

# The Effect of Stolen Goods Markets on Crime: Evidence from a Quasi - Natural Experiment

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18/02/2014

## Abstract

This paper analyses the causal effect of the availability of stolen goods markets on theft crimes. Motivated by the richness of anecdotal evidence, we study this overlooked determinant of crime's production function through the lens of *pawnshops*, a widespread business that offers secured loans to people, with items of personal property used as collateral. The endogeneity of pawnshops to crime is addressed in multiple ways. First, we strengthen the hypothesis that pawnshops deal with stolen goods by exploiting the properties of a panel of 2176 US counties from 1997 to 2010. Then, we detect causality exploiting the exogenous rise in the price of gold in a quasi - natural experiment fashion. Specifically, the identification strategy relies on the exogeneity of the interaction between the price of gold, constantly demanded by pawnbrokers in the form of jewels that are melted down to be transformed in a bar of precious metal, and the initial concentration of pawnshops to the county. Conservative estimates show that a one standard deviation increase in gold price generates a 0.05 standard deviation increase in the effect of pawnshops on burglaries and robberies. The mechanism behind the causal effect is corroborated by numerous falsification tests on other crimes that disprove the possibility that pawnshops might cause crime through channels other than the demand for stolen goods.

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\*Special thanks for the support to Robert Akerlof, Mirko Draca, Rocco Macchiavello and Chris Woodruff. I am indebted for the insightful discussions and useful comments to Sascha Becker, Dan Bernhardt, Clément de Chaisemartin, Justin McCrary, Magne Mogstad, Fabian Waldinger and the participants of the CWIP (Warwick). I gratefully acknowledge the nancial support from the Economic and Social Research Council (ESRC). All errors and omissions remained are my responsibility.

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# 1 Introduction

Theft crimes produce a substantial harm to society. In 2010, there have been an estimated 9.5 million theft crimes in the US territory that caused an economic loss for the victims of almost \$16 billions (FBI, 2010)<sup>1</sup>. As for any other legal market, the demand for stolen items can be a key determinant of theft crimes. Nevertheless, while research from criminologists has shown that the immediate availability of a market for stolen goods plays a key role in the burglar’s choice of whether, or where, committing a theft (Sutton, 2010), a systematic empirical investigation on the role of the stolen goods markets is missing. Two obstacles hinder this type of analysis. First, markets for stolen properties are hardly identifiable. Second, these markets are not randomly assigned to geographic locations.

This paper, motivated by the richness of anecdotal evidence, bridge this gap investigating this issue through the lens of *pawnshops*, a widespread business that offers secured loans to people, with items of personal property used as collateral. Pawnshops are second hand businesses where clients bring their personal items to be either sold for cash, or to be used as a collateral, for high - interest loans. This type of business have long been suspected of illicit trade. While the proponents of these shops, led by the National Pawnbrokers Association, stigmatize the frequency of this phenomenon, public opinion, newspapers and criminologists point the finger against this “modern thief’s automatic cash machine” (Glover and Larubbia, 1996). Despite the different standpoint, given that pawnbrokers assume the risk that an item might have been stolen, laws in many jurisdictions protect the brokers from unknowingly handling stolen goods. These laws usually require, for each transaction, a photo identification of the client (such as a driver’s license or government-issued identity document), as well as a “holding” period on the item purchased by the pawnbroker, to allow local law enforcement authorities to track stolen items. For the same reason, in some jurisdictions, pawnshops must regularly communicate to police a list of all newly pawned items and, if possible, any associated serial number.

Different dynamics can turn a pawnshop into a market for stolen goods. First of all thieves,

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<sup>1</sup>Personal calculation from the author, obtained summing up data on larceny, robbery, burglary and motor and vehicle theft from the FBI reports.

exploiting the increase in personal properties' trade in the community, can circumvent the security measures of an honest pawnbroker, "disguising" the stolen property in the regular flow of allowed items. Then, in some cases, the competition for profits could undermine the security policy of a pawnbroker, leading him to accept - from time to time - items of uncertain origin. From the words of a pawnbroker: *"If he's coming in my store with a VCR, I'm not asking him where he got it. It's the police's job to find out if it's stolen, not mine. You don't ask where things come from. If you don't take those, the guy down the street will"*, (Glover and Larubbia, 1996). Finally, in a worst scenario, the pawnbroker could explicitly facilitate the sale of stolen goods in his shop (fencing), exploiting the lack of a strict law enforcement from local authorities or - for example - the fact that the majority of stolen goods lack of a unique identifier and are hardly recognizable by police or by the victims.<sup>2</sup>

The first part of the paper sheds some light on the hypothesis that pawnshops deal in fact with stolen goods. We do so mainly by exploiting the properties of our panel data: 2176 counties in 50 states, (almost 70% of the US total), from 1997 to 2010. The variables of interest are 1) the number of different crimes reported and 2) the number of pawnshops, both by county per year.<sup>3</sup> The structure of the panel allows for the inclusion of county fixed effect. This inclusion controls for the presence of unobserved time invariant heterogeneity that correlates both to the rise of pawnshops and crime in the county. Hence, the baseline empirical analysis focuses on the effect of the within county variation of the number of pawnshops on the number of reported theft crimes. Year fixed effects and states linear trends are included to control for nationwide and state specific confounding shocks. Moreover, the analysis includes a rich set of county socio - economic controls that vary by year. The clear attempt is to shut down possible endogeneity concerns due to the omission of county

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<sup>2</sup>Pawnbrokers have often been associated with fencing. While pawnbrokers do not like this characterization of their business, police efforts have indicated that some pawnbrokers are actually involved in fencing. For example, in the US, the "Sarasota Police Department, Venice Police Department and North Port Police Department assisted with the undercover operation to sell gold jewelry to each business. Many were found to be in compliance. However, a number of businesses were operating under a 'no questions asked' policy, making no attempt to properly document the seller information, record the items being purchased or obtain the seller's fingerprint, all of which are state requirements" (Bill, 2011)

<sup>3</sup> More details on the data sources are given in the data section below.

specific time varying unobservables, possibly related to the diffusion of pawnshops and crime.

OLS estimates show a strong effect of pawnshops only on two types of theft crimes: larcenies and burglaries, with an elasticity respectively of 1.4 and 0.9, both significant at the 1% level. The findings are robust to extensive robustness checks, the clustering of standard errors at a different level, the sensitivity to outliers, averaging the regression by a measure of the quality of the information available to the researcher and using different functional forms. Moreover, implicit falsification tests on other crimes - that should not be directly affected by the presence of pawnshops - disprove the possibility that these might influence crime through different channels other than the demand for stolen goods. In particular, the availability of data on motor - vehicle thefts gives the possibility of unambiguously testing the hypothesis of the paper. Very reassuringly, this particular theft crime is totally insensitive to the presence of pawnshops in the county, plausibly because motor and vehicles are not accepted in pawnshops' transactions. Furthermore, no effect is detected for any violent crime.

Nevertheless, given the lack of random assignment of pawnshops to counties there are two possible threads to identification. First of all, we can not deny the possibility that the results might be driven by the omission of some crucial time variant unobservable related to the change in the number of pawnshops and to larcenies / burglaries *only*. But, how big should be this bias in order to completely invalidate our results? The Altonji et al. (2005) method of assessing selection on unobservables using selection on observables is pursued in this context. The rule of thumb outlined in Nunn and Wantchekon (2012) is that any ratio above 1 is acceptable. In our case the Altonji ratio is above 10 for theft crimes, finally suggesting that there is little concern that selection on unobservables is totally driving our results. A second econometric concern that might prevent the identification of a causal effect is the simultaneity between pawnshops and larcenies/burglaries. While in the relevant section we discuss different reasons why we believe this is not likely to be the case, this issue will be totally addressed with the introduction of the quasi natural experiment in the analysis.

Before doing so, we conduct two further empirical exercise related to: 1) the presence of the geographical spillovers 2) the role of states' legislation. In the first case we test whether the presence

of pawnshops in one county could have an effect on theft crimes in other counties. Our findings suggest that results are mainly driven by the presence of pawnshops in the same county. This is consistent with the evidence coming from burglars' interview, where it emerges that that one of the main determinants of the location of the crime is related to the distance to the resale point. Burglars know exactly that the probability of being caught increases while the stolen property is in possession and - for this reason - they prefer to commit a theft at a maximum distance of half an hour by car from the resale point, (Sutton, 2010). Nevertheless, our results capture a strong geographical spillover effect of the number of pawnshops at the state level (excluding the county under analysis) and burglaries. Plausibly, this shows that burglars might take the risk of traveling far from the crime scene to avoid suspects about the origin of the item or to outdistance the good from the place where it was stolen.

Then we move to the analysis of the role of states' usury laws. These laws, while creating ceilings on the maximum interest rate that pawnbrokers can use to charge clients, might affect the likelihood of this business being used as a resale point. From one side, a more liberal legislation (embedded in states with an high interest rate allowed), by increasing pawnbrokers' expected profits in the "legal" sector, might decrease the willingness to accept goods from uncertain origin. From the other, by raising competition among brokers, might increase pawnbrokers' willingness to accept items of uncertain origin. The results from parametric and non parametric estimates seem to suggest that competition across brokers might be an important determinant in turning these shops into a markets of stolen goods. While we do not want overemphasize the meaning of this result for reasons that we discuss in the related section, these findings are interesting enough to suggest scope for future research.

In the last section of the paper we address the endogeneity of pawnshops to crime exploiting the exogenous rise in the price of gold as a quasi natural experiment. The choice of including the price of gold depends on a different set of reasons. Gold has always been the major determinant of pawnbrokers' profit function, roughly representing 80 percent of the value of all pledges (Bos et al, 2012). But, what makes jewelry and - in particular - gold so profitable in pawnbrokers' activities? Along side the fact that gold is one of the most precious metal, a big part of the pawnbrokers' profits

comes from the process of melting down the gold received by their clients through the “refinement” process. In fact, 90% of the times pawnbrokers sell their jewelry to a company that is known as a ‘refiner.’ A refiner will take all of the rings, necklaces, bracelets and other items and melt them. Truly professional outfits will then begin to remove impurities from the metals until they get something close to pure gold. Hence, stolen items, easily transformed into an unrecognizable bar of precious metal, can disappear forever from the second - hand market (Sutton, 2010). Clearly, this dynamic might facilitate the burglars’ (or the pawnbrokers’) attempt of safely getting rid of the stolen goods.

This persistent demand for jewelry and gold in particular might influence criminal behavior. In fact, as in any other type of economic activity, the exact knowledge of the demand for stolen goods affects the type of items that are actually stolen. We test this hypothesis exploiting the exogenous rise in the price of gold as a quasi natural experiment, where the intensity of the treatment is measured by the initial concentration of pawnshops to the county, fixed at the first year of the sample. Results support this hypothesis. Conservative estimates show that an increase of one standard deviation in the gold price generates a 0.05 standard deviation increase in the effect of pawnshops on burglaries and robberies. Reassuringly - also in this case - no effect is detected on all other crimes and results are robust to a wide set of robustness and placebo checks. Furthermore, the estimates suggest this mechanism being more acute in densely populated counties. Plausibly, the anonymity of a big county might amplify the likelihood of the pawnshop being a convenient destination for stolen goods. In less densely populated areas instead, the pawnshop may be far from the crime scene, crime is generally less frequent and residents are more willing to defend the interests of the members of their communities. This could discourage thieves to use this channel to get rid of their stolen items.

