The Effect of Stolen Goods Markets on Crime: Pawnshops, Property Thefts, and the Gold Rush of the 2000s

By ROCCO D'ESTE*

First Version: April 2014
This Version: February 2017

This paper investigates the effects of stolen goods markets on crime. I use a forensic method, which leverages information from legal activities to provide insights on hidden illegal operations. In particular, I focus on pawnshops, assembling a novel crime-related dataset encompassing 2,200 US counties from 1997 to 2010. Within-county estimates isolate a theft crime–pawnshops elasticity of around 0.03, with larger effects detected when geographical spillovers are accounted for. A quasi-experimental design then reveals that the effects of changes in gold prices on burglaries are amplified by the predetermined stock of pawnshops within a county. Multiple falsification exercises find no effect on motor-vehicle thefts and on violent crimes. Overall, the analysis suggests that burglars respond more to changes in the value of criminal opportunities, in areas with a larger market for the trade of stolen property.

Keywords*: stolen goods markets, pawnshops, gold prices, criminal opportunities*
JEL Codes*: K14, K42*

• University of Sussex, Department of Economics, (e-mail: r.d-este@sussex.ac.uk). A previous version of this work has circulated with the title: 'The Effect of Stolen Goods Markets on Crime: Evidence from a Quasi-Natural Experiment'. Special thanks for the support to Robert Akerlof, Dan Bernhardt, Mirko Draca, Rocco Macchiavello, and Chris Woodruff. I am indebted for the insightful discussions and useful comments to Clement de Chaisemartin, Joseph Doyle, Giovanni Mastrobuoni, Imran Rasul, Fabian Waldinger, and all the participants of the CWIP (Warwick), ISC, PEUK, NESG, IAAE, SAEs and the 3rd IZA Young Scholar Program at Georgetown, Washington DC. I gratefully acknowledge the financial support from the Economic and Social Research Council (ESRC), the International Association of Applied Econometrics (IAAE) and the Royal Economic Society (RES). All errors and omissions remained are my own responsibility.

1. Introduction

Theft crimes impose a substantial social cost to society. In 2010, the United States experienced one theft every 40.5 seconds, with a total of 9.5 million crimes and an estimated economic loss for the victims of $16 billion (FBI, 2010).[1] Personal items were stolen in almost 85% of cases, strongly suggesting that burglars need a market in which to convert these goods into cash (Walters et al., 2013). In particular, this raises the hypothesis that the local availability of stolen goods markets may affect criminal behavior by reducing theft-related transaction costs, or by increasing the expected benefits deriving from illegal activity (Sutton, 2010).

Since Becker's seminal work (1968), economists have investigated the determinants of crime using of a cost-benefit analysis. But, while extensive research has focused on incentives related to sanctions, deterrence and legal labor market prospects, fewer papers have considered the sensitivity of crime to changes in the value of criminal opportunities. Ayres and Levitt (1998) analyze the impact of Lojack on auto theft rates, showing that higher levels of investment in personal security generate positive social spillovers, reducing thefts. Cook and MacDonald (2011) provide evidence of the social benefits of a non-profit collaboration, whereby businesses contribute towards a pool of private security expenditures to cover a common space.[2] Draca, Koutmeridis and Machin (2015) show that thefts are highly responsive to consumer and scrap metal prices, suggesting that burglars switch to items that yield a higher return. Freedman and Owens (2016) find that appropriative criminal behavior increases in neighborhoods where a fraction of residents experienced a sudden increase in earnings, implying that criminal opportunities are important in explaining patterns of crime.

My paper contributes to this literature by focusing on the effects that markets for stolen goods have on the proliferation of theft crimes.[3] I face two main challenges. First, markets for stolen goods are clandestine, therefore very hard to observe and to measure. Second, these markets are plausibly endogenous to the propagation of criminal activity.

---

[1] http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2010/crime-in-the-u.s.-2010/offenses-known-to-law-enforcement/standard-links/national-data

[2] Duggan, Hjalmarsson and Jacob (2011) find no evidence that the "gun show loophole" in the US – which makes it easier for potential criminal to obtain a gun – influences property and violent crime. Other work in this area includes (Gonzalez-Navarro (2013); Vollaard and Van Ours (2011); Vollaard and Van Ours (2014)). For a recent review of the literature on criminal opportunities see Draca and Machin (2015).

[3] See Chalfin and McCrary (2014) for a detailed literature review of the main results in the field of economics crime.

I overcome the first hurdle by using a forensic approach, which leverages information from legal activities to provide insights on hidden illegal operations (Zitzewitz, 2012). Specifically, I focus on pawnshops, widespread legal businesses often associated with the trade of stolen property. A novel crime-related panel dataset is built, collecting information on various reported crimes and on the number of pawnshops for 2,200 US counties, covering almost 94% of the population in all 50 states, from 1997 to 2010.

Endogeneity concerns are addressed in multiple ways. I initially rely on within-county variation in the number of pawnshops to explain within-county variation in the number of crimes. Ordinary least square estimates reveal a pawnshops-theft crime elasticity of around 0.03, with the effects being three to five times larger when geographical spillovers are accounted for. This appears to be a reasonable magnitude: the crime elasticity of police manpower, sentence length, and incapacitation of criminals vary within a range of 0.1 to 0.6 (Chalfin and McCrary, 2014). Falsification tests add support to the hypothesis of the paper. The correlation between pawnshops and crime is isolated to larcenies and burglaries. Changes in the number of pawnshops do not influence the theft of motors and vehicles: these items are not traditionally accepted by this business. Moreover, no effect is ever detected on any other violent crime, such as murder, aggravated assault, and rape.

