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Departamento Académico de Ciencia Política  
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Working Paper Series

“Money Laundering, Misaligned Incentives, and Violence”

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Working paper # 2017-002

<http://departamentodecienciapolitica.itam.mx>

*Very rough draft v3.2*

*Comments welcomed*

## **Money Laundering, Misaligned Incentives, and Violence**

**Vidal Romero (ITAM)<sup>1</sup>**

### **Abstract**

Some of the activities undertaken by drug trafficking organizations fall under the jurisdiction of national authorities, but many of their operations are first and better detected by local governments. A subset of such illegal activities may have short-term positive effects for local governments, such as laundering money through investments in real state or retailing. When the incentives of national and local authorities are disconnected, it may be in the short-term interest of local governments to not fight money laundering within their territories, unintentionally inducing waves of violence and crime in the near future. We consider a mechanism through which criminal organizations invest dirty money in legal business at a given locality, leading to improvements in the local economy, thereby increasing revenue for local governments and voters' wellbeing. In turn, this economic bonanza would attract other criminal organizations to the locality, which will eventually generate conflict among criminal organizations, endogenously increasing crime and violence. We develop theoretical insights on the conditions under which this mechanism would exist and we empirically test its incidence and the magnitude of its effects. We utilize a variety of econometric methods, using Mexican municipalities as units of analysis.

**Keywords:** money laundering, local tax revenue, Mexico, violence.

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<sup>1</sup> I thank insightful comments from Thomas Brambor and Alexandra Uribe, the excellent research assistance from Héctor Chávez, participants at the 2016 ITAM-CIDE-COLMEX Seminar, the 2016 APSA annual meeting, and support from the Asociación Mexicana de Cultura A.C. and the Sistema Nacional de Investigadores of Conacyt.

Collaboration between national and local authorities is fundamental for many aspects of governance, and it usually provides gains for both levels of government. However, under specific circumstances, it may be in the short-term interest of one of these authorities to not collaborate. This short-term divergence of interests can result in significant costs to society in the medium and long terms. One such circumstance is money laundering. This paper posits that money laundering by criminal organizations is a specific case of possible interest divergence between national and local authorities.

The investigation and prosecution of money laundering commonly falls under the jurisdiction of national authorities, since it is a topic related to international treaties in which domestic borders are not relevant. Thus, it is this level of government that has a primary interest in fighting the crime.

Local governments, however, may find that financial investments made by money launderers are beneficial to the development of their communities. Sudden economic bonanzas boost local governments' revenue, create more jobs in the private sector, and increase the amount of money circulating in the local economy. This circumstance alone—even if we assume that there is no active corruption at all—would deter local authorities from denouncing suspicious economic activities to the federal authorities.

Misaligned incentives on this issue seriously undermine the federal government's efforts to fight money laundering. The fact that many money laundering activities are better detected in the field exacerbates the problem. Local authorities have a strong comparative advantage, being able to gather systematic information on specific local economic activities and

identifying potential illegal acts. If the local authorities look the other way, the federal government will not have the information they need to act to prevent laundering.

While in many cases money laundering does seem to improve local economies in the short-term, the expected negative costs generated in the medium and long are much greater than the immediate economic bubble. There are increased incentives for corruption, expansion in criminal activities, and also incentives for citizens to become more permissive with criminals. These components are perfect ingredients for an increasing spiral of crime and violence, which is paradoxically, and perhaps inadvertently, induced by a local government that had sought to improve the local economy.

In this paper, we focus on a specific mechanism that may turn local tolerance for money laundering into large-scale criminal violence. At time  $t$ , a criminal organization invests money from its illegal activities in legal activities at a given locality—such as in real state, restaurants, or hotels. Local authorities do not block such investments because more money flowing into their economy is socially, politically, and economically convenient. Plus, detecting criminals operating in your jurisdiction may be bad publicity for investors and the public.

At time  $t+n$  such investments prompt economic development at the locality, again, this is seen as a good thing. Then, at time  $t+n+m$ , the economic bonanza attracts other criminal organizations towards the locality, especially since it may become obvious that local authorities are complacent (if not complicit); this may generate conflict among criminal organizations fighting to control the locality—because of the difficulties inherent to market competition in illicit markets—which in turn creates a spiral of crime and violence.

An increase on homicides when the economy has been performing very well is not expected. Different works in the literature on crime have shown a significant relationship between the economy and crime: as the economy improves, crime goes down (e.g. Fajnzylber *et al.*, 2002). Our contribution is to identify a set of specific circumstances under which economic booms are not followed by improvements on security.

We empirically test for the plausibility of our argument using Mexican municipalities as units of analysis. Our test covers 25 years, from 1989 to 2015, employing different econometric models, some of which consider a reduced number of years because of data availability and lagged data in the models. We find that increases, and atypical increases, in local revenue are related to a rise in homicides in the following years—which corroborates our argument. In addition to local revenue, we also use the number of different economic units as a proxy for the increase in economic activity potentially related to money laundering. We find that, for many of the economic areas that we analyzed, increasing economic activity resulted in a rise in homicides 3 or 4 years later, depending on the model specification.

As a robustness test, we specify a placebo regression in which we substitute local revenue for federal transfers to municipalities, a source of revenue that is relatively exogenous to local economic activity. We find that federal transfers are not a statistically significant determinant of homicides, providing additional assurance of the effect of local economic activity on homicides.