Due to data limitation on the financial service provided by these businesses, this study lacks of a precise welfare analysis related to the possible opening or closing of a pawnshop in a particular county. Nevertheless, this paper uncovers a precise and previously undetected causal mechanism, showing that “theft - related” transaction costs matter in the proliferation of property crimes. Hence, a closer monitoring of pawnshops from local authorities, (as well as of other second hand shops not

considered in this paper), seems to be warranted. This improved monitoring could plausibly reduce the illegal demand for stolen goods and, consequently, the number of theft crimes in pawnshops' surrounding area.

### ***Related Literature***

The findings and methodology of the paper contribute to the empirical literature on economics of crime. Different studies have analyzed a wide set of crime's potential determinants. Among these we find: the effect of police and incarceration (Levitt 1997, Di Tella and Schargrotsky 2004, Klick and Tabarrok 2005, Levitt 1996, Levitt 1998, Helland and Tabarrok 2007, Drago, Galbiati and Vertova 2009, Lee and McCrary 2009, Draca, Machin and Witt 2011), conditions in prisons (Katz, Levitt and Shustorovich 2003), parole and bail institutions (Kuziemko 2007), education (Western, Kling and Weiman 2001, Lochner and Moretti 2004), social interactions and peer effects (Case and Katz 1991, Glaeser, Sacerdote and Scheinkman 1996, Gaviria and Raphael 2001, Kling, Ludwig and Katz 2005, Jacob and Lefgren 2003, Bayer, Hjalmarsson and Pozen 2009), family circumstances (Glaeser and Sacerdote 1999, Donohue and Levitt 2001). Economists have also focused on the the effect of criminal histories on labor market outcomes (Grogger 1995, Kling 2006), the impact of unemployment and wages on crime (Grogger 1998, Raphael and Winter- Ebmer 2001), the strategic interplay between violent and property crime (Silverman 2004), the optimal law enforcement (Polinsky and Shavell 2000, Eeckhout, Persico and Todd 2009) the immigration status (Bianchi, Buonanno and Pinotti 2012) and the impact of violent movies and pornography on violent crimes (Dahl and Della Vigna 2009 and Bhuller, Havnes, Leuven and Mogstad 2011).

This paper, in its attempt to detect the causal effect of the availability of the stolen goods' market through the lens of pawnshops, strengthens the findings of different criminologists (Fass and Francis 2005 and Comeau and Koflas 2011). Their detailed analysis of the criminal histories of the most frequent pawners shows the suspicious regularity of these pawners having a long story of theft - related criminal records. Finally, this paper corroborates the results of an unpublished manuscript by Thomas j. Miles (2008), where the predictions against pawnshops are tested on a cross-section of counties with populations of at least 50,000 persons for the year 1996.

*Structure of the paper*

This paper proceeds as follows. In the next section I present some suggestive evidence related to the link between pawnshops and property crimes. Section 3 presents the data and lays down the initial econometric framework, reporting the different results and the robustness checks. In Section 4 we introduce the role of gold in quasi natural experiment and we present the main results. Section 6 concludes the paper, finally outlying some direction for future research.



## 2 Pawnshops and Property Crimes: Suggestive Evidence

Pawnshops, payday loans and check cashing outlets are all businesses that provide instant credit to “unbanked” clients at a very high interest rates.<sup>4</sup> Nevertheless, within all these activities, pawnbrokers offer a unique service: the supply of instant cash to their clients, only through the exchange of personal property’s items. The standard procedure begins with the assessment of the monetary value of the item brought by the client. If the client agrees with the offer made by the pawnbroker, she can either directly sell the item to the pawnbroker or she can ask for a loan, using the pledge as a collateral. Usually, the offer made by the pawnbroker ranges from 30 to 75 per cent of the market value of the pledge, with the average loan value being 100\$ for a two months period. The pawnbroker holds the personal item in custody until the maturity date of the loan. Importantly, in case the client does not return to claim back the pledged item at the maturity date, this becomes pawnbroker’s property.<sup>5</sup> The majority of pawnshops transactions involve jewelry such as rings, bracelets and necklaces but also electronics items such as televisions, stereo, mp3 and camera equipment (Bos et al., 2012).

In principle, the pawnbroker assumes the risk that an item might have been stolen. Nevertheless, to be found guilty of criminal possession, the pawnbroker must either know the item is illegal when it is received or must keep possession of the object after learning it is illegal, both facts often difficult to prove. Consequently, the main risk that the pawnbroker faces is losing both the collateral and the amount loaned if the police seize the item (Miles, 2008).<sup>6</sup> The National Pawnbrokers

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<sup>4</sup>U.S. households purchased more than \$40 billion in high-cost short-term loans using the “fringe banking sector” in 2007, Fellowes and Mabanta (2008). Even if there is no official and reliable estimate of the total number of clients, industry reports suggest that 34 million adults demanded the services of these companies. The sector consists of several types of high-cost lenders, but two comprise the dominant portion: payday lenders and pawnshops. In 2007 pawnshops made 42 million transactions for an overall value of 2.5 billion dollars. The maximum interest rate set by pawnbrokers and payday lenders is generally regulated at the state level. For a complete review of pawnshops’ operating system see Shackman and Tenney (2006).

<sup>5</sup>Alternatively, the pawnbroker becomes the owner of the item as soon as the sale process ends. Some estimates describe how around 80 percent of pawn loans tend to be repaid and that repeat customers account for much of the loan volume. Moreover, it is common for a customer to use the same pledge as collateral to obtain sequential loans (Avery, 2011).

<sup>6</sup>Nevertheless only Delaware, Virginia, and the District of Columbia explicitly permit police to search for and to seize without warrant items, which they believe are stolen. Laws in Florida, Alabama, California, Kansas, Louisiana, Mississippi, Ohio, and Tennessee require victims to seek legal adjudication to secure the return of their property from pawnshops. We will attempt to exploit this state differences in the last section of the paper.

Association (NPA) states that the best way to avoid the unknowingly handling of stolen goods, and all its related issues, is "... (by) refusing any items that are suspicious in nature or thought to be misappropriated." Nevertheless, always according to the NPA, "...less than half of one per cent of all pawned merchandise is identified as stolen. That's because customers must provide positive identification and a complete description of the merchandise. This information is then regularly transmitted to law enforcement, which dramatically decreases the likelihood that a thief would bring stolen merchandise to a pawn store". The NPA claim is supported by some industry study. In an inspection of 65,000 pawn transactions made in Dallas County, only 0.4 per cent of the items were identified as stolen (Scott 1992). Similar results are reported for Oklahoma (Wheat 1998) and in Florida for Collier and Palm Beach counties (Florida Committee on Criminal Justice 2000).

Conversely, other investigative reports - narrowly focusing on the criminal histories of the most frequent pawners - support the hypothesis that pawnshops deal with stolen property items. The first analysis of this type was conducted by Glover and Larrubia (1996). The reporters, after gathering all 70,000 pawn slips in Ft. Lauderdale, ranked pawnshops clients by the number of transactions made in that year. Thirty-nine of these top 50 pawners had criminal arrest records, nineteen of which were for burglary, theft, or related offenses.<sup>7</sup> Fass and Francis (2005) used a similar approach to analyze a database of all pawn transactions recorded by the Dallas Police Department (DPD) during the six-year period from January 1, 1991, through December 31, 1996.<sup>8</sup> The evidence from this analysis is startling. The 14,500 people pawning 30 times or more during the period were responsible of the 24 per cent of total loan value. These frequent pawners "...were two to three times more likely to have been convicted for theft, larceny, burglary, or robbery than those who pawned once or twice". Moreover "...nearly 65% of the 1,100 individuals within the group who pawned more than one hundred times had arrest records, more than half of them for some kind of

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<sup>7</sup>In a subsequent study Wallace (1997) describes how pawnshops may enable a few highly motivated criminals to commit many offenses. For example, an unemployed man visited a single pawnshop 38 times in less than two months and pawned, among other items, thirteen women's rings, ten men's rings, eleven necklaces, nine cameras, six watches, three VCRs, and two televisions. The day after his last visit to the pawnshop, the man was arrested for burglary. Another police survey of frequent pawners produced like findings in Portland, Oregon. 90 per cent of these pawners were chronic drug users with long criminal records, (Hammond 1997).

<sup>8</sup>Each transaction shows a pawn ticket number, a pawner identification number, shop identification number, transaction date, and classification code for items pawned.

stealing”.<sup>9</sup>

Wright and Decker (1994) interviewing burglars in the St. Louis area, describe different mechanisms through which pawnshops may be used to quickly convert stolen goods into cash. First, even if the burglar must provide his name, address, and a form of identification, rarely jurisdictions make full use of this information. Moreover, these requirements can be easily deceived. The burglar may provide false information (Glover and Larrubia, 1996) or use false identification when needed. Alternatively, some burglars reported persuading friends to pawn the items for them, reducing the likelihood that the pawnbroker would not accept the item from a suspicious client (Wright and Decker, 1994). Finally, two important aspects seem to support the hypothesis that pawnshops might be used by burglars as a channel for getting rid of the stolen property. First of all, given that the majority of stolen goods lack of a unique identifier, their recognition might be extremely difficult even for the victim itself. Secondly, jewelry such as rings, bracelets and necklaces can be easily melted down, transforming forever stolen items into an unrecognizable bar of precious metal (Sutton, 2010). We will discuss this second point in the section of the paper related to the gold price’s response.

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<sup>9</sup>Within the sample of the top 100 pawners, 83 individuals had arrest records. “Of these, 58 had accumulated 300 convictions for property as well as other offenses, or an average of 5.2 arrests per individual. Most property crime arrests, 74 per cent, were for theft, 11 per cent for burglary of vehicles, 7 per cent for burglary of homes or businesses, 5 per cent for robbery, and the rest for forgery and car theft. Other infractions mainly involved drug possession (23 per cent) or driving without a license (23 per cent)”. A similar analysis, conducted by Comeau and Klofas (2012) for the city of Rochester, NY shows similar evidence.

### 3 Data and Empirical Analysis

#### *Data*

This paper focuses on a balanced panel of 2176 US Counties, (70% of all the counties in the United States), in 50 States from 1997 to 2010. The final dataset is obtained by merging information from several sources. Data on criminal offenses is taken from the National Archive of Criminal Justice Data.<sup>10</sup> Eight different type of crimes are reported: larceny, burglary, robbery, motor-vehicle theft, murder, aggravated assault, rape, arson.<sup>11</sup> Our analysis needs a clear distinction between the first three different crimes. The FBI's Uniform Crime Reporting (UCR) Program defines *larceny* as the unlawful taking, carrying, leading, or riding away of property from the possession or constructive possession of another.<sup>12</sup> *Burglary* instead is defined as the unlawful entry of a structure to commit a felony or theft. Finally, *robbery* is the taking or attempting to take anything of value from the care, custody, or control of a person or persons by force or threat of force or violence and/or by putting the victim in fear.<sup>13</sup> Data on our variable of interest - the total number of pawnshops by county per year - is obtained by Infogroup Academic, a US private company.<sup>14</sup> Figure 1 shows the geographic distribution of the number of pawnshops in 1997, the first year in our analysis.<sup>15</sup>

Figure 1:

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<sup>10</sup>Data is freely downloadable at : [http://www.icpsr.umich.edu/icpsrweb/content/NACJD/guides/ucr.html#desc\\_cl](http://www.icpsr.umich.edu/icpsrweb/content/NACJD/guides/ucr.html#desc_cl).