My econometric analysis proceeds under the assumption that the measure of pawnshops, conditional on county FE and year FE, is exogenous to the propagation of theft crimes. Therefore, I need to be cautious about giving causal interpretations to the conditional correlations I uncover. Two main threats to the identification of a causal parameter exist. First, results might be driven by the omission of confounding county-specific and time varying unobservables. Nevertheless, the coefficient of interest is almost unaffected by the inclusion of 17 socio-economic controls and by a wide set of robustness checks. This seems to reduce the concerns that selection on unobservables is mainly driving the results.

The second concern – related to reverse causality – is addressed in the last section of the paper, where I exploit pawnbrokers' significant demand for gold, which materializes by trading items such as rings, necklaces and bracelets. This jewelry is melted down via a 'refinement' process, whereby professional outfits remove impurities from metal until they get a metal that is closer to being pure gold and, therefore, cannot be traced when re-sold (Bos et al., 2012). I hence

posit that upward shifts in gold prices cause more burglaries in counties with a larger number of businesses trading gold products, namely pawnshops.

I explore this hypothesis in a difference-in-differences design, interacting gold prices with the initial stock of pawnshops in a county, fixed to the first year of the sample. The key identifying assumption is that counties with a different concentration of pawnshops would have displayed similar criminal patterns, absent a change in gold prices.[4] A graphical analysis shows parallel trends for counties above and below the pawnshops' median, as well as an evident increase in burglaries concentrated in counties above the pawnshops' median, which follows the rise in gold prices. I find that a one standard deviation increase in the baseline number of pawnshops increases the effect of gold prices on burglaries by 0.05 to 0.10 standard deviations. In other terms, my estimates imply that the opening of 10 pawnshops in a county would increase by around 8% the number of burglaries motivated by the growth in gold prices. As in the previous analysis, several falsification exercises find no significant effects on motor-vehicle thefts, or on other crimes that do not primarily involve the theft of precious items. I also perform a different falsification test, based on the idea that pawnshops do not trade items made of copper, even if criminals heavily target this metal.[5] Even in this instance, no positive effect is detected.

My findings suggest that burglars respond more to changes in the value of criminal opportunities, in areas with a larger market for the trade of stolen property. However, the existing correlation between the baseline stock of pawnshops and area-specific factors, also correlated with criminal activity, threatens the validity of this interpretation. Other socio-economic characteristics, such as poverty and unemployment, could explain the excessive rise in burglaries associated with the growth in gold prices in counties with more pawnshops. To explore the extent of this issue – and in the attempt to control for these confounding channels – I include in the analysis 20 additional regressors. These are generated interacting each initial county-specific socio-economic control with gold prices. The effect of pawnshops through gold prices is robust across these (and several other) specifications.

[4] A similar identification strategy has been used by Gould, Weinberg, and Mustard (2002) to identify the effects of local labour market opportunities on crime.

[5] The resale market for copper is indeed more heavily concentrated around dedicated scrap metal dealers. See Sidebottom (2011), or Cardoso et al (2013).

This paper is important both for researchers and policymakers. From a research perspective – while speaking to the literature on the effects of changes in the value of criminal opportunities – my work contributes to the emerging literature in forensic economics, in that it exploits data on licit markets (i.e. pawnshops), to provide insights on hidden illegal activities (i.e. markets for stolen goods).[6] Fisman and Wei (2004) identify tax evasion in China comparing Hong Kong's exports to China and China's imports from Hong Kong. Sukhtankar (2012) detects embezzlement in politically controlled sugar mills in India, exploiting features of the 'close-to-fixed' proportions technology used in that sector. Parey and Rasul (2016) use the insight that the consumption of cannabis is often combined with the use of complementary legal inputs such as roll-your-own lose leaf tobacco and rolling papers. More generally, my design is most in line with a series of papers that map hidden behavior into observable information. Among these: Hsieh and Moretti (2006) on Iraqi sanctions, Dube et al. (2011) on CIA coup authorizations and insider trading, Della Vigna and Ferrara (2010) on illegal arms trade, Durante and Zhuravskaya (2015) on Israeli military strategy.

The policy implications of my paper are perhaps more pointed than usual. My findings suggest the need for a closer monitoring of pawnshops by local authorities. This monitoring, by diminishing the latent demand for stolen properties, should reduce the supply of crime in pawnshops' proximity. This is in line with the decision of some municipalities in the Unites States to apply stricter rules on this business, increasing the penalties in case of poor documentation of all transactions made by pawnbrokers. For these reasons, new policies are being implemented. These measures require pawnbrokers to share their records with authorities daily, using a free online reporting system, including jewelry and used electronic goods that can be tracked by serial numbers.[7]

Importantly, my study conveys broader general implications: it highlights the scope to further investigate, separate, and quantify the effects that other physical and online markets such as junkyards, flea markets, EBay, Craigslist, and the 'dark web' could have on the proliferation

[6] This paper is hence closely related to an unpublished PhD dissertation chapter by Thomas J. Miles (2007), who finds a positive effect of pawnshops on crime on a cross section of US counties, in the year 1996. He addresses endogeneity issues using state-level variation in the maximum interest rate allowed to pawnbrokers, an interesting approach nevertheless characterized by some data limitations. The analysis is limited to only one year of data (1996). This, alongside the use of a state-level instrument, does not allow for the inclusion of county nor state fixed-effects. In practice, any county/state unobservable characteristic, related to the number of pawnshops, crime and the state's decision of setting an interest rate might be a confounding factor in the analysis.

