bea.gov/bea/regional/statelocal.htm
RelWAGE	State-local March payroll divided by full-time-equivalent employment, expressed as a fraction of state per capita personal income, year 2000 (0.103; 0.009)	http://www.census.gov/govs/www/apesstl.html; http://www.bea.gov/bea/regional/statelocal.htm
Corrections	Corrections employment as percent of total state-local employment, year 2000 (3.996; 1.10)	http://www.census.gov/govs/www/apesstl.html
Judicial	Judicial employment as percent of total state-local employment, year 2000 (2.399; 0.75)	http://www.census.gov/govs/www/apesstl.html
Police	Police employment as percent of total state-local employment, year 2000 (5.285; 1.06)	http://www.census.gov/govs/www/apesstl.html
DCarea	Dummy variable for state with border to Washington, DC	

Note: The data are based on state level observations averaged over all available years from 1995–2004; unless otherwise stated. Observations for the District of Columbia are excluded for being outliers.

about corruption (Paldam, 2002; Treisman, 2000). We are proxying actual corruption by those caught in the legal net.[9]

Our cross-sectional data set has observations on all fifty states in the United States averaged over the years 1995–2004.[10] Additional results using a pooled sample are provided in Appendix A. Details about the variables used, data sources and summary statistics are provided in Table 1.

Regarding the expected influences of the independent variables, the main variable of interest is the border corruption effect. We would expect the coefficient on corruption in neighboring states (*BORDERconv*) to be positive, if corruption was contagious. It would then be the case that

[9] Thus, corrupt official who escaped detection are not captured. While the dependent variable can somewhat also be seen as driven by the strength of the enforcement machinery, we try to somewhat control for this by including three law enforcement variables ($Corrections_i$, $Judicial_i$, and $Police_i$).

[10] The District of Columbia was dropped from the data set as the values of some of the variables were out of line with other states, suggesting that the combination of state and federal effects in this case were generating influences that were somewhat unique.

corrupt practices in one state would induce individuals in the border states to "learn" to be more corrupt.[11]

Three variables measuring the various aspects of government activity in the state economy are included in Eq. (1): federal civilian activities (*GSPfederal*), the defense sector (*GSPdefense*), and combined state-local sector activities (*GSPstate*). The signs on the coefficients of each of these variables would be negative if such spending checked corruption (i.e., spending focused on rent avoidance) and positive if such spending increased rent-seeking opportunities (see La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1999; Rose-Ackerman, 1999). A higher unemployment rate could increase corrupt acts if it led to an increase in the discount rates resulting in greater bribe offers; on the other hand, public officials might be reluctant to accept bribes in periods of high unemployment for the fear of losing their jobs. Greater prosperity (*INCOMEpc*) and higher relative wages (*RelWAGE*) are likely to make bribes less attractive. Employment in corrections, judiciary and police capture the probability of apprehension and proxy somewhat for the severity of punishment (more corrections officers to oversee convicts). These would generally be viewed as checks against corruption, unless some of these branches are themselves corrupt (Becker & Stigler, 1974; Also see Bac, 1996).

We bring all these influences to bear in examining the determinants of corruption. While our main focus is on determining whether contagion effects exist in corruption, a secondary goal may be seen as providing additional insight into some of the other determinants of corruption. These determinants have been studied elsewhere, but there seems to be a lack of consensus in the literature regarding the strength of many of the influences (see Aidt, 2003; Bardhan, 1997; Jain, 2001; Lambsdorff, 2005 for reviews of the literature).

We used ordinary least squares (OLS) estimation procedure in the LIMDEP software package to estimate Eq. (1) with *t*-statistics based on White's robust, heteroskedasticity corrected covariance matrix. The dependent variable is the number of corruption convictions in a given state over the 1995–2004 period, weighted by population.

The estimation results are reported in Table 2. The following main points may be noted.