<sup>11</sup>County-level files are created by NACJD based on agency records in a file obtained from the FBI that also provides aggregated county totals. NACJD imputes missing data and then aggregates the data to the county-level. Specific information about the data, including the FBI definition of the eight types of crime, can be found in the data appendix.

<sup>12</sup>Examples are thefts of bicycles, motor vehicle parts and accessories, shoplifting, pocket-picking, or the stealing of any property or article that is not taken by force and violence or by fraud. Attempted larcenies are included. Embezzlement, confidence games, forgery, check fraud, etc., are excluded

<sup>13</sup>More information are available at the following web page: <http://www2.fbi.gov/ucr/handbook/ucrhandbook04.pdf>.

<sup>14</sup>More informations available at <http://lp.infogroup.com/academic>. Infogroup provided me with the overall number of pawnshops by county, per year. The data gathering process follows a six step procedure. In the compilation phase, data is taken directly from different sources such as: Government, public company filings, Utility Information, NCOA, Tourism Directories, web compilation and RSS Feeds etc... The second step in the process is the address standardization process followed by a phone verification phase with 40 millions call made per year. The last three phases include a standardization of elements and a duplicate removal, an enhanced content and a final quality check.

<sup>15</sup>In our sample we can observe an average of 9800 pawnshops per year. These numbers are corroborated by a other studies. See - for example - Fellowees and Mabanta (2008), Shackman and Tenney (2006).

Table 1 panel A shows an almost perfect balance of the panel for the 14 years considered in the analysis. This balance allows for an estimation free from compositional concerns. Panel B describes the crime - related summary statistics, expressed by county and normalized per 100,000 people. On average there are 5.87 pawnshops per county, with a standard deviation of 6.32. Within the category of “theft” crimes, larceny is the most common crime, followed by burglary and motor - vehicle theft.<sup>16</sup> Robbery, probably due to its violent nature, it is the least frequent “theft” crime. On average, all violent crimes and arson happen less frequently than theft crimes, with the lowest reported crime being murder, with an average of 3.62 and a standard deviation of 5.33.

Table 1:

Table 1 panel C shows the summary statistics for all the wide set of county socioeconomic controls used in our analysis.<sup>17</sup> From the US Census Bureau we have gathered data on income, poverty, population, ethnic and racial composition of the county, density, number of commercial banks and savings institutions and amount of deposits. Data on labour condition (unemployment, number of social insurance recipients and social security average monthly payment) is obtained from the Bureau of Labor Statistics-Current Population Survey. Data on the number of sworn police officers and civilian employees<sup>18</sup> is obtained from the Department of Justice-Federal Bureau of Investigation.

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<sup>16</sup>In the FBI’s Uniform Crime Reporting (UCR) Program, property crime includes the offenses of burglary, larceny-theft, motor vehicle theft, and arson. The object of the theft-type offenses is the taking of money or property, but there is no force or threat of force against the victims. The property crime category includes arson because the offense involves the destruction of property; however, arson victims may be subjected to force. Because of limited participation and varying collection procedures by local law enforcement agencies, only limited data are available for arson. In the FBI’s Uniform Crime Reporting (UCR) Program, violent crime is composed of four offenses: murder and non negligent manslaughter, forcible rape, robbery, and aggravated assault. Violent crimes are defined in the UCR Program as those offenses which involve force or threat of force.

<sup>17</sup>The majority of information is gathered through the following web site: <http://censtats.census.gov/usa/usa.shtml>.

<sup>18</sup>Sworn police officers are law enforcement employees with arrest powers. Civilian employees include personnel employed by each local agency who do not have arrest powers and include job classifications such as clerks, radio dispatchers, meter maids, stenographers and accountants

## *Empirical Analysis*

In the the empirical analysis we estimate the following OLS equation:

$$y_{i,s,t} = \alpha_i + \gamma_t + \mu_{s,t} + X'_{i,s,t}\beta_0 + \#paw_{i,s,t}\beta_1 + \epsilon_{i,s,t}$$

where  $i$  indicates the county,  $s$  the state and  $t$  the year. The outcome of interest is the number of reported crimes by county per year. Our coefficient of interest is  $\beta_1$ , the effect of pawnshops on crime. Both the number of crimes and the number of pawnshops are expressed in per capita terms. To allow for serial correlation of the error term within county, we cluster standard errors at the county level.

Our identification strategy heavily relies on the properties of the panel. This analysis exploits within country variation overtime by including country fixed effect  $\alpha_i$  that controls for the presence of time invariant unobserved heterogeneity that might be correlated both to the rise of pawnshops and crime in the county. We also include year fixed effects  $\gamma_t$  and state linear trends  $\mu_{s,t}$  to control for nationwide and state specific confounding shocks. Another important factor in our analysis is the introduction of the vector  $X'_{i,s,t}$ , a rich set of county (time - varying) socio - economic controls. The clear attempt is to shut down possible endogeneity concerns due to the omission of county - time varying unobservables, possibly related to the changes in the number of pawnshops and crime in the county. In the baseline specification we include a rich set of controls such as income per capita, percentage of people below the poverty line, percentage of unemployment, the number of social security recipients and the average monthly payment per subsidy. Given the type of credit service provided by pawnshops, an important potential confounding factor that we control for is the number of commercial banks and saving institutions in the county. In fact, together with the amount of banking and saving deposits, these controls capture time varying confounding unobservables, both related to the financial penetration in the county and the relative presence of crime. Following the literature, we also add the number of sworn police officers and civilian employees,<sup>19</sup> the population

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<sup>19</sup>In the baseline specification we include sworn police officers and civilian employees at the state level in the year (t-1), due to some concern related to the possibility of controlling for a potential outcome. Estimates are essentially unaffected if we control for total police officers at the county level in year (t)

density and the racial/ethnic composition.<sup>20</sup>

Table 2 shows the evolution of  $\beta_1$  both for the aggregated measure of theft crimes (obtained by summing up larceny, burglary, robbery and motor vehicle theft) and for the other crimes (murder, aggravated assault, rape, arson). The general decreasing pattern of the coefficient of interest indicates the importance of adding fixed effects (we include county FE, year FE and state linear trends) and all the described socioeconomic controls.<sup>21</sup> Column 5 and 10 reports our baseline specification with the inclusion of all the fixed effects and all the socio - economic controls. We observe a positive coefficient of 6.226, significant at the 1% level, only for theft crimes while no significant effect of pawnshops on other crimes is detected (column 10).

Table 2:

Table 3 shows the coefficient of interest, always obtained through the baseline specification with all fixed effects and all controls, for the 8 different crimes.

Table 3:

Interestingly, we detect a positive and significant effect only on larcenies and burglaries.<sup>22</sup> The coefficient of pawnshops on larcenies is 4.429 and it is significant at the 1% level, while the coefficient on burglaries is 1.537 and it is again significant at the 1% level. No effect is detected for the crimes of robbery, motor - vehicle theft and for all other crimes.

## Discussion of the Results and Selection on Unobservables

Given that the analysis exploits the within county variation, a major econometric concern is related to the omission of some significant - time varying - confounding unobservables. Nevertheless, there are different reasons to believe that this is not likely to be the case. First of all, we observe

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<sup>20</sup>The racial origin is defined according to the following four categories: White, Black, Asian and Indian American. Moreover each race is divided in Hispanic or Not Hispanic ethnic origin.

<sup>21</sup>Results would be unchanged if we were using state FE \* year FE instead of state linear trends.

<sup>22</sup>We use a linear specification, due to the presence of more than 20% of “measured zeros” for pawnshops and the different amount of zeros across different crimes. Nevertheless, estimating a log-log regression gives the same qualitative results. The estimated elasticity for larceny is 1.5, while for burglary is .83. All other crimes are unaffected. Results from this specification are available upon request.

a strong positive effect *only* on larcenies and burglaries. Larceny is the most generic (and most frequent) type of theft. It includes shoplifting, pocket picking, purse snatching, theft of objects from motor vehicles, theft of bicycles and theft of items from buildings in which the offender has legal access. Burglaries instead, are essentially larcenies aggravated by the unlawful entry in a private property. These two types of crimes seem to have in common a certain degree of premeditation that - plausibly - could be encouraged by the presence of pawnshops in the county. The meaning of the analysis is confirmed by implicit falsification tests that we implement by running regression on crimes that are not supposed to be directly affected by the change in the number of pawnshops. Probably, the most meaningful falsification test is on motors and vehicles thefts, because generally these products cannot be sold to pawnshops. Reassuringly, we do not detect any effect on this crime as well on robbery, (the most violent theft crime that will turn up to be significant in the second part of the paper), and on all the other crimes.

Nevertheless, given the lack of random assignment of pawnshops to counties we can not deny the possibility that the analysis is omitting some crucial time variant unobservables related to the change in the number of pawnshops and to the change in the number of larcenies and burglaries. But, how big should be this bias in order to completely invalidate our results? The Altonji et al. (2005) method of assessing selection on unobservables using selection on observables is pursued in this context. The intuition behind the test is to measure how strong the selection on unobservables must be relative to the selection on observables in order to explain away the effects. This strategy relies on a comparison between a regression run with potentially confounding factors controlled for, and one without.<sup>23</sup> The rule of thumb outlined in Nunn and Wantchekon (2012) is that any ratio above 1 is acceptable, as it indicates that selection on unobservables must be larger than selection on observables in order to invalidate our results. In our case the Altonjii ratio is above 10 for theft crimes<sup>24</sup>, finally suggesting that there is little concern that selection on unobservables is totally driving our results.

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<sup>23</sup>Let  $c$  denote the estimate with controls, and  $nc$  denote the estimate without controls. The Altonji ratio is  $|\frac{\beta_c}{\beta_{nc} - \beta_c}|$ .

<sup>24</sup>Notice that the inclusion of all the controls decreases the coefficient only from 6.848 to 6.226.



## Simultaneity

A second econometric concern that might prevent the identification of a causal effect is the simultaneity between the change in the number of pawnshops and the within county change in the number of larcenies and burglaries. The simultaneous relationships between pawnshops and crime might arise for different reasons. In the most naive way, crime can be the cause (and not the result) of the rise in the number of pawnshops. Once again, we find hard to believe that this “change of causality” might explain the all story, mainly because we detect the effect only on two theft crimes. If, for example, organized crime was creating pawnshops “ad-hoc” , we would plausibly expect to observe some positive effect also on other - more violent - crimes.