In the next section we discuss the relationship between authorities' misaligned interests and money laundering, and we develop a theory on the conditions under which money laundering would induce significant increases in crime and violence. We then empirically

test our theoretical expectations using Mexico as case study. We conclude discussing the main implications of our findings and our agenda for further research.

### **Misaligned Incentives, Money Laundering, and Violence**

At the core of all regimes is a redistributive conflict not only among citizens and organized groups, but also among authorities at different levels of government. The source of the conflict is a divergence in preferences regarding what the best use of resources is. This divergence is a function of economic and social conditions, and of the interests of politicians at different levels of government.

There are multiple issues that fall into the jurisdiction of two or more government authorities. This is especially true when political systems have different layers of elected authorities, such as in federal systems. The greater the divergence in economic and political interests, the higher the transaction costs to getting things done. Existing institutional arrangements would determine how much these transaction costs impede collaboration among authorities.

#### *Misaligned Interests and Money Laundering*

Government authorities allocate part of their resources to enforce certain norms; this is a basic function of all authorities. However, scarce resources force authorities to choose among the many rules that may be enforced. Regarding the fight against crime, governments cannot realistically aspire to take most crimes to a zero incidence rate, and even if they could, it would be highly inefficient in terms of opportunity cost (Becker, 1968).

Therefore, governments must rank their priorities when it comes to fighting crime, and in the many cases where two different levels of government are involved in fighting a crime, conflict of interests may arise between them, even if corruption is absent. *Ceteris paribus*, one would expect that such priority rankings would be determined by a combination of a desire to maximize the government's revenue (North, 1992; Levi, 1988), and a concern for its political image (Brody, 1991).

If ignoring a relatively non-violent crime such as money laundering increases tax revenue and/or improves its political image, then a local government would prefer to tolerate the illicit activity, estimating that the costs of toleration are lower than those of prohibition, at least in the short-term. In general, local authorities would prefer not to bother their citizens by limiting economic activities that do not generate an obvious direct harm on them, even if such activities have significant negative indirect effects, or if its effects are only perceived in the long run.

Asymmetric information plays a significant role in the dynamics between local and national authorities concerning misaligned interests. Since local authorities have an advantage regarding information about ground events, then they are able to ignore some norms that the national authorities are interested in enforcing.

The case of money laundering clearly fits to this setting. Money laundering is defined as "the process of making illegally-gained proceeds (i.e. "dirty money") appears legal (i.e. "clean")".<sup>2</sup> There are multiple ways of cleaning money (Kennedy, 2005; Unger and Hertog, 2012). These go from minor amounts laundered through small legal business, such as

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<sup>2</sup> United States Department of the Treasury (retrieved at <https://goo.gl/IHZnFz> , March 16, 2016).

grocery stores, up to billionaire transactions using construction companies or financial markets. Precise estimates on the size of this crime are difficult to obtain because of its nature, but the United Nations Office on Drugs and Crime estimates that around the globe between \$800 billion and \$2 trillion dollars are laundered.<sup>3</sup>

Existing literature has focused on money laundering related to domestic criminal activities, such as drug trafficking (e.g. Levi, 2002) and, more recently related to financing of terrorist organizations (e.g. Cuellar, 2003).

Money laundering may bring a short-term improvement to local economies when it is invested in construction, hotels, or other labor-intensive business that creates jobs at the locality. Local economies can also be activated if money is invested in businesses that consume locally, such as restaurants. These types of economic investments have a double positive short-term effect for local officials such as mayors. First, they improve majors' popularity because of the relative improvement in the community, aided by the presence of new business, constructions, or other consumer options.

Second, more economic activity induced by money laundering also benefits majors in the short-run by increasing tax revenue, which they can then try to use for their preferred purposes. It would make sense for a businessman who is laundering money to operate within the bounds of legality, including paying all local taxes and permits. The last thing a criminal may want is to get caught for not paying a municipal construction permit.

This is where asymmetric information is relevant. Money laundering tends to operate across domestic and international borders; it is generally the national authority that is

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<sup>3</sup> <https://goo.gl/XvFSjr>. See also Schneider (2010).



formally in charge of fighting the crime. The customary focus of authorities is to detect money laundering through fire alarm schemes within formal financial institutions and in the tax system. This structure is mostly effective and cost efficient, however, it potentially leaves many illegal activities undetected at the local level. One reason is that unusual economic booms take some time to be reflected in tax revenue at the federal level, which reduces authorities' abilities towards fighting it. In developing countries, this is all exacerbated by the fact that many transactions are conducted in cash and mixed with informal markets. Another reason is local knowledge.

Local authorities usually have a better awareness regarding what is happening within their jurisdictions (Oates, 1999; Díaz-Cayeros, 2006), including the economic activities possibly fueled by money laundering. They also have an advantage in detecting atypical economic activity. Majors usually have good information on who is doing what under their jurisdiction. For instance, if a new hotel is being built, it is relatively easy to know who owns it, and for a major to figure out if Mr. X who owns the hotel has enough funds of his own to make such investment. Another case would be one of constructions showing exuberant architecture—which are sometimes associated to mafia kingpins—which are visible to the local observer, but that is unidentifiable for a bureaucrat at some office in a country's capital city.