- The overall fit of all models is reasonable as shown by the adjusted R^2 that is greater than or equal to 0.25 and the *F*-value that is statistically significant at least at the 5% level.
- As a test of the overall specification of the baseline model (column 1), we ran a RESET test (see Ramsey & Schmidt, 1976 for details). The test showed an absence of any significant specification errors.[12,13]
- The main variable of interest, *BORDERconv*, is positive and statistically significant in all cases suggesting that greater corruption in a state's neighbors induces more corrupt acts. Thus, corruption does appear to be contagious. In terms of elasticity, a 10% increase in neighboring corruption appears to increase corruption in a given state by about 4–11% depending upon whether a control variable is included in the model for states that border Washington, DC.[14] This finding is unique to the literature as it suggests clusters of corruption. It also has implications

[11] Our approach to modeling the effects of contiguous border-state corruption (*BORDERconv*) on home-state corrupt activity is similar to the mixed regressive-spatial autoregressive model using a first-order rook specification of spatial contiguity. See LeSage (1999).

[12] Details are available from the authors upon request.

[13] It has been noted in the literature that there might be simultaneity issues between corruption and some of its determinants (Lambsdorff, 2005). The specification test (RESET) somewhat addresses these concerns.

[14] Elasticity calculations are based on the parameter estimates reported in Table 2 evaluated at the sample means.

Table 2
Corrupt acts and contagion effects (dependent variable: corruption convictions per capita)

BORDERconv	0.335** (2.84)	1.017** (4.75)	0.321** (2.71)
GSPfederal	−0.0003** (2.74)	−0.0001 (1.47)	−0.0003** (3.00)
GSPdefense	0.0003** (3.23)	0.0003** (3.85)	0.0003** (3.80)
GSPstate	−0.00003 (0.49)	−0.00004 (0.77)	−0.00009 (1.22)
UN	0.062* (1.69)	0.039 (1.22)	0.067* (1.92)
INCOMEpc	−0.000009 (1.4)	−0.000003 (0.53)	
RelWAGE	−1.350 (0.46)	0.385 (0.15)	0.045 (0.01)
Corrections	−0.055** (2.60)	−0.030* (1.65)	−0.053** (2.03)
Judicial	0.086** (2.34)	0.052 (1.48)	0.074* (1.74)
Police	−0.0006 (0.02)	0.012 (0.46)	−0.017 (0.48)
DCarea		−1.364** (4.12)	
Constant	0.527 (1.37)	−0.103 (0.28)	0.378 (0.96)
N	50	50	50
Adj. R^2	0.25	0.40	0.25
F-Value	2.67**	3.92**	2.82**

Note: Variable definitions are provided in Table 1. The figures in parentheses are *t*-statistics based on heteroskedasticity-consistent standard errors. **Statistical significance at least at the 5% level and *significance at the 10% level.

for public policy. For instance, efforts to control corruption in a given state are only going to be successful if such practices in bordering regions are also checked. It also suggests that policy makers should work towards more regional intergovernmental collaborations to control corruption.

- Of the three measures of government activity included in the model, greater *GSPfederal* and *GSPstate* are associated with lower corruption, although the resulting coefficient is statistically insignificant in the latter case. This makes sense since some of this spending might be devoted towards strengthening the checks and balances that make corruption more difficult. Greater defense spending, on the other hand, seems to spur corruption at the state level. This could be due to the fact that there is relatively less competitive bidding in defense contracts and thus there may be greater opportunities for rent-seeking and rent-awarding. Goel and Nelson (1998) find government size and corruption to be positively related.
- Corruption also seems to go up in periods of greater unemployment, suggesting that higher unemployment might be affecting discount rates prompting bribe payers to be more eager to "jump the queue" by offering bribes. The results regarding the effect of unemployment support earlier findings in the literature (Goel & Nelson, 1998). From a policy angle, policies lowering unemployment are likely to reduce corruption.
- Economic prosperity (*INCOMEpc*) and relative wages (*RelWAGE*) do not seem to have an appreciable impact on corruption. Evidence regarding the effect of relative wages is mixed in the literature.[15]
- Greater corrections employment and more police are associated with lower corruption. However, the statistical significance of the resulting coefficient is rather low in the case of police. In contrast, greater judicial employment (which includes all court and court-related activities)

[15] One reason for the lack of consensus on the *RelWAGE* variable is that it is difficult to come up with a good proxy for the alternate wage (opportunity cost) of government employees, especially when some of the job-related benefits of government employment may be hard to quantify (e.g., job security).