Nevertheless, the pawnbroker’s choice of locating the business in a particular county might depend on the contemporaneous level of burglaries and larcenies, (or on the previous level given the autocorrelation of crime). In one extreme case, pawnbrokers might decide to avoid to locate their shop in counties with high level of property crimes. If that were the case, our  $\beta_1$  coefficient would suffer - if anything - from a downward bias. In the opposite case, pawnbrokers might decide to locate their shop in counties with an high level of larcenies and burglaries. This phenomenon, while potentially inflating the effect of pawnshops on crime and hence undermining the precision of our estimate, it would not make the analysis less interesting. In fact, what would be the logic of deliberately locating a pawnshop in a high crime community? Honest pawnbrokers would expect less honest customers, (ceteris paribus, relatively more potential clients would have been victim of a theft). Moreover, this particular choice might endanger the same pawnbroker, increasing the likelihood of him being a victim of a robbery. In synthesis, if the coefficient is inflated by the systematic phenomenon of locating a pawnshop in high-risk communities, we find hard to believe that this is not due the willingness of consciously allowing for the opportunity of receiving stolen goods. Table 4 investigates this aspect focusing on the lagged structure of the number of pawnshops.

Table 4:

For the case of larceny, including in the regression the number of pawnshops in  $t - 1$  determines

a loss of significance for both the coefficients, that shows up again in the specification where we include the number of pawnshops in the county up to  $t - 2$ . For the case of burglaries, we observe a similar pattern that shows how the introduction of the number of pawnshops at  $t - 1$  and  $t - 2$  dominates the effect of the contemporaneous number of pawnshops. These results seem to suggest that what is driving the results is the previous number of pawnshops in the county rather than the contemporaneous one. The simultaneity between pawnshops and crime will be totally addressed in the last section of the paper where we will rely on the exogeneity of the interaction between the gold price and the initial allocation of pawnshops (fixed at the first year of the sample).

### Robustness Checks

Table 5 shows the set of robustness checks for the crimes of larceny (Panel A) and burglary (Panel B).

Table 5:

Column 1 shows the coefficient when we cluster standard errors at the state level, while column 2 reports the coefficient when we perform double clustering at the county - year level (taking into account both autocorrelation of the error structure within county and the spatial correlation in each year across counties). In column 3 we show the results by averaging the regression by the coverage indicator reported by the agency, a measure of the reliability of the information available to the researcher.<sup>25</sup> Finally, we perform two tests to check the sensitivity to outliers. In column 4 we eliminate from the sample the counties in the top 1% of the pawnshops' per capita distribution. In column 5 we drop from the sample of the analysis the counties in the top 1% of the population distribution. The stability of the coefficient is shown in all different specifications.

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<sup>25</sup>The Coverage Indicator variable represents the proportion of county data that is not imputed for a given year. The indicator ranges from 100, indicating that all ORIs in the county reported for 12 months in the year, to 0, indicating that all data in the county are based on estimates, not reported data. The Coverage Indicator is calculated as follows:

$$CI_x = (1 - (\text{sum}((ORI_{ipop}/\text{countypop})((12 - \text{monthsreported}/12)))) * 100$$

where

CI = Coverage Indicator

x = county

i = agency within county

## Heterogeneity in the Results

### Geographical Spillovers

The empirical analysis has been focused so far on understanding the effect of the within county change in the number of pawnshops on the changes of theft crimes *in the same county*. This section of the paper extends the analysis focusing on the possible geographical spillover effects that the presence of pawnshops *in one county* might have on the proliferation of theft crimes *in other counties*.

We do so by constructing two new variables 1) a measure of the number pawnshops in the bordering counties where crime is measured; 2) a measure of the number of pawnshops in the state of the county where crime is measured. To avoid collinearity issues and difficulty of interpretation, these two variables do not include the number of pawnshops in the county where crime is actually measured.

However, before proceeding to the analysis of the results, two important caveats to the analysis should be emphasized. First of all, given that our final dataset includes data on 2176 counties (70 % of the US total) and not all the counties of the United States, we observe these two measures with error. This inevitably leads to a downward bias in the estimated coefficients. A more serious econometric concern is instead related to the fixed effect structure of our estimating equation. The inclusion of two independent variables that belong to a different geographical unit of the dependent variable worsen the reliability of the estimate of these two coefficients, given that we are increasing the likelihood of omitting some time variant factor related - for example - both to the variation of crime in the county and the variation of the number of pawnshops close to its borders.

With these two caveats in mind we estimate the following OLS regression:

$$y_{i,s,t} = \alpha_i + \gamma_t + \mu_{s,t} + X'_{i,s,t}\beta_0 + \#paw_{i,s,t}\beta_1 + \#pawbord_{i,s,t}\beta_2 + \#pawstate_{i,s,t}\beta_3 + \epsilon_{i,s,t}$$

where *pawbord* is the number of pawnshops per capita in county *i* bordering' counties and *pawstate* is the number of pawnshops per capita in the state of county *i*. The number of pawnshops in county

i is excluded from both regressors. Table 6 shows the results of this specification.

Table 6:

The inclusion of these two new variables strengthens the effect of the number of pawnshops on the number of larcenies and burglaries in the same county (first row of table 6). Interestingly, we do not observe any effect on crime of the number of pawnshops in the neighboring counties but we find a large and significant coefficient of the number of pawnshops at the state level only for burglary (11.97 significant at the 5% level). The state level coefficients are suspiciously high also for larcenies and robberies but not significant.

Overall, these results strengthen the idea that the presence of pawnshops is affecting theft crimes through the “market for stolen goods” hypothesis. Moreover, the results partially corroborate the findings of different criminologists that - from interviews with burglars - describe how the presence of a market of stolen goods might strongly affect the choice of whether and where committing a theft. In fact, burglars know exactly that the probability of being caught increase while the stolen property is in possession and - for this reason - prefer to commit a theft at a maximum distance of half an hour by car from the resale point, (Sutton, 2010). Nevertheless, our results seem also to capture some strong spillover effect that shows how burglars might also take the risk of traveling far from the crime scene, plausibly to avoid suspects about the origin of the item or to outdistance the good from the place where it was stolen.

### **Usury Laws & Theft Crimes?**

This section of the paper attempts to investigate whether the legislation affecting pawnshops might be a potential driver in the conversion of these shops into a market for stolen goods. While this business is regulated by a variety of laws, we focus on the possible effect that states’ usury laws - by affecting the level of profitability of this business and plausibly the degree of competition in the

market - might have on the diffusion of theft crimes.<sup>26</sup> In particular, each state can decide to set a maximum interest rate that the pawnbroker can charge to the client. Table 7 shows the maximum monthly interest rate that pawnbrokers can apply to their clients, by state as of 2011.<sup>27</sup>

Table 7:

The maximum interest rate is 25% a month while the minimum is 2%. Arkansas, Colorado, Idaho, Iowa, Maryland, Nebraska, New Hampshire, North Dakota, South Dakota, West Virginia does not have a maximum interest rate regulated at the state level.

But, why these laws could affect the proliferation of theft crimes though the presence of pawnshops? From one side, a more liberal legislation (embedded in states with an high interest rate allowed), by increasing pawnbrokers' expected profits in the "legal" sector, might decrease the willingness to accept goods from uncertain origin. However, different study on the sector have shown that these fee ceilings are positively related both to the number of pawnshops per capita and to the level of competition in this market.<sup>28</sup> This competition effect might hence push pawnbrokers to be more willing to accept goods from uncertain origins. From the words of a pawnbroker: *"If he's coming in my store with a VCR, I'm not asking him where he got it. It's the police's job to find out if it's stolen, not mine. You don't ask where things come from. If you don't take those, the guy down the street will"* (Glover and Larrubia, 1996).

Table 8:

In panel A of table 8 we show the results from the parametric specification where the number

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<sup>26</sup>Pawnbrokers are governed by all of the major federal laws that apply to entities designed as financial institutions. The federal laws that regulate the pawn industry are Patriot Act, Truth in Lending Act, Equal Credit Opportunity Act, as well as Data Privacy and Safeguard of consumer information as part of the Federal Trade Commission (FTC) Rules. Pawn shops that deal in firearms are regulated by the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF). Pawn shops may also be Federal Firearms License holders. States have regulated the pawn industry for decades, and most pawnbrokers are licensed and regulated by local authorities as well. (NPA, 2014).

<sup>27</sup>One of the difficulties in gathering information about the state legislation is that our sample spans a period of 14 years. Nevertheless, other papers show very similar interest rates in other periods of our sample. See Shackman and Tenney (2006) or Pindus et al. (2010)

<sup>28</sup> See Caskey (1991), Shackman and Tenney (2006) and Carter and Skiba.

of property crimes is interacted with the maximum interest rate allowed by the state law. In panel B instead we create a dummy variable for the states whose interest rate is above the median and we interact it with the number of pawnshops. The direct effect of the two terms composing the interaction is controlled by the inclusion of both the number of pawnshops in the county and county fixed effect. Apart from this new interaction term, the specifications are identical to the baseline analysis of the paper. In both cases the table reports a positive and significant effect of the variable of interest on theft crimes (larceny, burglary and robbery) and nothing else on other crimes.

Importantly, we do not want to overemphasize the meaning of this result for two main reasons. First of all, the empirical strategy used does not allow for a clean identification of the effect of time invariant usury laws. Moreover, the presence of other possible confounding mechanisms might play a key role in this context. As an example, the maximum interest rate in the state might be correlated to the level of monitoring of pawnshops' activities made by police. Unfortunately, data that could help to shed some light on this phenomenon are - at the moment - unavailable to the researcher. Accounting for this caveat, this finding suggests the importance of analyzing, in future well thought empirical exercise, the role that competition across brokers might have in turning pawnshops into a potential market of stolen goods.

## 4 The Response to Gold Price: Evidence From a Quasi Natural Experiment

In this section of the paper we will address the endogeneity of pawnshops to crime exploiting the exogenous rise in the price of gold as a quasi natural experiment. Before going to the details of the research design we will carefully describe the mechanism behind the importance of gold in our context. Then we will move to the description of the identification strategy and to the analysis of the results.

### The Mechanism Behind the Importance of Gold Price

Gold has always been the major determinant of pawnbrokers' profit function.<sup>29</sup> Bos et al. (2012) describe how in the US 34% of men and 63% of women used jewelry as pledge in pawn transactions, with gold representing roughly 80 percent of the value of all pledges.<sup>30</sup> Table 9, borrowed from Carter and Skiba (2012), reports the number of loans for each collateral category, the percentage of observations, and the average amount and standard deviation of the items pawned for each category. The sample of observations is from a pawnshop lender in Texas between 1997 and 2002 .

Table 9:

Forty-nine percent of the pawnshop loans in the dataset are collateralized with jewelry, with over half of the items in the jewelry category consisting of rings, including both men's and women's class and wedding rings. The next most popular category of pledges is televisions and electronics, including satellite dishes, stereos, and CD players. Individuals also commonly pawn tools, house-

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<sup>29</sup>The importance of gold in pawnbrokers' activities is reflected in its symbol: three spheres suspended from a bar. The three sphere symbol is attributed to the Medici family of Florence, Italy, owing to its symbolic meaning of Lombard. This refers to the Italian province of Lombardy, where pawn shop banking originated under the name of Lombard banking. The three golden spheres were originally a symbol medieval Lombard merchants hung in front of their houses, and not the arms of the Medici family. It has been conjectured that the golden spheres were originally three flat yellow effigies of byzants, or gold coins, laid heraldically upon a sable field, but that they were converted into spheres to better attract attention.

<sup>30</sup>Similar evidence is found in Comeau et al. (2011).

hold items such as small appliances, sporting equipment, guns, musical instruments, and camera equipment.