Local authorities also can detect clusters of business that are being opened in specific geographic areas within their territories. And local authorities also find it easier to spot economic activities that generate a supply that clearly exceeds the demand for a specific

good or service. The latter may signal that the project was not originally meant to operate as a profitable investment, which is common in money laundering schemes.

There are other related cases that have been studied that have similar mechanics to money laundering. One is copyright protection, which commonly falls within the jurisdiction of federal authorities, yet clearly local authorities are in a better position to monitor the selling of merchandise that violates copyright laws, such as counterfeit clothing or pirated movies. Many of these are sold in the streets by informal vendors. Federal authorities have an obvious preference for enforcing copyright laws, since it would help them to improve their image with foreign and domestic investors, international organizations interested in protecting copyrights, and formal businesses. Local authorities, however, may have incentives not to enforce copyright laws since they do not usually directly benefit from better relations with some of these actors such as international organizations of multinational firms. However, depending upon local economic structures, local authorities may incur significant costs if enforcing copyright laws would imply bothering local political clienteles, such as street vendors, and limiting citizens' options for shopping for cheap goods (Dimitrov, 2009).

Nonetheless, piracy does imply multiple costs for the social aggregate, such as tax evasion, black markets, and disincentives for innovation. It is also detrimental to local formal businesses. However, most of these costs are not usually linked to local authorities—so they do not necessarily imply a cost in form of votes or popularity.

Money laundering also generates conflict of interests between businessmen—both licit and illicit—and the government regulators and enforcers on money laundering issues (Gill and Taylor, 2004). Money laundering regulation necessarily increases transaction costs

reducing economic activities, which directly affects businessmen's interests. For instance, rules that restrict cash transactions or that require exhaustive background checks would deter some individuals to invest.

There are, however, positive effects of money laundering regulation to businessmen conducting legal businesses, such as limiting unfair competition from informal businesses.

Under specific conditions—especially those in which businessmen act not fully in accordance to tax laws—businessmen opposition to money laundering regulation also puts pressure on majors to omit informing the federal authority on suspicious activities.

#### *Variables Affecting Local Authorities' Incentives*

There is of course variance on the incentives that mayors face to omit reporting suspicious activities to federal authorities in charge of fighting money laundering, which is determined by mayors' time-horizon, the sources of municipal revenue, the existence of corrupt relations of mayors and criminals, and the business culture of local elites.

**(a) Time-horizon.** Part of the issue at hand has to do with different time horizons: the short-term benefits of tolerating money laundering versus the long and medium-term costs. We would expect that the more likely it is that the same major is in office when the negative effects of money laundering are evident to citizens, the less likely it is that a mayor should tolerate laundering. In this sense, the possibility of reelection should reduce the incentives towards toleration, since political calculus would consider both the expected benefits in  $t$  and the costs in  $t+n$ .

When reelection is not an option, majors would have incentives to take actions that would benefit them in the present time, and which costs are delayed to a period after their administration is over. This is the case, for instance, of public debt, which is contracted by a municipal authority, but most of such credit usually is paid by a different administration. Thus, *ceteris paribus*, majors have many incentives to contract long-term debts, which benefit them and citizens in the short-run, but may hurt the economy and the political fate of future majors in the long-run.

**(b) Sources of municipal revenue.** Direct dependence on local revenue sources should increase incentives for majors to tolerate money laundering within their territories. Therefore, easy access to credit, federal transfers, or revenue from natural resources may allow majors more room to resist the temptation of shady revenue and opening the municipality doors to organized crime.

High municipal dependence on federal transfers also increases the power of federal governments to induce local governments into collaborating with them to fight money laundering.

**(c) Corruption.** The mechanism that we study in this paper does not necessarily imply explicit and active collusion between local authorities and criminals; it would only require inaction from local officials.

However, if there is collusion, things get further complicated for national authorities to effectively fight criminal organizations laundering money (Levi *et al.*, 2007; Markovska and Adams, 2015). The problem of asymmetric information only gets worse, since local

authorities involved in these sorts of corruption schemes would have strong incentives to cover up their crimes.

**(d) Local economic elites.** There is also a sort of cultural factor that would impact upon the propensity of local authorities to tolerate money-laundering investments within their territories. There is variance in societies' propensity to make business with "strangers"; some communities receive investments regardless of the source more easily, while other societies are more conservative and closed and do not easily welcome new investors (Greif, 1994). The more closed a society is, the less likely outside criminal organizations will be tolerated, and money laundering is less probable.

### *Money Laundering and Violence*

The presence of money laundering is a symptom of weak (specific or overall) institutions, in the sense that it is present because the state is not strong enough to enforce the law, and/or because state officials are not sufficiently bounded so that they can omit acting against money laundering.

When a local government decides not to interfere with suspicious economic activities that may constitute money laundering it is signaling—or directly communicating if there is collusion—to local criminal organizations that it is acceptable to clean money within their geographic circumscription. This circumstance may attract outside criminal organizations to the locality.

Simultaneously, money laundering may create an observable improvement within the locality. Improvements in the local economic situation are the result of the dirty money

invested, and of the increased revenue in the municipal treasury. This economic bonanza, along with the perceived weakness of local authorities, should act as an incentive for local criminal organizations to increase their illegal activities, including many other types of illegal businesses, such as extortion, kidnapping, and robbery.