[7] See for example: http://www.statesman.com/news/news/local/plan-would-require-some-secondhand-stores-to-sha-1/nRkKz/?__federated=1 or http://thetimes-tribune.com/news/scranton-to-require-stricter-rules-for-pawn-shops-1.1658773

of illegal activity.[8] These markets may affect criminals' incentives by reducing theft-related transaction costs, by increasing the expected benefits arising from theft, by amplifying the effects of world prices fluctuations of metals and technological goods and – in some cases – by trading weapons, drugs, and other illegal products.[9] Very little is known in this area, suggesting promising venues for future research.

This paper unfolds as follows. Section 2 specifies the institutional background. Section 3 presents the data and lays out the initial econometric framework, it reports the findings for that framework, provides various robustness checks, and tests for the presence of heterogeneous results. Section 4 introduces the role of gold in the quasi-natural experiment, outlines the research design, presents results, robustness checks, and falsification tests. Section 5 concludes.

2. Institutional Background

Pawnshops offer cash in exchange for clients' personal property.[10] The client can either directly sell the item to the pawnbroker or she can ask for a loan, using the pledge as a collateral. In the latter case, the pawnbroker holds the personal item in custody until the maturity date, typically two months later. If the client does not return to reclaim the item, its ownership passes to the pawnbroker.[11]

Several dynamics can turn a pawnshop into a market for the intermediation of stolen goods (Sutton, 2010). First, even if pawnbrokers assume the risk that an item might have been stolen, they often only lose the collateral and the amount loaned, if the police seize the item.[12] Competition may also reduce a pawnbroker's incentive to question items of uncertain origin. As one pawnbroker put it: '*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.*

[8] See FBI report on the dark web: http://www.fbi.gov/news/podcasts/thisweek/the-dark-web.mp3/view

[9] See for example: http://www.zdnet.com/article/beyond-silk-road-2-0-over-400-dark-web-tor-sites-seized-by-fbi/

[10] 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).

[11] Alternatively, the pawnbroker becomes the owner of the item as soon as the sale process ends. About 80 per cent of pawn loans are repaid and 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).

[12] The charge for criminal possession depends on the evidence of the pawnbroker being aware of the illegal origin of the item, a fact that is usually very difficult to establish. See for example: http://www.lacriminaldefenseattorney.com/Legal-Dictionary/F/FA-FIRE/Fence.aspx

If you don't take those, the guy down the street will' (Glover and Larubbia, 1996). Finally, the pawnbroker could explicitly facilitate the sale of stolen goods in his shop,[13] exploiting the lack of strict law enforcement from local authorities or, for example, the fact that most stolen goods do not have a unique identifier, and are hard to recognize by the police, or by the victims.[14]

For these reasons, laws in many jurisdictions strictly regulate pawnbrokers' activities. These laws usually require 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. Pawnshops must also regularly send to police a list of all newly pawned items and, if possible, any associated serial number.

Despite these measures, various investigative reports add support to the hypothesis of a close link between pawnshops and criminal activity. Glover and Larrubia used the pawnshops-level transaction data to rank clients by the number of transactions made in 1996. Thirty-nine of the top fifty clients had criminal arrest records, often related to burglary, theft, or similar offenses.[15] Fass and Francis (2005) used a similar approach to analyze a database of all pawn transactions recorded by the Dallas Police Department (DPD) from January 1, 1991, through December 31, 1996. The 14,500-people pawning 30 times or more during the period '*were two to three times more likely to have been convicted for theft, larceny, burglary, or robbery than those who pawned once or twice'*.[16] Overall, this evidence seems to suggest a close link between pawnshops and criminal activity.

---

[13] Police efforts have indicated that some pawnbrokers are 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 jewellery to each business. Many were found to comply. However, several businesses operated 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 (Bill, 2011).

[14] 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 a burglar must provide his name, address, and a form of identification, jurisdictions rarely 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 a pawnbroker would not accept the item from a suspicious client (Wright and Decker, 1994). Finally, jewellery such as rings, bracelets and necklaces can easily be melted down, transforming forever stolen items into unrecognizable bars of precious metal (Sutton, 2010).

[15] In a subsequent study Wallace (1997) describes how pawnshops may enable 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).

[16] Within the sample of the top 100 pawnshops' clients, 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 equivalent evidence.

3. Data and Empirical Analysis

This section describes the newly built database. Then, it presents the empirical analysis and the results. Finally, it shows various robustness checks, and investigates the presence of heterogeneity in the estimates.

3.1. Data

This paper focuses on a newly assembled panel of 2,200 US Counties, in 50 States, from 1997 to 2010.[17] Data on reported crime comes from the National Archive of Criminal Justice Data (NACJD).[18] County-level files are created by NACJD, and are based on agency records from the FBI, which also provides aggregated county totals. Eight different types of crimes are reported: larceny, burglary, robbery, motor-vehicle theft, murder, aggravated assault, rape and arson.[19]

Infogroup Academic provided the number of pawnshops by county-year. The data gathering process follows a six-step procedure. In the compilation phase, data is taken directly from sources such as government, public company filings, utility information, tourism directories, web compilation, and RSS feeds. The second step in the process is the 'address standardization', followed by a phone verification phase with 40 million calls made per year. The last four phases include a standardization of elements, a duplicate removal, an enhanced content, and a final quality check.[20]

Table I reports summary statistics for pawnshops and crime, normalized per 100,000 people. The average number of pawnshops per county is 5.88, with a standard deviation of 6.32. Larceny is the most common theft crime, followed by burglary and motor vehicles theft.[21] Violent crimes

[17] This represents almost 70% of all the US counties, covering almost 93% of US population. The final sample is obtained merging NACJD county data on reported crimes and Infogroup data on pawnshops (which are provided from 1997 to 2010). The presence of missing observations on both datasets determines the final size of the dataset.