But, what makes jewelry and - in particular - gold so profitable in pawnbrokers' activities? Along side the fact that gold is one of the most precious metal, a big part of the pawnbrokers' profits comes from the process of melting down the gold received by their clients through the "refinement" process. In fact, 90% of the times pawnbrokers sell their jewelry to a company that is known as a 'refiner.' A refiner will take all of the rings, necklaces, bracelets and other items and melt them. Truly professional outfits will then begin to remove impurities from the metals until they get something close to pure gold.<sup>31</sup> Hence, stolen items, easily transformed into an unrecognizable bar of precious metal, can disappear forever from the second - hand market (Sutton, 2010), ending in the Bullion Market or in similar places.<sup>32</sup> This dynamic might hence potentially facilitate the burglars' (or the pawnbrokers') attempt of safely getting rid of the stolen goods.

This strong demand for jewelry and gold in particular might influence criminal behavior. In fact, as in any other type of economic activity, the exact knowledge of the demand for stolen goods affects the type of items that are actually stolen. Even if most thieves have an ever-changing hierarchy of items that they prefer to steal (Sutton, 2010), crime statistics and victim surveys describe how the most commonly stolen items during burglaries are cash, jewelry and consumer electrical.<sup>33</sup> Table 10 is borrowed from Burrell and Wellsmith (2010).

Table 10:

In the period of our study, gold price raised of about 37% until 2005 and then experienced an impressive increase of almost 200% in the last five years of the sample.<sup>34</sup>

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<sup>31</sup>Refiners typically have minimum quantities of metals that they will accept and work with. They normally work with several pounds of the material, so the direct link between clients and refiner can rarely happen. Information about this argument can be found online from a lot of different sources. As an example: <http://www.pawn-nerd.com/where-do-pawn-shops-sell-their-gold-and-silver/> or <http://www.economist.com/news/finance-and-economics/21591230-falling-price-gold-hurting-pawnbroking-business-hock-and-sinker>.

<sup>32</sup>The Bullion Market is a forum through which buyers and sellers trade pure gold and silver. The bullion market is open 24 hours a day and is primarily an over-the-counter market, with most trading based in London. The bullion market has a high turnover rate and most transactions are conducted electronically or by phone. Gold and silver derive their value from their industrial and commercial uses; they can also act as a hedge against inflation.

<sup>33</sup>Similar evidence is found in Fitzgerald and Poynton (2010), Sorensen (2011) and Walters et al. (2013).

<sup>34</sup>I use as unit of measurement the price of gold in US dollars (averaged over the entire year) per troy ounce. Data are freely downloadable at the following website: <http://www.gold.org>.



Figure 2:

## Research Design and Identification Strategy

Now that we have described the dependence of pawnbrokers' profits from the demand of gold, we analyze in detail the research design that we use to detect the causal effect of pawnshops on crime. Specifically, in this section of the paper we try to answer to the following question: *does the exogenous increase in the expected resale value of gold cause relatively more theft crimes in counties with an higher initial concentration of pawnshops?* The underlying hypothesis is that the exogenous shift in the resale value of the stolen property, exogenously determined by changes in the macroeconomic conditions, while potentially increasing burglars' expected value of committing a theft uniformly in all the counties, might cause relatively more theft crimes in counties with a higher concentration of potentially interested markets. More in details we estimate the following ols equation:

$$y_{i,t} = \alpha_i + \gamma_t + X'_{i,t}\beta_0 + [\#pawns_hops_{i,t=1997} * goldprice_t] \beta_2 + \epsilon_{i,t}$$

Where the coefficient of interest is  $\beta_2$ , the effect of the interaction between the initial concentration of the number of pawnshops per capita fixed in the first year of our sample (1997) and the gold price at time  $t$ .

The key requirement for our exclusion restriction to hold is the lack of correlation between the error and the interaction term, once we condition on the fixed effect structure of the estimates and on all controls. For this reason, as in the first part of the paper, we use a within county specification including county fixed effect. Moreover a key role in this specification is played by the inclusion of the year FE, that partial out from the estimate the direct and uniform effect that the rise in gold price might have on the growth of theft crimes. Moreover, while arguably the gold price is related to the stability of the global economic conditions, our specification uses a wide set of controls related to the conditions of the local economy. Furthermore, in order to control for the presence of other

possible confounding factors, we add an interaction between each control in year 1997 and the price of gold.<sup>35</sup>

Another possible concern could be related the endogeneity of the initial allocation of the number of pawnshops in the county and the within county variations of the number of crimes. To minimize this concern we add another term composed by the interaction between the number of pawnshops in 1997 and annual linear trends.<sup>36</sup> Finally, this specification totally addresses the simultaneity concerns between pawnshops and crime expressed in the first part of the paper. Table 11 reports the results of this analysis.

Table 11:

Using this specification, the only significant coefficient is related to the crime of burglary, with a coefficient of 0.339 significant at the 10% level. To put this result into perspective, a one standard deviation increase in gold price generates a 0.05 standard deviation increase the effect of the initial allocations of pawnshops on burglaries. No effect is detected on all other crimes. In Table 12 we use a similar specifications where we group year fixed effects. We do so in order to avoid to overkill the variance of the variable of interest, given the positive trend of gold price for almost all the periods of the sample.<sup>37</sup> We believe that this change of specification, while not altering the quality of the identification strategy, allows for a more flexible estimation of the variable of interest.

Table 12:

In this case the results of burglaries is 0.460 significant at the 5% level and the coefficient for robberies is 0.05 significant at the 1% level. In both cases a one standard deviation in the price of gold increases the effect of the initial allocations of pawnshops in 1997 of about 0.05 standard deviations. Qualitatively, as in the first part of the paper, this results continue to strengthen the

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<sup>35</sup> Results are qualitatively unchanged if we allow all the the controls to vary with the gold price.

<sup>36</sup>Results are almost identical if we include the interaction between pawnshops in year 1997 and quadratic trends.

<sup>37</sup>In this specification we group year FE, one dummy every three years (two years for the last period) and we include gold price (given that is not collinear anymore with year FE)

idea that pawnshops can cause property crimes though the market of stolen goods hypothesis, given that we observe a positive effect on burglaries and robberies and no effect on all other crimes.

### **Heterogeneity in the Results: Density**

Finally, we try to analyze whether the intensity of this causal mechanism might depend on the outside environment where the pawnshop is located. Specifically, the anonymity and the dispersion of a big city may amplify the likelihood of the pawnshop being a convenient destination for stolen goods. In rural and less densely populated areas instead, the pawnshop may be far from the crime scene. Moreover, in these quiet and remote areas criminal activity is generally less frequent, and residents are more willing to defend the interests of the members of their communities. All these considerations could undermine the burglars' incentives of trying to use the local pawnshops to sell stolen goods (and hence to commit a burglary in its proximity). For this reason, we investigate for the possible presence of an heterogeneous effect of pawnshops on property crimes, dividing the sample in "low" and "high" density counties.

Table 13:

The table shows results in line with the hypothesis that population density can be an important factor that determines theft crimes. For the case of burglary, the coefficient is significant in both samples but with a bigger effect in more densely populated counties. For the crime of robbery instead the coefficient is significant at the 1% level only in the sample of dense populated counties.

## **5 Concluding Remarks**

This paper has investigated the hypothesis that the availability of a market for stolen goods can be a key determinant in the choice of the criminal of whether and where committing a theft. In

particular, motivated by the richness of anecdotal evidence, I have looked at this issue through the lens of pawnshops, a business that has long been suspected of illicit trade. The endogeneity of pawnshops to crime has been addressed in multiple ways.

In the first part of the paper we have used the panel properties of our data to strengthen the hypothesis that pawnshops are indeed a potential market for stolen goods. Results confirm this hypothesis given that the contemporaneous number of pawnshops is a strong and significant predictor of the crimes of larceny and burglary. The findings are robust to extensive robustness checks, the clustering of standard errors at a different level, the sensitivity to outliers, averaging the regression by a measure of the quality of the information available to the researcher and using a log - log model. The mechanism behind the findings is corroborated by numerous falsification tests on other crimes that disprove the possibility that pawnshops might affect crime through channels other than the transaction of stolen goods. Moreover we have attempted to enter in the “black -box” of this mechanism by analyzing possible geographical spillover effects and the role that states’ usury laws might have in turning pawnshops into a market for stolen goods. While the empirical setup does not allow a clean identification of these two potential effects, we strongly believe that is a promising venue for future research.

In the second part of the paper we have used the rise in the gold price as a quasi natural experiment to detect causality. In particular, the identification strategy relied on the exogeneity of the interaction between the price of gold, constantly demanded by pawnbrokers in the form of jewels that are usually melted down to be transformed into a bar of the precious metal, and the initial allocation of the number of pawnshops in the county. Conservative estimates show that one standard deviation increase in the gold price generates a 0.05 standard deviation increase in the effect of the initial allocations of pawnshops on the change of burglaries and robberies. Also in this case results are robust to a wide set of robustness checks and are corroborated by the presence of falsification tests on crimes that should not be affected by the presence of pawnshops.

We are aware that one of the main limitations of this study is the absence of a robust welfare analysis related to the possible opening or closing of a pawnshop in a particular county, mainly due to data unavailability on the financial service provided by these businesses. Nevertheless, one

of the fundamental merits of this paper is to uncover a precise and previously undetected causal mechanism, showing that the presence of a potential market for stolen goods can indeed cause theft crimes. We believe that this has already the power to inform policy. A closer monitoring of pawnshops from local authorities, (as well as of other potential markets for crime not considered in this paper), in fact seems to be warranted. This improved monitoring could plausibly reduce the illegal demand for stolen goods and, consequently, the number of theft crimes in pawnshops' surrounding area.

The main and, we believe, most relevant contribution of this paper is a first step towards a systematic empirical investigation of the role of the market for stolen goods for theft crimes, an issue that has not been properly explored in the existing literature on the determinants of crime. The findings of the paper suggests interesting directions for future research.

## References

1. Altonji, Joseph G., Todd E. Elder, and Christopher R. Taber, "Selection on Observed and Unobserved Variables: Assessing the Effectiveness of Catholic Schools," *Journal of Political Economy*, February 2005, 113 (1), 151 -184.
2. Avery, Robert B., and Katherine Samolyk. "Payday loans versus pawnshops: The effects of loan fee limits on household use." *Federal Reserve System*, Working Paper (2011).
3. Bayer, Patrick, Randi Hjalmarsson, and David Pozen, "Building Criminal Capital Behind Bars: Peer Effects in in Juvenile Corrections," *Quarterly Journal of Economics*, February 2009, 124 (1).
4. Becker, Gary S., "Crime and Punishment: An Economic Approach," *Journal of Political Economy*, March/April 1968, 76 (2), 169–217.
5. Bianchi, Milo, Paolo Buonanno, and Paolo Pinotti. "Do immigrants cause crime?." *Journal of the European Economic Association* 10.6 (2012): 1318-1347.
6. Bhuller, Manudeep, Havnes, Tarjei , Leuven, Tarjei and Mogstad, Magne, "Broadband Internet: An Information Superhighway to Sex Crime?", *Review of Economic Studies*, 80, 1237-1266, 2013.
7. Case, Anne C. and Lawrence F. Katz, "The Company You Keep: The Effects of Family and Neighborhood on Disadvantaged Youths," NBER Working Paper #3705, 1991.
8. Caskey, John P. "Fringe banking and the rise of payday lending." *Credit markets for the poor*, 17 (2005): 18-19.
9. Comeau, Michelle, Klofas, John "Analysis of 2011 Rochester City Pawn Shop Transactions: The Year in Review", Center for Public Safety Initiatives, Working Paper, 2012.
10. Dahl, Gordon, and Stefano DellaVigna. "Does movie violence increase violent crime?." *The Quarterly Journal of Economics* 124.2 (2009): 677-734.