Of course, not all economic improvements within a locality are attributable to money laundering. The analytical challenge is to identify when it is the case that a locality improves because of the investment of dirty money.

A key difference is institutional. When local improvements are based mainly on money laundering, it is a signal of weak institutions. Further illicit activities should weaken these even more. In settings of legal economic improvement, one would expect that institutions are strengthened. This difference is key to understanding the different effects that both types of localities would experience in their near future.

The existence of money laundering may also signal the existence of a monopoly of criminal organizations at a given locality, since it implies a relatively long time horizon for criminal organizations (Magaloni *et al.*, 2015).

The combination of weak institutions and the arrival of new criminal organizations into a given locality may eventually generate a spiral of crime and violence. Competition among criminal organizations over territorial control within the municipality will probably increase many types of other crimes, because the time-horizon of the criminal organizations is shortened once a competing group challenges them for control. Additionally, confrontations among rival groups result in more homicides in the municipality (Magaloni *et al.*, 2015).

The new context of increasing crime and violence at the locality will be reflected in an economic decline (Calderon *et al.*, 2013; Jaitman, 2015). Thus, municipalities that benefited in the short-run from dirty money invested within their territories would see a significant reversal of fortunes just a few years afterwards, endogenously generated by tolerating money laundering.

### **The Mexican Case**

Money laundering has been a significant problem in Mexico for many decades. This nation's weak institutions and a massive informal economy—it is estimated that a quarter of Mexico's GDP comes from informal activities<sup>4</sup>—provides a fertile ground for illicit transactions. All of these issues have aggravated as organized crime has increased its presence in Mexico (Osorio, 2013; Magaloni *et al.*, 2015).

Formally, it is the federal government that is in charge of fighting money laundering. Two agencies are in charge, one at the ministry of the treasury and other at the Attorney General's Office. The focus in Mexico has shifted to fighting money laundering in financial firms and tax payers to money laundering related to organized crime activities (Behrens, 2015).

The new focus implies that the federal authority requires even more cooperation from local authorities for detecting suspicious activities related to money laundering. Yet, local authorities are the weakest level of authority in many respects; which implies that mayors are always in need of more revenue, and have little protection against criminal threats.

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<sup>4</sup> [goo.gl/v2u85q](http://goo.gl/v2u85q).

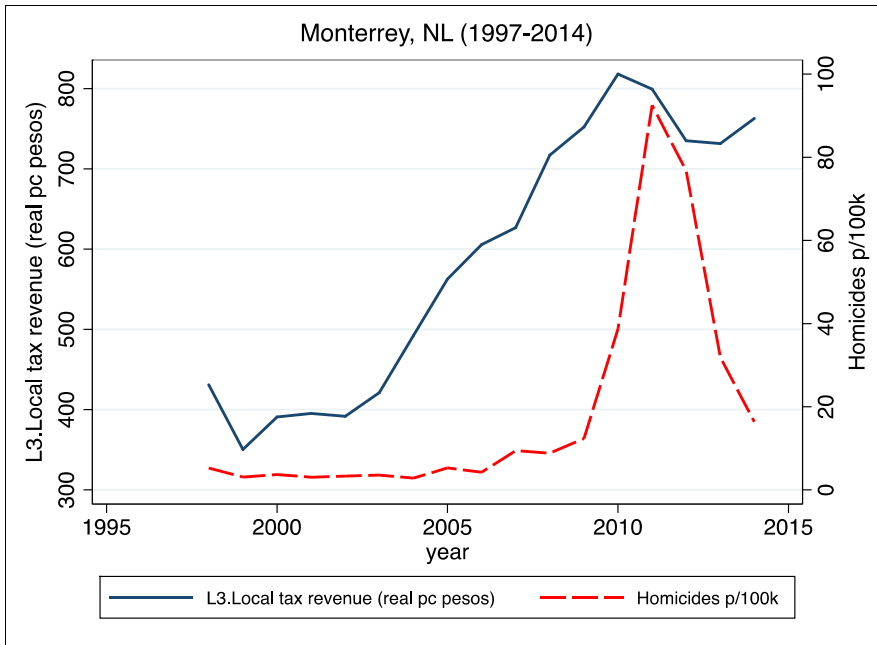
In this setting, it is not uncommon to read of mayors colluded with criminal organizations, or mayors being killed by criminal organizations. It is also not uncommon to observe suspicious economic booms at given localities, such as real estate developments that seem to go far beyond the existing demand for housing and offices. It is also obvious the many white elephants at some localities: abandoned malls and hotels, half-finished projects, or luxury restaurants in which the entire population of the locality might fit in.