seems to increase corruption. Possible explanations for this finding might be that bribe takers and bribe givers either view the judicial process as somewhat corrupt (or endogenous), the punishment given might be too lenient or the delay in punishment might reduce its (present-discounted) deterrence impact. Comparing the relative magnitudes of *Corrections* and *Judicial*, it seems that the corruption inducing effect of an increase in judicial employment is slightly larger than the corruption reducing influences of greater corrections employment.[16]

- As a further check of the robustness of our findings, we control for the influence of the District of Columbia by including a dummy variable for the Washington area (*DCarea*). The resulting coefficient is statistically significant and all other results are generally the same. The negative sign on *DCarea* might be due to the fact that greater media scrutiny around the nation's capital might be acting as a deterrent to corrupt.[17]
- In order to capture temporal influences underlying the variables in the estimated model, we ran a pooled version of the set estimated in Table 2. The results, presented in Appendix A, are similar to what is reported earlier and that the existence of corruption contagion effect holds.
- Finally, to test the reach of contagion effects to other crimes, we estimated a simple model to examine the determinants of murder rates in the United States. The presence of contagion in this case is affirmed (see Tables B1 and B2).

3. Concluding remarks

Empirical research on corruption has gained prominence in recent years as better data have become available and as corruption has featured more prominently on the public's and the politicians' radar screen. This paper adds to the literature by examining whether corruption acts are contagious in that there is a demonstration effect at play (Andvig & Moene, 1990; Wirl, 1988 somewhat recognize this possibility). Greater corruption in an area might signal greater rents to be had. Alternately, it might signal a lower probability of being caught and/or being punished. Yet another possibility might be that bribery is more appropriately viewed as a part of doing business in certain regions and over time greater numbers of individuals might learn the mechanisms associated with offering and accepting bribes (Lambsdorff & Teksoz, 2005).

Using state-level U.S. data over 1995–2004, the key findings of this study may be thus summarized. The main variable of interest, namely, the effect of neighboring corruption is positive and statistically significant in all cases, implying that corruption does appear to be contagious. Viewed alternately, President Wolfensohn was right in terming corruption as a cancer and our results provide the further diagnosis that the cancer seems to be malignant. A 10% increase in corruption in neighboring states appears to increase corruption in a state somewhere in the range of 4–11%.

Of the different types of government spending, only the federal spending seems to have a significant impact on corruption, while spending by the state and local governments does not seem to be relevant.[18] Further, defense and non-defense spending seem to have opposite effects

[16] The respective elasticities of corruption with respect to corrections employment and judicial employment are −0.71 and 0.67. In practice, however, changes in these two types of employment might not necessarily be taking place concurrently.

[17] Alternately, there might be grand corruption and less petty corruption, resulting in less corruption overall. We are, however, unable to distinguish between petty and grand corruption in our data set.

[18] One reason for the lack of significance of the state and local spending might be that the dependent variable includes federal convictions of public sector corruption.

on corruption, with the former contributing to corruption. Corruption increases in periods of high unemployment, while the effects of personal income and relative wages do not appear to be statistically significant. Some of these findings are at odds with the literature due to different data sets (cross-country data versus single country data), time period or the set of explanatory variables considered.

Of the variables controlling for detection and punishment of corrupt individuals, greater corrections employment reduces corruption, while greater judicial employment seems to increase corruption. Changes in the police force do not seem to have a statistically significant impact. These findings hold when we control for the disproportionate effects of the Washington, DC area and when a pooled sample is estimated. Further, contagion effects are also found in a simple model of the causes of murder rates.

Besides adding to the literature, the existence (or a lack thereof) of contagion effects has important policy implications. For instance, if a contagion effect is present, then corruption control resources may be focused on certain areas where corruption begins to rear its head. Failure to check corruption in certain areas would likely lead to its spread to other areas. Alternatively, allocating resources to corruption control may yield spillover benefits in terms of reducing corruption in neighboring jurisdictions. Economic efficiency dictates that these benefits should be taken into account when policy makers make decisions on resource allocations to law enforcement agencies charged with the responsibility to control corruption by public officials.