11. Di Tella, Rafael and Ernesto Schargrotsky, "Do Police Reduce Crime? Estimates Using the Allocation of Police Forces After a Terrorist Attack," *American Economic Review*, March 2004, 94 (1), 115–133.
12. Donohue, John J., III and Steven J. Levitt, "The Impact of Legalized Abortion on Crime," *Quarterly Journal of Economics*, May 2001, 116 (2), 379–420.
13. Draca, Mirko, Stephen Machin, and Robert Witt. "Panic on the streets of London: Police, crime, and the July 2005 terror attacks." *The American Economic Review* 101.5 (2011): 2157-2181.
14. Drago, Francesco, Roberto Galbiati, and Pietro Vertova, "The Deterrent Effects of Prison: Evidence from a Natural Experiment," *Journal of Political Economy*, 2009, 117 (2), 257–280.
15. Eeckhout, Jan, Nicola Persico, and Petra E. Todd. "A theory of optimal random crackdowns." *The American Economic Review* 100.3 (2010): 1104-1135.
16. Fass, Simon M., and Janice Francis. "Where have all the hot goods gone? The role of pawnshops." *Journal of Research in Crime and Delinquency* 41.2 (2004): 156-179.
17. Fellowes, Matthew, and Mia Mabanta. Banking on wealth: America's new retail banking infrastructure and its wealth-building potential. Brookings Institution, 2008.
18. Fitzgerald, Jacqueline, and Suzanne Poynton. "The changing nature of objects stolen in household burglaries." *Crime and Justice Statistics: Bureau Brief 62* (2011): 1-12.
19. Florida Committee on Criminal Justice. 2000. "A Review of Florida's Pawnbroking Law." The Florida Senate, Committee on Criminal Justice (Interim Project Report 2000-26). Washington, DC: Government Printing Office.
20. Gaviria, Alejandro and Steven Raphael, "School-Based Peer Effects and Juvenile Behavior," *Review of Economics and Statistics*, May 2001, 83 (2), 257–268
21. Glaeser, Edward L. and Bruce Sacerdote, "Why is There More Crime in Cities?," *Journal of Political Economy*, December 1999, 107 (2, Part 2), S225–S258

22. Glaeser, Edward, Bruce Sacerdote and Jose A. Scheinkman, "Crime and Social Interactions," *Quarterly Journal of Economics*, May 1996, 111 (2), 507–548.
23. Glover, S. and E. Larrubia. 1996, November 24. "A System in Hock: Quick Cash with Few Questions." South Florida Sun-Sentinel, p. 22A.
24. Grogger, Jeff, "The Effect of Arrests on the Employment and Earnings of Young Men," *Quarterly Journal of Economics*, February 1995, 110 (1), 51–72.
25. Grogger, Jeff, "Market Wages and Youth Crime," *Journal of Labor Economics*, October 1998, 16 (4), 756–791.
26. Hammond, B. 1997, December 3. "Pawnshops Link Addicts and Crime." The Oregonian, p. 5A.
27. Helland, Eric and Alex Tabarrok, "Does Three Strikes Deter: A Non-Parametric Investigation," *Journal of Human Resources*, Spring 2007, 42 (2), 309–330.
28. Jacob, Brian A. and Lars Lefgren, "Are Idle Hands the Devil's Workshop? Incapacitation, Concentration and Juvenile Crime," *American Economic Review*, December 2003, 93 (5), 1560–1577.
29. Katz, Lawrence F., Steven D. Levitt, and Ellen Shustorovich, "Prison Conditions, Capital Punishment and Deterrence," *American Law and Economics Review*, Fall 2003, 5 (2), 318–343.
30. Klick, Jonathan and Alexander Tabarrok, "Using Terror Alert Levels to Estimate the Effect of Police on Crime," *Journal of Law and Economics*, April 2005, 48.
31. Kling, Jeffrey R., "Incarceration Length, Employment, and Earnings," *American Economic Review*, June 2006, 96 (3), 863–876.
32. Kling, Jeffrey, Jens Ludwig, and Lawrence F. Katz, "Neighborhood Effects on Crime for Female and Male Youth: Evidence from a Randomized Housing Voucher Experiment," *Quarterly Journal of Economics*, February 2005, 120 (1), 87–130.



33. Kuziemko, Ilyana. Going off parole: How the elimination of discretionary prison release affects the social cost of crime. No. w13380. National Bureau of Economic Research, 2007.
34. Lee, David S. and Justin McCrary, "Crime, Punishment, and Myopia," NBER Working Paper # 11491, July 2005
35. Levitt, Steven D., "The Effect of Prison Population Size on Crime Rates: Evidence from Prison Overcrowding Litigation," *Quarterly Journal of Economics*, May 1996, 111 (2), 319–351.
36. Levitt, Steven D., "Using Electoral Cycles in Police Hiring to Estimate the Effect of Police on Crime," *American Economic Review*, June 1997, 87 (3), 270–290.
37. Levitt, Steven D., "Juvenile Crime and Punishment," *Journal of Political Economy*, December 1998, 106 (6), 1156–1185.
38. Levitt, Steven D., "Understanding Why Crime Fell in the 1990s: Four Factors that Explain the Decline and Six that Do Not," *Journal of Economic Perspectives*, Winter 2004, 18 (1), 163–190.
39. Lochner, Lance and Enrico Moretti, and Enrico Moretti, "The Effect of Education on Crime: Evidence from Prison Inmates, Arrests, and Self-Reports," *American Economic Review*, March 2004, 94 (1), 155–189.
40. Miles, Thomas J. "Markets for Stolen Property: Pawnshops and Crime", (unpublished dissertation chapter), 2007.
41. Nunn, Nathan and Leonard Wantchekon, "The Slave Trade and the Origins of Mistrust in Africa," *American Economic Review*, 2012, 101 (7), 3221 - 52.
42. Paige, Skiba , Marieke Bos, and Susan Carter. "The Pawn Industry and Its Customers: The United States and Europe." *Vanderbilt Law and Economics Research Paper*, 12-26 (2012).
43. Polinsky, A. Mitchell and Steven Shavell, "The Economic Theory of Public Enforcement of Law," *Journal of Economic Literature*, March 2000, 38 (1), 45–76.

44. Raphael, Steven and Rudolf Winter-Ebmer, "Identifying the Effect of Unemployment on Crime," *Journal of Law and Economics*, April 2001, 44 (1), 259–284.
45. Scott, D. 1992, June 26. "Pawnshops Multiply Despite Seedy Image: Big Chains Gobble Momand- Pops, Spawn Industry Transformation." *Dallas Business Journal*, pp. 1, 54-55.
46. Shackman, Joshua D., and Glen Tenney. "The Effects of Government Regulations on the Supply of Pawn Loans: Evidence from 51 Jurisdictions in the US." *Journal of Financial Services Research* 30.1 (2006): 69-91. APA
47. Silverman, Dan, "Street Crime and Street Culture," *International Economic Review*, August 2004, 45 (3), 761–786.
48. Sorensen, David WM. Rounding up Suspects in the Rise of Danish Burglary: A Statistical Analysis of the 2008/09 Increase in Residential Break-ins. Justitsministeriet, 2011.
49. Sutton, Michael. Stolen Goods Markets. US Department of Justice, Office of Community Oriented Policing Services, 2010.
50. Walters, Jennifer Hardison, Andrew Moore, M. Stat, Marcus Berzofsky, and Lynn Langton. "Household Burglary, 1994-2011."
51. Warner, Bill. "No Questions Asked: Sarasota Pawn Shop Businesses Charged in Sting Operation, Black-Market Fencing Easy Cash For Burglars & Armed Robbers." April 25, 2011.
52. Wellsmith, Melanie, and Amy Burrell. "The Influence of Purchase Price and Ownership Levels on Theft Targets The Example of Domestic Burglary." *British Journal of Criminology* 45.5 (2005): 741-764.
53. Western, Bruce, Jeffrey R. Kling, and David F. Weiman. "The labor market consequences of incarceration." *Crime & delinquency* 47.3 (2001): 410-427.
54. Wheat, W. J. 1998. "A Study on the Status of the Pawnbrokers Industry in the State of Oklahoma." *Consumer Finance Law Quarterly Report* 52:87-92.

55. Wright, Richard T. and Scott H. Decker. 1994. *Burglars on the Job: Streetlife and Residential Break-ins*. Boston: Northeastern University Press.

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**Table 1 Descriptive Statistics**

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**Panel A - Panel Structure**

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Number of Counties	2176		
Panel Period	1997 - 2010		
Year	Freq.	Per cent	Cum.
1997	2,175	7.14	7.14
1998	2,175	7.14	14.28
1999	2,174	7.14	21.42
2000	2,174	7.14	28.55
2001	2,174	7.14	35.69
2002	2,180	7.16	42.84
2003	2,175	7.14	49.98
2004	2,176	7.14	57.13
2005	2,176	7.14	64.27
2006	2,181	7.16	71.43
2007	2,176	7.14	78.57
2008	2,176	7.14	85.71
2009	2,176	7.14	92.86
2010	2,176	7.14	100

**Panel B - Pawnshops and Crime Statistics**

---

Variable	Obs	Mean	Std. Dev.	Min	Max
Pawnshops	30464	5.87	6.32	0	112.8541
Larcenies	30464	1721.88	1107.62	0	12072.79
Burglaries	30464	611.92	413.60	0	2959.852
Robberies	30464	49.37	72.74	0	822.3734
Motor - Vehicle Thefts	30464	178.18	180.18	0	2385.282
Murders	30464	3.62	5.33	0	128.8778
Rapes	30464	25.51	22.69	0	513.4788
Aggravated Assaults	30464	221.94	204.87	0	2676.221
Arsons	30464	16.95	20.59	0	604.2454
Total Enforcement	25083	143.75	116.65	1.727205	4141.032

**Panel C - Socioeconomic and Demographics**

---

Banks and Savings Institutions	30463	40.34	17.87	0	257.52
% Unemployment	30410	6.04	2.68	0.7	30.1
% Of People Below the Poverty Line	30464	0.14	0.06	0	0.50
Social Security Recipients	30464	19662.11	45986.32	0	1148135
Social Security Monthly Average Payment	30464	408.67	75.82	0	2457
Income per Capita	30422	27049.01	7816.2	8419	124742
Total Population	30464	121856.2	345971.3	2400	9554556
Density	30450	305.06	1965.87	0.18	67589.02
% White non Hispanic	29526	0.8	0.18	0.0201672	0.99
% White Hispanics	29526	0.06	0.11	0	0.97
% Black Hispanics	29526	0.002	0.004	0	0.13
% Black not Hispanics	29526	0.09	0.14	0	0.86
% Asians not Hispanics	29526	0.01	0.02	0	0.63
% Asians Hispanics	29526	0.0005	0.001	0	0.05
% American Indians Hispanics	29526	0.001	0.003	0	0.05
% American Indians not Hispanics	29526	0.01	0.06	0	0.88

Notes: the number of pawnshops all reported crimes, banks and savings institutions are normalized per 100.000 people.