#### *A tale of two cities*

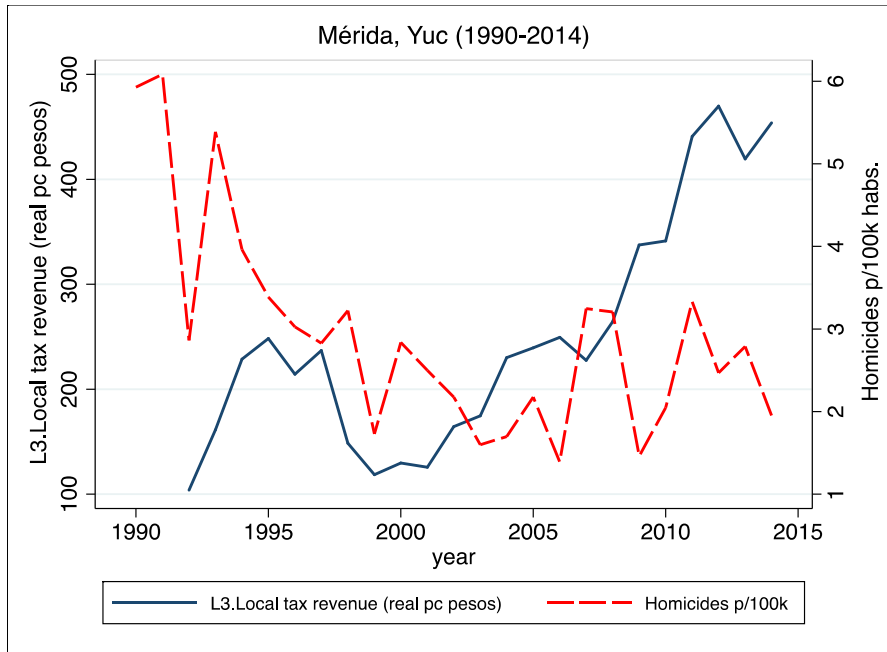
Two cases illustrate for the Mexican case the mechanism that we present in this paper. First the municipality of Monterrey, the second most important city in Mexico financially, which had an economic boom in the 2000s and an epidemic of homicides in the following years. It has been widely reported a significant presence of organized crime at Monterrey. Figure 1 shows the relationship between these two variables, with a 3 year lag on local tax revenue. It can be observed how increases in local tax revenue are related to a future increase in homicides.

#### **Figure 1 – Local revenue and homicides in Monterrey**





The counter-case is the municipality of Mérida, one of México's quietest urban areas. Here we observe the opposite relationship between crime and local economic activity, actually, the relationship that one would have expected in a normal setting: less homicides as economic conditions improve. Figure 2 shows the case of Merida.

**Figure 2 – Local revenue and homicides in Mérida**

### Empirical Test

To test for the empirical plausibility of our argument, we specify three sets of regression models using Mexican municipalities as units of analysis over a period of 26 years (1990-2015 because of data availability). The core hypothesis that we test in this section is that municipalities which experience an economic improvement in  $t-n$  will have a higher likelihood of observing crime induced violence in  $t+n$ .

In the following sub-sections, we test for specific economic activities which could be related to money laundering in three different ways: assuming a lagged linear effect of local revenue on homicides, substituting local revenue by the number of economic units at the municipality, and by assuming that local revenue has an effect on homicides only—or

especially—when it is atypically high, which may be a better representation of money laundering presence.

*Test 1: Lagged linear effect*

We use a panel corrected standard errors model (PCSE) (Beck and Katz, 1995), its dependent variable is the homicide rate per 100 thousand habitants. We approximate a municipality's economic circumstance, and the potential dirty money invested at the municipality, by the total revenue collected by municipal authorities—in per capita real Mexican pesos (2014=100) (*Local revenue*). A main source of revenue is the tax on real estate (*predial*), which should reflect the wealth in the municipality. The variable also considers taxes on house purchases and transfers, construction permits, and operating licenses for all registered businesses, among others. If there is an improvement in the local economy at a municipality, then, *ceteris paribus*, there should be an increase in revenue. This variable also provides information on how local economic circumstances affect municipal presidents' incentives, since it reflects the information that they have regarding the local economy.

To account for the lagged effect of revenue on homicides, we specify local revenue at four consecutive moments in time: 1, 2, and 3 years before the year of our dependent variable (homicides), and revenue contemporary to our dependent variable.

We use a set of controls that account for other variables that the literature has deemed significant for explaining the incidence of homicides (See the summary statistics in Appendix A). First, we include two dummy variables that divide municipalities by their

population to account for the different economic environments that are a function of the size of markets, and the opportunities criminals have of hiding. The first variable, *Pop 32,660-100,000*, considers municipalities with populations from the median municipality (at 32,660 habitants) up to 100,000 habitants (the 91th percentile), and the second variable considers municipalities with more than 100,000 habitants, *Pop 100,000-max*. The control group is populations from the 25<sup>th</sup> percentile (12,713 habitants) to the median municipality by population.

We do not include municipalities in the first quartile since we deem that the theoretical mechanism that we state in this paper does not make much sense in very small localities in which economic activity is too small, and in some cases almost inexistent. The results of the regression model are quite similar to each other, and interestingly the coefficient of our 3 years lagged revenue variable is even bigger in magnitude (See Appendix B).

To account for the conditions most favorable for drug trafficking organizations—which are related to a high share of homicides in Mexico—we include a dummy variable that approximates the value of the territory for this organizations, which is assumed to increase as it gets close to the United States border. This should increase conflict among DTOs, which then increases homicides (Dell, 2011; Osorio, 2013). We use the dummy variable, *North*, which indicates if the municipality's capital is above 22 degrees latitude. We also include a dummy variable that states whether a federal highway passes through the municipality, *Federal highway*. Federal highways are a useful mean of transportation for drug traffickers.

We also include a variable on the share of population between 18 and 29 years (*Pop 15-29 yrs*). To account for the government's intervention during President Calderon-s

administration, we add a dummy variable that indicates the years of the intervention from 2007 to the last year in sample (*Drug war*).