Also, in terms of their impacts on corruption, all government spending are not created equal, nor are all types of policing, enforcement and judicial employment. Our results suggest that while some types of government spending (e.g., federal spending at the state level (*GSPfederal*) in Table 2) and certain types of government employment (e.g., *Corrections*) reduce corrupt activity, other types of spending (such as spending on defense) and employment (*Judicial*) might have the opposite effect. It is possible for these effects to cancel each other. Thus, to be effective, corruption control expenditures should be coordinated across different government functions, keeping in view their impacts on corruption. Policies that bring about greater transparency in government procurement, especially defense, may be helpful in reducing rent seeking. Another implication relates to the overall state of the economy. It seems that corrupt activities increase during economic downturns as evidenced by the negative sign on per-capita income and the positive sign on unemployment in Table 2 (although only the latter effect is statistically significant). Therefore, policies inducing economic well-being are likely to reduce corruption. This task is complicated by the possible simultaneity between corruption and economic growth. Future research could provide evidence of contagion effects for other jurisdictions.

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Appendix A. Pooled sample results

To obtain additional insights into the contagion effects of corruption from neighboring states, the same variations of Eq. (1) reported in Table 2 were re-estimated using a panel data set. In particular, the cross-sectional data set used in the previous analysis (consisting of mean values for each model variable over the 1995–2004 time period) was converted into a panel

Table A1
Variable definitions, summary statistics and data sources

Variable	Definition (mean; S.D.)	Source
CONVpc	Average federal public corruption convictions per 100,000 population (0.308; 0.22)	U.S. Department of Justice (2004)
BORDERLAGconv	Unweighted average of average *CONVpc* in contiguous states, lagged one period (0.356; 0.37)	U.S. Department of Justice (2004)
GSPfederal	Gross State Product originating from federal civilian activities in a state, per capita, measured in 2000$ (810.83; 427.75)	http://www.bea.gov/bea/regional/gsp/
GSPdefense	Gross State Product originating from federal defense activities in a state, per capita, measured in 2000$ (424.84; 448.14)	http://www.bea.gov/bea/regional/gsp/
GSPstate	Gross State Product originating from the state-local public sector in a state, per capita, measured in 2000$ (2929.45; 397.74)	http://www.bea.gov/bea/regional/gsp/
UN	Average state unemployment rate (%) (4.72;1.09)	http://data.bls.gov/cgi-bin/dsrv
INCOMEpc	Real per-capita income, measured in thousands of dollars, 1982-84$ (15.755; 2.39)	http://www.bea.gov/bea/regional/statelocal.htm
RelWAGE	State-local March payroll divided by full-time-equivalent employment, expressed as a fraction of state per capita personal income (0.107; 0.010)	http://www.census.gov/govs/www/apesstl.html; http://www.bea.gov/bea/regional/statelocal.htm
Corrections	Corrections employment as percent of total state-local employment (3.935; 1.09)	http://www.census.gov/govs/www/apesstl.html
Judicial	Judicial employment as percent of total state-local employment (2.347; 0.72)	http://www.census.gov/govs/www/apesstl.html
Police	Police employment as percent of total state-local employment (5.169; 1.01)	http://www.census.gov/govs/www/apesstl.html
DCarea	Dummy variable for state with border to Washington, DC	

Note: The data are based on state level observations averaged over all available years for the following time periods: 1995–1997 (period 1), 1998–2000 (period 2), and 2001–2004 (period 3). Only periods 2 and 3 are used in the analysis with the exception that period 1 data in used in the construction of the *BORDERLAGconv* variable.
Observations for the District of Columbia are excluded for being outliers.

data consisting of three periods: 1995–1997 (period 1), 1998–2000 (period 2), and 2001–2004 (period 3). Further, to account for possible dynamic effects of cross-border corruption on home-state corrupt acts the *BORDERconv* variable was re-specified in the model with a one-period lag (*BORDERLAGconv*). This setup increased the total number of observations to 100 (Table A1).