TABLE 2  
Theft Crimes vs. Other Crimes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Theft Crimes					Other Crimes				
Pawnshops per capita	17.82*** (5.319)	17.38*** (5.319)	24.75*** (6.173)	6.848*** (2.191)	<b>6.226***</b> <b>(2.195)</b>	2.999*** (0.633)	2.991*** (0.634)	2.226*** (0.574)	0.189 (0.435)	<b>0.217</b> <b>(0.437)</b>
Observations	30,464	30,464	30,464	30,464	29,483	30,464	30,464	30,464	30,464	29,483
Adjusted R-squared	0.005	0.007	0.233	0.841	0.845	0.007	0.007	0.343	0.732	0.743
YEAR FE	NO	YES	YES	YES	YES	NO	YES	YES	YES	YES
STATE TRENDS	NO	NO	YES	YES	YES	NO	NO	YES	YES	YES
COUNTY FE	NO	NO	NO	YES	YES	NO	NO	NO	YES	YES
Controls	NONE	NONE	NONE	NONE	ALL	NONE	NONE	NONE	NONE	ALL

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Standard errors are clustered at the county level. The number of pawnshops and reported crimes are expressed in per capita terms. The unit of analysis is the county. Theft Crimes include: larcenies, robberies, burglaries and motor – vehicle thefts. Other crimes include: murders, rapes, aggravated assaults and arsons. The table shows the evolution of the coefficients when fixed effects and controls are included. The most complete specification (with county FE, year FE, State linear trends and all controls) is shown in column 5 and 10.

TABLE 3  
Crimes Breakdown

	(1) Larcenies	(2) Burglaries	(3) Robberies	(4) M-V Thefts	(5) Murders	(6) Rapes	(7) Assaults	(8) Arsons
Pawnshops per capita	<b>4.429***</b> <b>(1.664)</b>	<b>1.618***</b> <b>(0.620)</b>	0.0124 (0.0590)	0.166 (0.188)	0.0179 (0.0174)	0.0200 (0.0453)	0.128 (0.414)	0.0516 (0.0393)
Observations	29,483	29,483	29,483	29,483	29,483	29,483	29,483	29,483
Adjusted R-squared	0.830	0.798	0.912	0.840	0.300	0.557	0.731	0.526
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
State Trends	YES	YES	YES	YES	YES	YES	YES	YES
County FE	YES	YES	YES	YES	YES	YES	YES	YES
Controls	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. All the standard errors are clustered at the county level. The table shows the results from 8 different regressions, one for each type of reported crime. All the specifications include county FE, year FE, state trends and all controls.



TABLE 4  
Pawnshops' lagged structure

	(1)	(2)	(3)	(1)	(2)	(3)
	Larcenies			Burglaries		
Pawnshops per capita	<b>4.429***</b> <b>(1.664)</b>	<b>1.961</b> <b>(1.391)</b>	1.818 (1.330)	<b>1.618***</b> <b>(0.620)</b>	0.187 (0.523)	-0.0797 (0.520)
Pawnshops per capita (T-1)		<b>2.378</b> <b>(1.537)</b>	0.0376 (1.318)		<b>1.450**</b> <b>(0.628)</b>	0.409 (0.565)
Pawnshops per capita (T-2)			<b>2.691*</b> <b>(1.383)</b>			<b>1.215**</b> <b>(0.585)</b>
Observations	29,483	27,378	25,272	29,483	27,378	25,272
Adjusted R-squared	0.830	0.836	0.848	0.798	0.805	0.812
Year FE	YES	YES	YES	YES	YES	YES
State Trends	YES	YES	YES	YES	YES	YES
County FE	YES	YES	YES	YES	YES	YES
Controls	ALL	ALL	ALL	ALL	ALL	ALL

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. All the standard errors are clustered at the county level. In both columns 1, both for larcenies and burglaries, we show the baseline specification with the contemporaneous number of pawnshops. In columns 2 we add the number of pawnshops per capita, at t-1. Finally, in columns 3 we include the number of pawnshops per capita at t-2.

TABLE 5  
Robustness Checks

	(1)	(2)	(3)	(4)	(5)
Panel A - Larcenies					
Pawnshops per capita	4.429* (2.276)	4.429*** (1.694)	4.406*** (1.569)	4.614*** (1.761)	4.397*** (1.668)
Panel B - Burglaries					
Pawnshops per capita	1.618** (0.688)	1.618** (0.765)	1.473** (0.632)	1.645** (0.648)	1.610*** (0.620)
Year FE	YES	YES	YES	YES	YES
State Trends	YES	YES	YES	YES	YES
County FE	YES	YES	YES	YES	YES
Controls	ALL	ALL	ALL	ALL	ALL

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Panel A shows the results for larcenies, while panel B shows the results for burglaries. Column 1 shows the results when we cluster at the state level, while in column 2 we cluster at the county/year level. In column 3 we perform a weighted regression using as weight the FBI coverage indicator. In column 4 we eliminate from the sample the counties in the top 1% of the pawnshops' per capita distribution. In column 5 we eliminate from the sample the counties in the top 1% of the population distribution.

TABLE 6  
Geographical Spillovers

	(1) Larcenies	(2) Burglaries	(3) Robberies	(4) M/V Thefts	(4) Other Crimes
Pawnshops (Same County)	<b>5.097***</b> <b>(1.649)</b>	<b>1.725***</b> <b>(0.631)</b>	0.00834 (0.0603)	0.240 (0.188)	0.364 (0.437)
Pawnshops (Bordering Counties)	1.767 (2.325)	0.996 (0.879)	0.0356 (0.0860)	-0.0299 (0.267)	0.304 (0.561)
Pawnshops (State Level)	<b>17.82</b> <b>(12.80)</b>	<b>11.97**</b> <b>(4.652)</b>	0.891 (0.572)	1.568 (1.895)	1.791 (3.268)
Observations	29,147	29,147	29,147	29,147	29,147
Adjusted R-squared	0.832	0.799	0.912	0.842	0.766
Year FE	YES	YES	YES	YES	YES
State Trends	YES	YES	YES	YES	YES
County FE	YES	YES	YES	YES	YES
Controls	ALL	ALL	ALL	ALL	ALL

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. All the standard errors are clustered at the county level. Each column shows the results from a different regression where the outcome variable is the number of reported crimes (per capita) in the county. In each regression we include the number of pawnshops in the county, the number of pawnshops in the bordering counties (excluding the number of pawnshops in the county where crime is measured), the number of pawnshops in the state (excluding the number of pawnshops in the county where crime is measured). Other crimes include murder, arson, aggravated assault and rape.

TABLE 7  
Usury Laws

State	Interest	State	Interest
ALABAMA	25	MONTANA	25
ALASKA	20	NEVADA	10
ARIZONA	8	NEWJERSEY	4
CALIFORNIA	2.5	NEWMEXICO	10
CONNECTICUT	3	NEWYORK	4
DELAWARE	3	NORTHCAROLINA	2
FLORIDA	25	OHIO	5
GEORGIA	25	OKLAHOMA	20
HAWAII	20	OREGON	3
ILLINOIS	3	PENNSYLVANIA	2.5
INDIANA	3	RHODEISLAND	5
KANSAS	10	SOUTHCAROLINA	22.5
KENTUCKY	2	TENNESSEE	2
LOUISIANA	10	TEXAS	20
MAINE	25	UTAH	10
MASSACHUSETTS	3	VERMONT	3
MICHIGAN	3	VIRGINIA	5
MINNESOTA	3	WASHINGTON	3
MISSISSIPPI	25	WISCONSIN	3
MISSOURI	2	WYOMING	20

This table shows the maximum interest rate that pawnbrokers can charge to their clients per 30 days, by state as of 2011 (Carter and Skiba, 2012). Arkansas, Colorado, Idaho, Iowa, Maryland, Nebraska, New Hampshire, North Dakota, South Dakota, West Virginia does not have a maximum interest rate regulated at the state level.

TABLE 8  
Heterogeneity in the Results: Usury Laws

	(1) Theft Crimes	(2) Violent Crimes
Panel A - Parametric Estimate		
Pawnshops*Interest Rate	<b>0.406*</b> <b>(0.239)</b>	0.0312 (0.0415)
Panel B - Non Parametric Estimate		
Pawnshops*Dummy	<b>9.154*</b> <b>(5.216)</b>	0.715 (0.895)
Year FE	YES	YES
County FE	YES	YES
Controls	ALL	ALL

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Robust standard errors in parentheses clustered at the county level. In Panel A the coefficient of interest is the interaction between the numbers of pawnshops per capita, by county, and the maximum interest rate allowed at the state level. In Panel B we create a dummy variable that takes the value 1 for the states that have a maximum interest rate above the median. We replace the interest rate of the states not regulated by any usury law, with the maximum interest rate in the sample (25%).

Table 9  
Collateral by Category (Carter and Skiba, 2012)

Category	Number of Observations	Percentage of Observations	Average Loan Amount	Standard Deviation
<b>Jewelry</b>	199,288	<b>49.98%</b>	\$96.28	105.02
TVs/Electronics	126,297	31.68%	\$58.80	62.34
Tools/Equipment	31,600	7.93%	\$50.18	60.67
Household Items	10552	2.65%	\$42.92	44.7
Missing	7,833	1.96%	\$63.75	72.54
Guns	7,734	1.94%	\$146.97	98.75
Instruments	7,700	1.93%	\$116.92	104.66
Camera/Equipment	4,052	1.02%	\$75.85	77.87
Misc	3,666	0.92%	\$51.50	62.46

Table 9 reports the number of loans for each collateral category, the percentage of observations, and the average amount and standard deviation of the items pawned for each category. All amounts are in 2002 dollars. The sample of observations is from a pawnshop lender in Texas between 1997 and 2002, (Carter and Skiba, 2012).

Table 10 (Burrel and Wellsmith, 2010)

Items stolen during burglaries

Cash	40%	Documents	5%
<b>Jewellery</b>	<b>31%</b>	Ornaments	5%
Audio	25%	Food	5%
VCR	17%	Tools	5%
TV	17%	Furniture	3%
Personal	12%	Cigarettes	3%
Telecom	12%	Vehicles	2%
Computer	11%	Cycle	2%
Photographic	11%	DVD	2%
Games	10%	Building	1%
Purse	10%	Garden	1%
Cards	10%	Digital	0%
Luggage	9%	Sports	0%
Clothing	9%	Antiques	0%
Domestic	7%		
Keys	6%		

This table show percentage of the stolen items during burglaries. Police recorded crime data are from the Sanwdwell Metropolitan Borough Council area of the West Midlands. The period covered is from 1997 to 2003. Percentage do not sum to 100 due to the stealing of multiple categories.