Finally, we include an index of public services at the municipality, *Public services index*, which approximates the economic conditions that may induce criminal activity. This variable goes from 0 to 1, 0 is the absence of public services and 1 is total coverage of public services at the locality. The richer the municipality, the more attractive it is to criminal organizations.

Table 1 shows the regression results. Model 1 is our fully specified regression and Model 2 is a placebo regression. They include a total of 1,216 municipalities (out of 2,457) due to data availability for all variables, and because we did not include municipalities in the first quartile.

As can be observed in Model 1, that local revenue lagged 3 years has a positive and significant effect on homicides, which supports our hypothesis. The difference in the homicide rate per 100 thousand habitants between the municipality in the sample with the lowest revenue (0.002 per capita real pesos) and the municipality with the highest revenue (5,094.8 per capita real pesos) is of 33.5 homicides per 100 thousand inhabitants more at the richer municipality. This is a huge difference. For instance: the homicide rate per 100 thousand habitants in Mexico for 2015 was 18, and the jump in homicides from the start of Mexico's war on crime in 2007 to its peak homicide rate in 2011 was of around 15 homicides per 100 thousand habitants.

### **Table 1 – PCSE regression models**

**Dependent variable:** Homicides per 100k habitants.

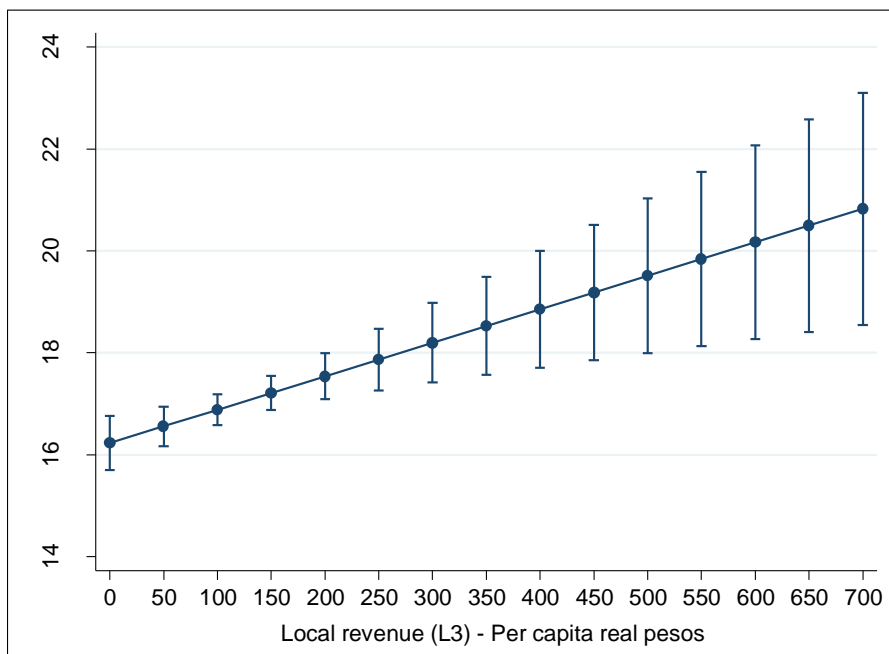
	<b>Model 1</b>	<b>Model 2 (Placebo)</b>
<b>Local revenue (L3)</b>	0.007*** (0.002)	
<b>Local revenue (L2)</b>	0.000 (0.002)	
<b>Local revenue (L1)</b>	0.000 (0.002)	
<b>Local revenue</b>	-0.003* (0.002)	
<b>Pop 32,660-100,023</b>	-2.102*** (0.365)	-1.977*** (0.365)
<b>Pop 100,000-max</b>	-2.584*** (0.395)	-2.055*** (0.395)
<b>North</b>	7.790*** (0.507)	7.925*** (0.501)
<b>Drug war</b>	7.612*** (0.399)	7.531*** (0.402)
<b>Public services index</b>	-84.916*** (3.545)	-84.618*** (3.64)
<b>Pop. 15-29 yrs.</b>	0.262*** (0.071)	0.303*** (0.071)
<b>Federal highway</b>	-0.408 (0.339)	-0.403 (0.338)
<b>Federal transfers (L3)</b>		0.001 (0.001)
<b>Federal transfers (L2)</b>		0.001 (0.001)
<b>Federal transfers (L1)</b>		0.000 (0.001)
<b>Federal transfers</b>		0.000 (0.001)
<b>Constant</b>	75.515*** (2.905)	73.890*** (2.847)
<b>N</b>	16,792	16,792
<b>Groups</b>	1,216	1,216

Note: \*  $p < .10$ ; \*\*  $p < .05$ ; \*\*\*  $p < .01$ . Standard errors in parentheses.

Figure 3 shows the predictions of the model. If we restrict our model predictions to the mean plus minus two standard deviations in the distribution of local revenue, the effect is of

around 3 homicides per 100 thousand habitants. Homicides rise from 16 homicides per 100 thousand when revenue is almost non-existent, to almost 20 homicides per 100 thousand habitants when we increase revenue in two standard deviations (442 more per capita real pesos).