[18] Data are downloadable at: http://www.icpsr.umich.edu/icpsrweb/content/NACJD/guides/ucr.html#desc_cl. (Accessed date: December 2012)

[19] NACJD imputes missing data and then aggregates the data to the county-level. The FBI definition of the eight types of crime, as well as the explanation of the hierarchy rule, can be found in the data appendix.

[20] More information is available at http://lp.infogroup.com/academic. The sample has an average of 9800 pawnshops per year. These numbers are confirmed by other studies. See - for example - Fellowees and Mabanta (2008), Shackman and Tenney (2006).

[21] In the FBI's Uniform Crime Reporting (UCR) Program, property crime includes the offenses of burglary, larceny-theft, motor vehicle theft, and arson. 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-

and arson are less frequent, with the lowest reported crime being murder, with an average of 3.86 and a standard deviation of 5.43.

[TABLE I HERE]

I also merge in the database a comprehensive set of county-specific, time-varying, socio-economic controls. These are obtained from the US Census Bureau and from the Bureau of Labor Statistics-Current Population Survey.[22] I include: income per capita, percentage of people below the poverty line, percentage of unemployment, social security recipients, average monthly payment per subsidy, number of commercial banks and saving institutions, banking and saving deposits, population density, and the racial/ethnic composition in the county.[23] The discussion of the related descriptive statistics (shown in Table I) is omitted for brevity considerations only.

3.2. Empirical Analysis

I initially use the following OLS equation:

$$y_{i,t} = \alpha_i + \gamma_t + X'_{i,t}\beta_0 + \#pawnshops_{i,t}\beta_1 + \epsilon_{i,t} \qquad (1)$$

where i indicates the county, and t the year. Outcomes of interest are reported crimes. The analysis focuses on β_1, the relationship between pawnshops and crime, both expressed in per capita terms.[24] Standard errors are clustered at the county level. I incorporate in the model county fixed effects α_i, year fixed effects γ_t, and a vector of county-specific, time-varying socioeconomic controls $X'_{i,t}$ described above.

negligent manslaughter, forcible rape, robbery, and aggravated assault. Violent crimes are defined in the UCR Program as those offenses that involve force or threat of force.

[22] I use http://censtats.census.gov/usa/usa.shtml. (Accessed date: December 2012)

[23] The racial origin is defined according to four categories: White, Black, Asian and Indian American. Moreover, each race is divided into Hispanic or Not Hispanic ethnic origin.

[24] The coefficient β_1 is identified using within county variation in pawnshops per capita. 40% of the observations display a change in the number of pawnshops from t-1, with this variation being distributed across 70% of the counties in the sample.

Theft-Related vs Non-Theft-Related Crimes

Pawnshops could influence crime by being an outlet for stolen goods. This is the main hypothesis of the paper. For this reason, I start by examining the effect of pawnshops separately for theft-related, and for non-theft-related crimes. Results are presented in Table II. Panel A shows the estimates of β_1 for the pooled measure of theft-related crimes (obtained by summing up larceny, burglary, robbery and motor-vehicle theft). Panel B shows the results for non-theft related crimes (murder, aggravated assault, rape, arson). The latter can be considered as the first falsification test presented in the analysis.

[TABLE II HERE]

I first focus on theft-related crimes. Column 1 presents the baseline specification, where only year fixed effects are included. The coefficient is 16.7, significant at the 1% level: a one-unit increase in the number of pawnshops in a county is associated with 16.7 more theft crimes in the same county. The inclusion of county fixed effects (column 2) reduces the magnitude of the coefficient, suggesting that pawnshops are typically located in areas with high levels of crime. The within county estimate is 9.84, still significant at the 1% level. In Column 3 I show the results when all the 17 county-specific, time-varying observables are added to the analysis. All these variables serve the scope to absorb confounding factors, related to within county changes in socio-economic conditions and criminal activity. The inclusion of this new wide set of controls barely affects the estimate: the magnitude is now 8.5, significant at the 1% level. In column 4 I add state linear trends, while in column 5 I include the interaction of state and year fixed effects. This is potentially important as many criminal justice policies are set at the state level, and might co-vary with crime or law enforcement. Coefficients are 6.1 and 5.6, respectively, and are both significant at the 1% level. Table II, panel B reports the results for the pooled measure of non-theft related crimes. It is interesting to notice that no significant effects are detected for non-theft related crimes, once county-fixed effects are included in the analysis.

More on Theft-Related Crimes

It is now worth describing the characteristics of the separate offences that belong to the category of theft-related crimes. *Larceny* is the unlawful taking, carrying, leading, or riding away of property from the possession of another. This is the most common type of theft crime. Usual types of larcenies include shoplifting, pocket picking, purse snatching, and theft of objects from motor vehicles. *Burglary* is the unlawful entry of a structure to commit a felony or a theft. Items stolen during larcenies and burglaries are usually accepted during pawnshops' transactions.[25] Given these premises, it seems reasonable to expect a positive correlation between changes in the number of pawnshops and in these two theft-related crimes.