TABLE 11  
Response to Gold Price

	(1) Larcenies	(2) Burglaries	(3) Robberies	(4) M/V Theft	(5) Murder	(6) Assault	(7) Rape	(8) Arson
Pawnshops (t0)*Gold Price (t)	0.481 (0.560)	<b>0.339*</b> <b>(0.194)</b>	<b>0.0243</b> <b>(0.0195)</b>	0.0292 (0.0642)	0.00294 (0.00389)	-0.103 (0.121)	0.0119 (0.0151)	-0.00631 (0.0120)
Observations	29,470	29,470	29,470	29,470	29,470	29,470	29,470	29,470
Adjusted R-squared	0.811	0.778	0.910	0.837	0.297	0.720	0.537	0.507
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
County FE	YES	YES	YES	YES	YES	YES	YES	YES
Pawnshops (t0)* Year	YES	YES	YES	YES	YES	YES	YES	YES
Controls	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL
Controls*Gold Price	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. All the standard errors are clustered at the county level. This table shows the results of the specification where pawnshops per capita and the interaction between pawnshops in 1997 (the first year of the sample) and Gold price at time t are included. We also include: 1) the interactions between all controls fixed in the year 1997 and the gold price at time t, 2) the interaction between pawnshops at time 0 and linear trends.



TABLE 12  
Response to Gold Price (Grouped Year Fixed Effects)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Larcenies	Burglaries	Robberies	M/V Theft	Murder	Assault	Rape	Arson
Pawnshops (t0)*Gold Price (t)	0.576 (0.532)	<b>0.460**</b> <b>(0.187)</b>	<b>0.050***</b> <b>(0.0188)</b>	0.0491 (0.0624)	0.00427 (0.00382)	-0.0786 (0.117)	0.0110 (0.0147)	-0.00464 (0.0115)
Observations	29,470	29,470	29,470	29,470	29,470	29,470	29,470	29,470
Adjusted R-squared	0.811	0.778	0.910	0.837	0.297	0.720	0.537	0.507
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
County FE	YES	YES	YES	YES	YES	YES	YES	YES
Pawnshops (t0)* Year	YES	YES	YES	YES	YES	YES	YES	YES
Controls	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL
Controls*Gold Price	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. All the standard errors are clustered at the county level. This table shows the results of the specification where pawnshops per capita and the interaction between pawnshops in 1997 (the first year of the sample) and Gold price at time t are included. We also include: 1) the interactions between all controls fixed in the year 1997 and the gold price at time t, 2) the interaction between pawnshops at time 0 and linear trends. We used grouped year FE, one dummy every three years (two years for the last period) and we include gold price (given that is not collinear anymore with year FE).

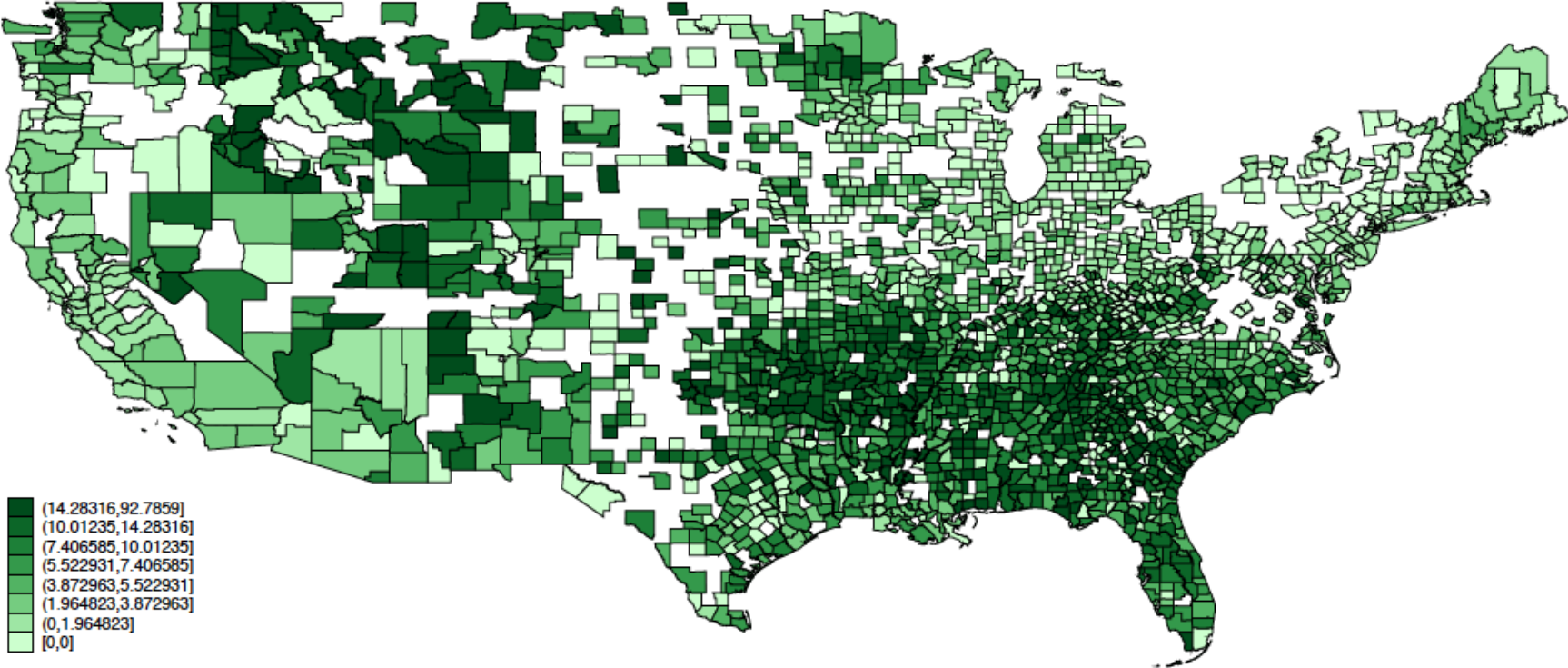
TABLE 12  
Heterogeneity in the Results: Density

	(1)	(2)	(3)	(4)
	Below	Burglaries Above	Below	Robberies Above
Pawnshops (1997)*Gold Price (t)	<b>0.437*</b> <b>(0.239)</b>	<b>0.809**</b> <b>(0.332)</b>	0.0103 (0.0190)	<b>0.166***</b> <b>(0.0460)</b>
Observations	14,798	14,672	14,798	14,672
Adjusted R-squared	0.699	0.833	0.673	0.925
Year FE	YES	YES	YES	YES
County FE (Grouped)	YES	YES	YES	YES
Controls	ALL	ALL	ALL	ALL
Controls*Gold	ALL	ALL	ALL	ALL
Pawnshops (t0)* Year	YES	YES	YES	YES

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Standard errors clustered at the county level. The sample is divided in counties below the median density and above the median density. The density percentiles are computed with respect to the density of the county, averaged for each county in the 14 years of the sample (1997 - 2010). We used grouped year FE, one dummy every three years (two years for the last period) and we include gold price (given that is not collinear anymore with year FE).

# Number of Pawnshops

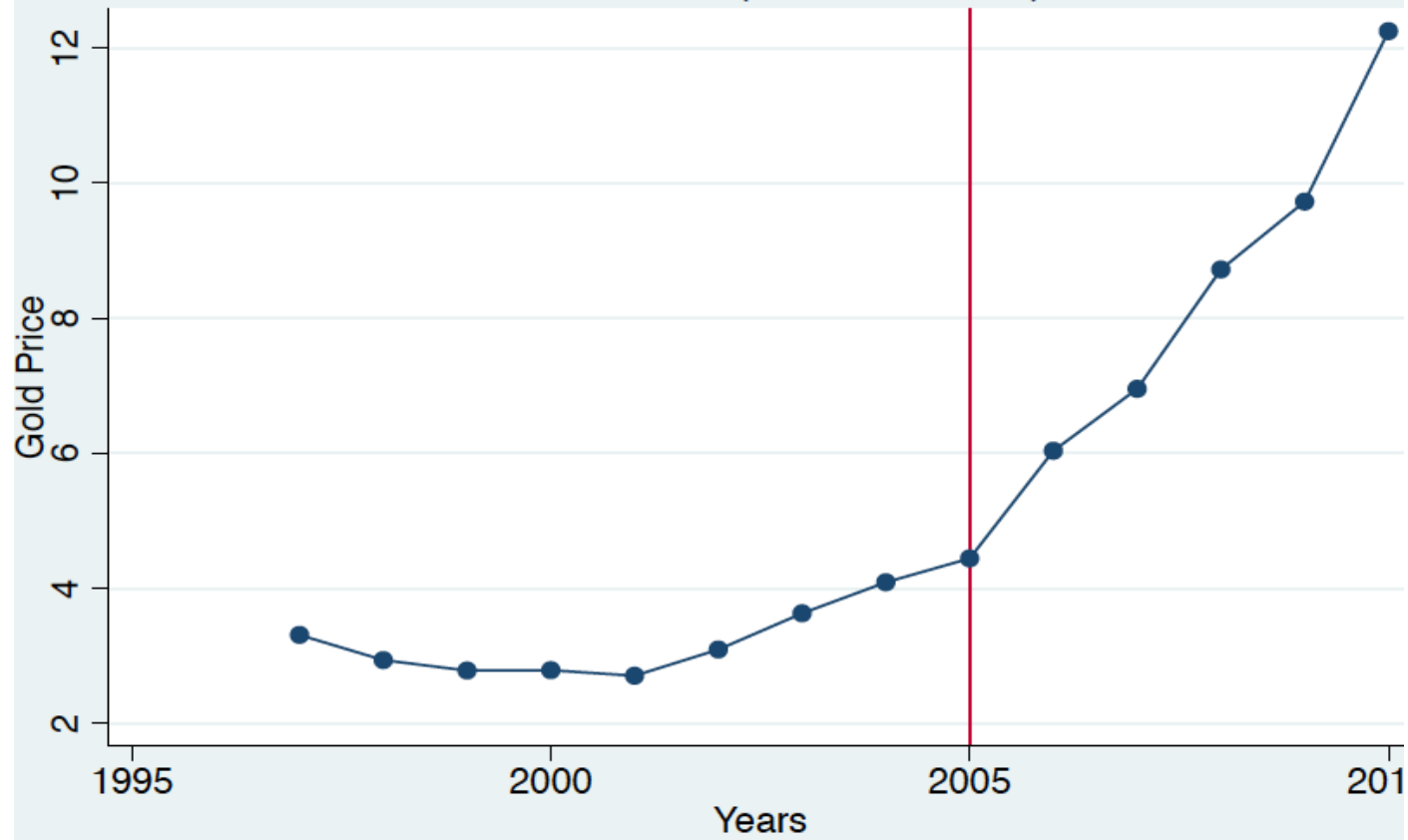
United States of America, 1997



Dark Green	(14.28316, 92.7859]
Dark Green	(10.01235, 14.28316]
Dark Green	(7.406585, 10.01235]
Dark Green	(5.522931, 7.406585]
Dark Green	(3.872963, 5.522931]
Light Green	(1.964823, 3.872963]
Light Green	(0, 1.964823]
Light Green	[0, 0]

Number of pawnshops per 100,000 people. The state of Alaska and Hawaii - while being in the sample of analysis - are eliminated for illustrative purposes only.

### Gold Price (1997 - 2010)



Price of gold averaged during the year. Gold is expressed in troy ounce and it is normalized by 10