**Figure 3 – Model 1 Predictions: Local Revenue (L3)**



Closer lags of local revenue, 2 and 1 year lags, do not have an effect on homicides (Table 1). This sets significant incentives for majors to tolerate money laundering, expecting that the potential negative effects will detonate once they are out of office. For the period in the sample, most Mexican majors were elected for 3 years, without the possibility of reelection.

Contemporary revenue affects homicides negatively and significantly. The interpretation of this result is not straightforward. One potential explanation is that decreasing revenue

activates local authorities to do something about crime. An alternative explanation is that of reverse causality, because of the simultaneity of both variables.

We conduct a robustness test on our Model 1 by specifying a placebo model in which we substitute local revenue—which is collected by municipal authorities—with federal transfers (*participaciones federales*), which are funds redistributed by the federal government to municipalities, and are thus not directly linked to the economic activity at the municipal level. Therefore, if our hypothesis is true, then local tax revenue should have an impact on homicides, but federal transfers should not. In Table 2, Model 2, we can observe that this is the case: federal transfers' coefficients are not significant, as opposed to local revenue coefficients.

### *Test 2: Economic Units*

To further delve into the relationship between economic bonanzas related to money laundering within communities, and their negative future effects regarding crime and violence, we replicate our Model 1 in Table 1, but we substitute local revenue for the number of economic units in different economic sectors within the municipality. We utilize Mexico's economic censuses, which are conducted every 5 years since 1989; their main focus is to estimate the number of economic units. For different reasons, the censuses do not consider all municipalities, and some of the items are not replicated in all waves, yet, they contain sufficient valid information to work with.<sup>5</sup>

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<sup>5</sup> The censuses are available at <http://www.inegi.org.mx/est/contenidos/proyectos/ce/>.



We included 14 different items, lagged by 3 years, which are listed in Table 2. The Table also reports the coefficient for the economic unit variable, and the sample size for each regression model. The complete output of the regressions is in Appendix C.

As can be observed in Table 2, for half of the economic units we tested, an increase in the unit was related to an increase in the homicide rate per 100 thousand habitants. Note also that, regardless of statistical significance, only 1 out of 14 variables' coefficients have a negative sign. This is also evidence that supports our theory.

**Table 2 – PCSE Regression Models on Economic Units**

**Dependent variable:** Homicides per 100k habitants.

<b>Variable (L3 yrs)</b>	<b>Coefficient</b>	<b>N</b>
Hotels	.060**	1,210
Gas stations	.044***	1,304
Shoe stores	.036***	1,479
Jewelry shops	.032***	992
Accounting firms	.026*	838
Bars	.016**	1,571
Beauty parlors	.009*	1,595
Housing buildings	0.049	220
Credit firms	0.039	421
Office buildings	0.028	250
Real estate firms	0.024	1,314
Car dealership	0.008	617
Clothing shops	0.005	1,610
Money exchange	-0.013	360

Note: All models include all the controls in model 1.

*Test 3: Lagged shock*

Finally, we specify a model that considers sudden increases in local revenue as a shock that would eventually trigger an increase in homicides—which is different to the assumed linear relationship between local revenue and homicides in models in the previous sections. This model, we believe, resembles better our theoretical argument.

We model atypical yearly increases to real per capita local revenue by including a dummy variable that indicates whether the increase in a given year (i.e. the difference between  $t+1$  and  $t$ ) is above 1.96 standard deviations of the state's observations. Such increases—above 1.96 standard deviations—should be uncommon, assuming that yearly differences approximate a normal distribution; 2.5% of our cases (1,186 observations) conforms to this condition.

We specify a PCSE model using our shock dummy variable at four different consecutive yearly lags. The model considers basically the same controls than models 1 and 2, which are the standard controls in the literature on the determinants of homicides. Table 3 shows the model's results.

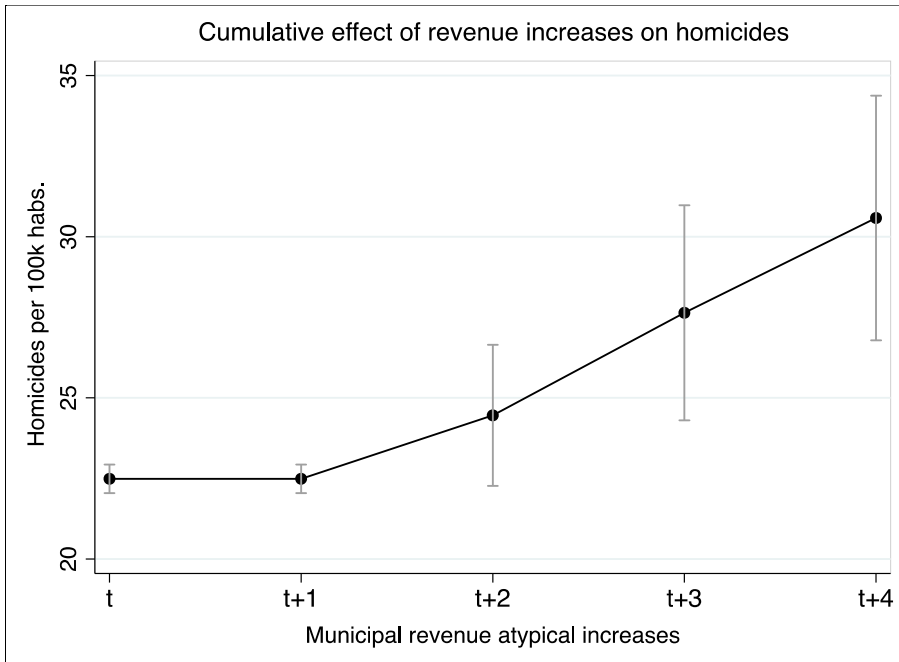
**Table 3 – PCSE Regression Model****Dependent variable:** Homicides per 100k habitants.