Robbery is the taking or attempting to take anything of value from the care, custody, or control of a person by force or violence. Two aspects need to be highlighted. First, robberies – due their violent nature – happen less frequently than burglaries and larcenies.[26] Second, almost 60% of the robberies are executed in commercial house, gas stations, banks, and convenience stores (FBI, 2010). This might suggest that criminals are more prone to use violence (facing in expectation harsher judicial sentences) to get an immediate monetary reward, rather than to steal items that should be later converted in cash. For these reasons, it is difficult to predict whether the analysis will detect some systematic effect of pawnshops on robbery.

Motor vehicle theft is the theft or attempted theft of a motor vehicle. This seems to represent a clean falsification exercise for my analysis: vehicles are not typically accepted during pawnshops' transactions. Table III, panel A presents the results separately for each of these crimes. For transparency, I also present the results by type of offence for non-theft-related crimes (Panel B).

[TABLE III HERE]

All the specifications include county FE, year FE, and all socio-economic controls. In line with the initial hypothesis, I detect a positive and significant effect for larcenies and burglaries. The coefficient of pawnshops on larcenies is 6.7, significant at the 1% level. The coefficient on

[25] Evidence about typical products traded by pawnshops is presented in table A1, and will be discussed later in the text.

[26] Table 1 reports an average number of robbery by county (per 100,000 people) of 52.74; the same table shows a number of 1,840 for larceny and 654.2 for burglary.

burglaries is 1.65, and it is significant at the 5% level. Conversely, I do not find any effect on robbery. Moreover, no significant effects are detected on motor-vehicle theft, murder, aggravated assault, rape, and arson.[27]

3.3. Further Robustness Checks

Further robustness checks are presented in table A2 for larceny, and in table A3 for burglary. All specifications include county FE, year FE, and all socio-economic controls (as in Table II). Panel A shows the results obtained by: (1) clustering standard errors at the state-level; (2) weighting the empirical model by the FBI coverage indicator;[28] (3) dividing the number of pawnshops by the county population fixed in 1997;[29] (4) adding state-quadratic trends; (5) state-cubic trends; (6) county-specific linear trends; (7) state-linear trends. In Panel B, I check the sensitivity to outliers showing the results trimming the sample at the 1%, 2%, and 5% of the distribution of pawnshops (columns 1 to 3) and of the population distribution (columns 4 to 6). Percentiles are computed using the distributions in 1997. Column 7 presents the results when the interaction of state FE and year FE is included. The coefficient of interest is stable across all specifications for larceny and burglary, with the only exception being burglary, once county-specific linear trends are included in the analysis. The coefficient is this case is still 0.8, with a p-value of 13%.[30]

[27] Given the lack of random assignment, the omission of some time-variant unobservables might be driving the results on larcenies and burglaries. A possible way to quantify the extent of this concern is to use the Altonji et al. (2005) method of assessing selection on unobservables using selection on observables. The intuition behind the test is to measure how strong the selection on unobservables must be relative to the selection on observables to explain away the effects. This strategy relies on a comparison between a regression run with potentially confounding factors controlled for, and one without. A rule of thumb is that any ratio above 1 is acceptable, as it indicates that selection on unobservables must be larger than selection on observables to invalidate the results (Nunn and Wantchekon, 2012). In my specification, the Altonjii ratio exceeds 20 for the measure of pooled theft-related crimes.

[28] 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. It is important to outline that measurement error in the outcome variable that is not correlated with the measurement of the independent variable generates larger standard errors that the ones obtained under perfect measurement.

[29] This robustness check is performed in order not to use within-county variation in pawnshops per capita artificially provided by changes in population, rather than by changes in the number of pawnshops.

[30] Figure A1 displays interesting graphical evidence. It shows the trends in the number of pawnshops by year in the estimating sample, and the trends in the pooled measure of larceny and burglary. The figure displays an overtime downward trend followed by pawnshops and by the pooled measure of theft crimes, as well as a peculiar movement between these two, which seems to be in line with the forensic spirit of the paper.

3.4. Functional Forms, Magnitude, and Heterogeneity in the Estimates

This section tests the sensitivity of the coefficient with respect to various functional forms, it focuses on the magnitude of the effect detected, and investigates the presence of heterogeneity in the estimates. Results are reported in table IV-A for larceny, and in table IV-B for burglary. All the regressions include county FE, year FE, and all county observables (unless otherwise specified).

[TABLE IV-A / IV-B HERE]

I start by examining larceny. Column 1 shows the results from a linear specification, weighted by county population. The effect is three times larger than in the baseline without weights, with a coefficient of 18.26, significant at the 5% level. Column 2 shows a log-linear specification, where the outcome is transformed in *log(1+y)*, and *y* represents crime per 100,000 people. The coefficient is 0.0048 and it is significant at the 5 percent level. Columns 3 reports the crime-pawnshops elasticity, obtained using a log-log specification: the coefficient is 0.026, and it is significant at the 5% level.