The results are reported in Table A2. All three variations of the model were estimated using LIMDEP and a random-effects estimation procedure. This estimation procedure has been widely used in panel data sets such as ours which is cross-sectionally dominated and where time-invariant variables are included among the regressors (see, for example, Beck & Katz, 1995). For all three variations of the model reported in Table A2 the Lagrange multiplier test, reported in the bottom row of the table, provides evidence in support of a random-

Table A2
Corrupt acts and contagion effects: panel data set (dependent variable: corruption convictions per capita)

BORDERLAGconv	0.093* (1.72)	0.085 (1.54)	0.082 (1.49)
GSPfederal	−0.0001 (1.21)	−0.0001 (1.04)	−0.0001 (1.37)
GSPdefense	0.0002** (2.14)	0.0002** (2.09)	0.0002** (2.42)
GSPstate	0.00002 (0.19)	0.00003 (0.32)	−0.00007 (0.90)
UN	0.002 (0.12)	0.002 (0.10)	0.002 (0.13)
INCOMEpc	−0.024 (1.53)	−0.026 (1.56)	
RelWAGE	1.285 (0.35)	1.358 (0.36)	3.366 (0.97)
Corrections	−0.017 (0.62)	−0.019 (0.62)	−0.015 (0.55)
Judicial	0.076 (1.51)	0.081 (1.53)	0.062 (1.24)
Police	−.002 (0.05)	−0.003 (0.08)	−0.027 (0.71)
DCarea		0.077 (0.31)	
Constant	0.395 (0.88)	0.400 (0.88)	0.188 (0.44)
N	100	100	100
Lagrange multiplier test	8.80**	8.87**	8.91**

Note: Variable definitions are provided in Table A1. Estimation is based on a random effects model. The figures in parentheses are *t*-statistics. **Statistical significance at least at the 5% level and *significance at the 10% level.

effect estimation procedure over an OLS estimation procedure that ignores country-specific effects.[19]

For the most part the results are consistent with what was reported above. In particular, the level of (lagged) corrupt activity in neighboring states (*BORDERLAGconv*) is associated with more corruption in the home state, similar to what was observed earlier analysis. While the evidence is statistically weaker than before, the coefficient on this variable is statistically significant at the 10% level for one of the three models estimated. Elsewhere, the coefficient on the *Corrections* variable is no longer statistically significant in contrast to the earlier results.

Appendix B. Are violent crimes contagious?

Table B1
Variable definitions, summary statistics and data sources

Variable	Definition (mean; S.D.)	Source
MURDERpc	Murders per 100,000 state population, 2003 (4.74; 2.54)	http://www.census.gov/compendia/statab/tables/06s0295.xls
BORDERmurder	Unweighted average of average *MURDERpc* in contiguous states, 2003 (4.81; 2.53)	Authors' calculation
UN	State 2003 average unemployment rate (%) (5.56; 1.05)	http://data.bls.gov/cgi-bin/dsrv
INCOMEpc	Per-capita income, 2003 ($30,358; $4,269)	http://www.bea.gov/bea/regional/statelocal.htm
Legal	Corrections, Judicial, and Police employment as percent of total state-local employment, 2003 (10.29; 1.95)	http://www.census.gov/govs/www/apesstl.html
DCarea	Dummy variable for state with border to Washington, DC (0.04, 0.20)	

[19] The results are very similar to those obtained via OLS based on robust standard errors.

Table B2
Murder rates and contagion effects (dependent variable: murders per 100,000 population)

BORDERmurder	0.596** (5.60)	0.467** (4.37)	0.434** (2.51)
UN	0.702** (2.31)	0.525 (1.61)	0.547 (1.48)
INCOMEpc	−0.00004 (0.79)	−0.0001** (2.04)	−0.0001** (2.21)
Legal		0.437** (2.59)	0.452** (2.87)
DCarea			0.532 (0.24)
Constant	−0.798 (0.39)	−0.977 (0.51)	−0.750 (0.43)
N	50	50	50
Adj. R^2	0.46	0.53	0.52
F-Value	14.81**	14.66**	11.50**

Note: Variable definitions are provided in Table B1.
The figures in parentheses are *t*-statistics (absolute value) based on heteroskedasticity-consistent standard errors. **Statistical significance at least at the 5% level.

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