<b>Model 4</b>	
<b>Local revenue shock</b>	
<b>t-4</b>	2.942*** (1.060)
<b>t-3</b>	3.183** (1.421)
<b>t-2</b>	1.968* (1.117)
<b>t-1</b>	2.933 (1.891)
<b>T</b>	0.953 (1.364)
<b>Pop 100,000-max</b>	-2.378*** (0.483)
<b>North</b>	2.988*** (0.762)
<b>Drug war</b>	9.202*** (0.567)
<b>Public services index</b>	-87.714*** (5.045)
<b>Pop. 15-29 yrs.</b>	-1.047*** (0.152)
<b>Altitude</b>	-0.002*** (0.000)
<b>Federal highway</b>	-3.142*** (0.509)
<b>Election year</b>	0.849* (0.462)
<b>Constant</b>	112.5*** (4.776)
<b>State fixed effects</b>	Yes
<b>N</b>	18,940
<b>Groups</b>	2,041

Note: \* p &lt; .10; \*\* p &lt; .05; \*\*\* p &lt; .01. Standard errors in parentheses.

The results on model 3 make sense with the previous models. A significant lagged effect on homicides can be observed beginning at the second year after an atypical increase in local revenue. The impact continues for next two periods that we measure. Figure 4 shows the marginal and cumulative effect of atypical municipal revenue, which, we argue, may be originated in money laundering activities.

Suppose that there is an atypical increase in revenue at municipality  $x$ . In that year and the next one, there would be no increase in homicides—and, likely, an economic improvement. Problems start at the second year; homicides increase in almost 2 per 100 thousand habitants, which is a 9% increase from the baseline (at 22.5). Then, assuming that atypical increases in revenue continue, the homicide rate would further increase in 3.2 for the third year and an additional 2.9 for the fourth year, totaling an increase of 8.1; which represents a dramatic 36% increase in the homicide rate in a 4 year lapse.

**Figure 4 – Model 3 predictions as a function of local revenue**

### Conclusions and implications

In this paper we have argued that under a specific set of plausible conditions municipalities have perverse incentives for not denouncing suspicious money laundering activities. Usually, it is the federal government that is in charge of fighting money laundering. This level of government is in a better position to identify suspicious activities within formal financial institutions; yet, local authorities have better information about local suspicious activities, especially at their early stages, when they are not obvious to the federal government's tax books.

Under many circumstances, municipal authorities prefer to have more economic activity within their territories—which implies more revenue and happy voters—than to fight money laundering by alerting the federal government.

Such economic bonanzas do not come without a price. Economic improvement within a given locality increases its attractiveness to other criminal organizations, and money laundering signals potentially permissive authorities. Increased competition among criminal organizations would be likely to induce a turf-war, resulting in increased crime and violence.

Our results support the paper's hypothesis. We find evidence showing that, under different specifications, atypical increases in municipalities' revenue and economic activity induce increases in homicides in the near future.

Further tests are required to confirm the findings of this paper. The econometric modeling could be improved with models that capture better the dynamics of the phenomenon. We also require to consider the existing variance on regulations across countries; although there is convergence on regulation across nations, specific institutions and enforcement procedures vary (Serrano and Kenny, 2003; Sharman, 2008).

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**Appendix A – Summary statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max
Homicides100k	16792	16.98431	21.11812	.4766726	393.301
Local revenue					
L3.	16792	115.4007	221.0467	.0017222	5094.794
L2.	16792	120.4055	228.4138	.0017222	6046.058
L1.	16792	124.6387	230.8436	.0017222	6046.058
--.	16792	128.7135	238.4642	.0017222	6046.058
pob_3~100023	16792	.3707122	.4830099	0	1
pob_100023~x	16792	.1939614	.3954108	0	1
North	16792	.2291567	.4203028	0	1
Drug war	16792	.2538709	.4352376	0	1
Public S Indx	16792	.8019359	.07932	.2746	.926
Pop 15-29 yrs	16792	26.82848	2.402392	18.36	39
Fed highway	16792	.6842544	.464826	0	1

**Appendix B – Robustness**

Variable	Model 1 Pop>12,713	Model 3 All municipalities
Local revenue		
L3.	.00657037***	.01134257***
L2.	-.00022686	-.00269287
L1.	.00038345	.00094657
--.	-.00304299*	-.002821
pob_3~100023	-2.1021011***	-7.6563015***
pob_100023~x	-2.5836533***	-6.5398146***
North	7.7897852***	13.332076***
Drug war	7.6124055***	9.465472***
Public S Indx	-84.916135***	-94.036083***
Pop 15-29 yrs	.26172513***	-1.1990475***
Fed highway	-.40792636	-6.0373103***
Constant	75.51477***	130.17448***
N	16792	22958

legend: \* p<.1; \*\* p<.05; \*\*\* p<.01