Results expressed in this form allow us to provide a clear benchmark for the estimates. The magnitude of the effect of pawnshops on crime appears to be reasonable: the elasticity of crime to changes in police, sentence length, and incapacitation of criminals vary within a range of 0.1 to 0.6.[31] Nevertheless, the effects detected might represent a lower bound of the 'true' effect of pawnshops on theft crimes. This is because the within-county analysis does not take into account potential geographical spillovers. To explore the merits of this hypothesis, I construct a state-level measure of pawnshops per capita, excluding the number of pawnshops and the population in county *i* (the county where crime is measured). The inclusion of the state-level variable slightly reduces the magnitude of the within-county coefficient, which is now 5.727 and it is significant at the 1 percent level. Consistently with the departing hypothesis, I find a 38.05 coefficient of pawnshops at the state level, significant at the 5% level. This coefficient is hence more than 5 times larger than in the within-county analysis. In column 6 I perform a similar state-level analysis. I aggregate both the dependent and independent variables to state-year

[31] For a review of the literature, see Chalfin and McCrary (2014).

levels, and control for state FE, year FE, and time-varying state-level observables. One pawnshop more in a state is associated with more than 35 theft crimes in the same state, with this coefficient being significant at the 10% level. Results are larger and more precise when I weight the state-level regression by state population. The coefficient is 63.69 significant at the 5 percent level.[32]

The same analysis is repeated for burglary and it is shown in table IV-B. The coefficient for the linear specification weighted by county population is 1.849, but is not precisely estimated. The log-linear and the log-log specifications are similar to the case of larceny. I detect a coefficient of 0.004, and a coefficient of 0.024, respectively. Both estimates are significant at the 5% level. Differently from the previous case, the state level analysis does not capture precise nor sizeable geographical spillovers. Admittedly, understanding the underlying motivation for this difference is extremely difficult, and it goes beyond the scope of this work.

4. Responses to Gold Prices: A Quasi Experimental Design

The decision of opening a pawnshop might be motivated by the contemporaneous level of criminal activity in the chosen area. In case of positive (negative) sorting of pawnshops in high-crime localities, this 'simultaneous' process might generate an upward (downward) bias in the coefficient of interest. This econometric issue is further addressed in this section of the work, which employs the time-series variation provided by changes in international gold prices, and the cross-sectional variation associated with the initial number of pawnshops in each county.

Gold Items, Pawnshops, and Burglaries

Before entering in the core of the analysis, it is worth describing features that are particularly relevant in our context. Do pawnbrokers trade gold products? Why? Moreover, do burglars disproportionately target gold items?

Gold-related goods have always been the primary determinant of pawnbrokers' profits. Bos et al. (2012) show that 34% of male and 63% of female clients in the US used jewelry as part of the pledge in pawn transactions, with gold representing roughly 80 percent of the value of all

[32] Columns 5 and 6 use robust standard errors clustered at the state level.

pledges. Table A1, 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.[33] Fifty percent of pawnshop loans are collateralized with jewelry, with over half of jewelry consisting of rings, including both men's and women's class and wedding rings.[34] This strong demand for gold is portrayed in figure A3, which shows the sign "we buy gold" that can be usually observed on the doors of these businesses.

But, what makes gold so important for pawnbrokers? The bulk of pawnbrokers' profits originates from melting down the gold received by their clients through the 'refinement' process. A refiner takes the rings, necklaces, bracelets and other items and melts them. Professional outfits remove impurities from the metals until they get something close to pure gold.[35] Hence, stolen items – easily transformed into an unrecognizable bar of precious metal – can disappear forever from the pawnshops counter, ending up in the bullion market or in similar places (Sutton, 2010).[36] A simple representation of this process is shown in figure A4.

Crime statistics and victim surveys describe that jewelry and gold products represent one of the most commonly stolen items during *burglaries* (Table A4).[37] This evidence is consistent across a variety of sources.[38] Additionally, recent work from Draca, Koutmeridis and Machin (2015) reports that the jewelry category that appears in 44 stolen goods in their database typically "features a high level of gold content". As previously stated, *larceny* includes general thefts that are perpetuated without breaking in a private property. Among these theft crimes we

[33] The sample of observations originates from a pawnshop lender in Texas between 1997 and 2002 but can be interpreted as representative of the transactions profile of a typical pawnshop Similar evidence is in fact found in Comeau et al. (2011). See also Fellowees and Mabanta (2008), Shackman and Tenney (2006).

[34] The next most popular category of pledges is televisions and electronics, including satellite dishes, stereos, and CD players. Individuals also commonly pawn tools, household items such as small appliances, sporting equipment, guns, musical instruments, and camera equipment. The average loan amount for loans collateralized by jewels is $96, a value only lower than guns and musical instruments.

[35] Refiners typically have minimum quantities of metals that they accept and work with. They normally work with several pounds of material, so direct link between clients and refiners can rarely happen. Information can be found online, see: http://www.pawnnerd.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.

[36] 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. 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.

[37] Police recorded crime data are from the Sanwdwell Metropolitan Borough Council area of the West Midlands (Burrel and Wellsmith, 2010).

[38] Similar evidence can be found in various websites. For example:
http://www.alarm.org/homesafety/topsixitemsburglarsstealfromhomes.aspx, https://www.theaa.com/home-insurance/home-burglary-statistics-15-commonly-stolen-items.

can enumerate: shoplifting, pocket picking, and purse snatching.[39] UCR data do not classify the type of objects stolen by crime category. But it might be useful to mention that in 2010 only 11.3% of common larcenies targeted normal buildings, while 35% were thefts from motor vehicles, 17% from shops, 3% bicycles, and 31.8% all others. Overall, this seems to suggest that fewer gold items might be stolen during a typical larceny, as this crime does not involve the trespassing into a private property, where precious items are generally secured and protected.

4.1. A Difference-in-Differences Design: Pawnshops and Gold Prices

I now posit that upward shifts in gold prices cause more thefts in counties with a higher prevalence of pawnshops. I explore this hypothesis using a difference-in-differences design, where I interact gold prices with the number of pawnshops in a county fixed in 1997. The baseline geographical distribution of pawnshops, that resembles the differential in gold treatment-intensity across locations, is shown in Figure 1.

[FIGURE 1 HERE]

In this difference-in-differences design, the key identifying assumption is that the 'high' and 'low' pawnshops counties would have experienced similar crime trends absent a change in gold prices. Figure 2 explores the merits of this assumption. I show the mean of residuals – for burglary and larceny – averaged by year, and by whether the county is below or above the median of pawnshops in 1997.[40]

[FIGURE 2 HERE]

For burglary, we can observe parallel trends up to 2001. After 2001 and 2005, we notice an extremely interestingly pattern: a rise in gold prices, and a visible increase in burglaries that is only concentrated in counties above the pawnshops median. Figure 2 presents the same exercise for larceny. This figure shows parallel trends for larceny in counties below and above the pawnshops median, but no apparent response following the increase in gold prices in counties above the pawnshops' median. For completeness, figure 3 shows the same evidence for the

[39] For more info: http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2010/crime-in-the-u.s.-2010/property-crime/larcenytheftmain

[40] Residuals are obtained from a specification where I include state and year FE, and all county-level controls.

remaining 6 crimes analyzed in the paper. It is interesting to notice that – as we should expect – almost perfectly parallel trends are shown for motor-vehicle thefts, an acquisitive crime plausibly less sensitive to variation in gold prices. Furthermore, the graphical analysis does not seem to uncover revealing patterns similar to the case of burglary for the other crimes.

[FIGURE 3 HERE]

My study analyzes a period of 14 years, from 1997 to 2010. In the first 9 years, from 1997 to 2005, gold prices fluctuated significantly, rising in value by about 37%. From 2006 to 2010 instead, these prices displayed an impressive increase of almost 200% (Figure A2).[41] The 2006 spike in gold prices might have led other businesses, such as jewelers and online refineries, to increase or to start their demand for gold, to exploit the high-profitability of this new type of commerce. To investigate the presence of potential heterogeneous effects in criminal responses, I start this analysis by splitting the sample into two periods: 1997-2005 and 2006-2010. Importantly, the analysis and all the robustness checks are reported for these two samples, as well as for the entire sample that goes from 1997 to 2010.

4.2. Empirical Model and Results

These premises are the basis of the following OLS estimating equation:

$$y_{i,t} = \alpha_i + \gamma_t + X'_{i,t}\beta_0 + \left[\#pawn_{i,t=1997} * gold\_prices_t\right]\beta_2 + \epsilon_{i,t} \qquad (2)$$

where *i* indicates the county, and *t* the year. The coefficient of interest is β_2, the effect on crime of the interaction between the initial concentrations of pawnshops per capita in a county, fixed to the first year of the sample (1997), and gold prices at time *t*. In this specification, a key role is played by the inclusion of year fixed effects. These partial out from the estimate the direct and uniform effect that the rise of gold prices might have on the growth of theft crimes in all counties. I also include county fixed effects and all the county observables discussed above.

[41] 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 from the following website: http://www.gold.org. (Accessed date: December 2012)

Table V reports the results of the estimating equations (2) for burglaries. Panel A refers to the period 1997-2005, Panel B refers to the period 2006-2010.

[TABLE V HERE]

I detect a coefficient of 1.00 significant at the 5% level in the first part of the sample, and a coefficient of 0.431 significant at the 1% level in the second part of the sample (column 1). The lower effect in the second part of the sample might be consistent with an expansion of the number of participants to the 'gold' business, due to an increase in its profitability. If the initial concentration of pawnshops is interpreted as a measure of the 'true size' of the market for stolen goods, this could suffer from a time-variant measurement error, leading to a more severe attenuation bias in a period with several other businesses and e-commerces are trading gold items.[42]

The analysis suggests that burglars seem to respond more to changes in the value of criminal opportunities, in counties with a higher prevalence of markets for stolen property. However, the existing correlation between the baseline intensity of pawnshops and area-specific factors, also correlated to property thefts, threatens the validity of this interpretation. In practice, factors such as poverty and labor market conditions might be driving the differential effect of gold prices in 'high-pawnshops' areas, as criminals in these disadvantaged locations might be more incentivized to steal, when gold prices are rising.

To explore the merits of this competing interpretation, and to partially absorb confounding trends, I include 17 additional variables in the analysis (column 2). These are generated interacting gold prices with all the (county-specific) socio-economic variables, fixed in year 1997. As a remainder, these are: income per capita, percentage of people below the poverty line, percentage of unemployment, social security recipients, average monthly payment per subsidy, number of commercial banks and saving institutions, banking and saving deposits, population density, and 8 controls for the racial/ethnic composition in the county. In the first part of the sample, the pawnshops-gold interaction is strengthened by the inclusion of this further set of

[42] Other possible explanations are related to the mechanic decrease overtime of the 'available gold to steal' in areas with a high concentration of pawnshops or to the progressive understanding by the local community of the involvement of these businesses in the trade of stolen jewelry.

controls (1.17 significant at the 5% level). In the second part of the sample, I detect a slight reduction of the coefficient of interest to 0.3, which is still significant at the 5% level.

Other interpretation confounders could be more 'crime-specific'. For example: if the initial intensity of pawnshops is correlated with burglars' 'level of expertise', changes in gold prices could incentivize crime in 'high-pawnshops' counties because more experienced burglars respond more to changes in the profitability of crime. To partially control for this possibility, I include the interaction of gold prices with the initial rate of burglaries in 1997 (column 4), and with the ratio between burglaries and all crimes in 1997 (column 5). I also add the interaction with the measure of police officers in 1997 (column 6). Results are robust to all these specifications. Finally, I present the results of the most demanding specification displayed in column 5, weighted by county-population. The coefficient is 4 times larger for the sample from 1997 to 2005 (significant at the 1% level), and twice as big for the sample from 2006 to 2010 (significant at the 5% level).

To put these results into perspective, a one standard deviation increase in the initial concentration of pawnshops in a county generates a 0.05 to 0.10 standard deviation increase in the effect of gold prices on burglaries. In other terms, moving from the 25th percentile of the 1997 pawnshops distribution (0.62 pawnshops per 100,000 people), to the 75th percentile (9.54 pawnshops per 100,000 people) increases by around 4% to 7% the number of burglaries associated with the rise in gold prices.

4.3 Falsification Tests and Robustness checks

As in the previous analysis, table VI reports the results separately for all other crimes in the two sample periods. These can be interpreted as other falsification tests for my analysis. It is reassuring to notice that no positive effects are found for the other crimes in both samples, except for arson from 2005 to 2010. A closer look to this specific crime in figure 3 reveals initial diverging patterns rather than parallel trends, with the positive effect detected due to an overtime reduction in the number of arsons in counties below the pawnshops median, rather than to an increase in counties above the 1997 pawnshops median.[43]

[43] Estimates related to arson should be considered with extreme caution for two reasons. First, the level of accuracy and the number of FBI agencies reporting this crime via UCR is unstable and not accurate. Please consult: https://ucr.fbi.gov/crime-in-the-u.s/2010/crime-in-the-u.s.-

[TABLE VI HERE]

Table A5 reports the results for estimating equation (2) for the entire sample (1997 to 2010) using burglary as an outcome. The magnitude of the coefficients is in the middle to the estimates obtained when the sample is divided in 2 periods. P-values are below 1% for all the specifications, but for the baseline (significant at the 5 percent level), and for the specification which includes all the socio-economic controls interacted with gold prices. In this case, the coefficient is 0.15 with a p-value around 18%.

Tables A6 and A7 reports several robustness checks. For completeness, each table shows the results in Panel A for the 1997-2005 period, in Panel B for the 2006-2010 period, and in Panel C for the 1997 to 2010 period. All the specifications include year FE, county Fe, all county observables, and all county observables fixed at 1997 and multiplied by gold prices. I start by describing table A6. Column 1 shows results when I include linear trends multiplied by the initial stock of pawnshops in a county. Column 2 includes quadratic trends multiplied by the initial stock of pawnshops in a county. Column 3 includes county specific linear trends. Column 4 to 6 report results when the distribution of the initial number of pawnshops is trimmed at the top 1%, 2%, and 5%, respectively. Results are significant and strong across all specifications in panel A. Coefficients are highly unstable to the inclusion of trends interacted with the initial number of pawnshops in panel B (2006 to 2010). Some potential explanations might be related to the fact that: the 2006-2010 panel contains only 5 years of data; gold prices display an upward trend during this period (figure A2) that generates collinearity when other trends are included; results in the final part of the sample are weaker for the economic reasons discussed above. Finally, when we consider the entire sample (panel C), results are always significant at the 1% level except for the case when we include county specific linear trends. The coefficient is 0.224 but it is not statistically different from zero.

Table A7 reports another set of robustness check. Column 1 shows the results when the year 1997 is excluded from the sample. This robustness check is performed to avoid the simultaneity between crime and pawnshops occurring in 1997, and it only affects the results in panel A and in panel C. Column 2 to 4 report results when the distribution of the initial population in a county

2010/methodology. Second, arson is the only crime that is not reported using the hierarchy rule. Please see the data appendix for more information.

is trimmed at the top 1%, 2%, and 5% respectively. Column 5 shows the result weighted by the FBI coverage indicator. Column 6 includes state linear trends. Results are significant across all the specifications, with the only exception being panel B when state specific linear trends are incorporated in the analysis.

4.4 An Additional Falsification Test: Copper Thefts and the 'Red Gold' Rush

Finally, I perform an additional falsification test. This stems from the idea that pawnshops do not typically trade copper (as shown in Table A1), even if criminals heavily target this metal.[44] Table VII displays the estimates of the interaction between copper prices and the initial concentration of pawnshops (columns 1 and 3). I add the product between pawnshops and gold prices in columns 2 and 4.[45]

[TABLE VII HERE]

From 1997 to 2005, I detect a positive but imprecisely estimated effect of copper prices through pawnshops. This effect vanishes when I include the second interaction with gold prices. Despite the 0.84 correlation between gold and copper prices, pawnshops seem to affect burglaries exclusively via gold prices. Similarly, from 2006 to 2010, the copper-interaction term is negative and significant at the 1% level in both specifications, and the gold-interaction term is 0.34, significant at the 5% level. Similar effects are also shown for all the sample (Table A8).

To conclude, while I do not want to overemphasize the negative impact that the initial concentration of pawnshops has on burglaries through copper prices, I consider the substitutability across markets for stolen goods – due to oscillation in world prices of metals and technological goods – an interesting venue for future research.

[44] The demand for copper from developing nations has generated an intense international copper trade. According to the FBI, copper thieves exploit this demand and the related spike in international prices by stealing and selling the metal to recyclers across the United States. See: http://www.fbi.gov/news/stories/2008/december/copper_120308. Also, two illustrative pictures about this type of crime are shown in figure A5.

[45] Data on historical copper price is obtained from the U.S. geological survey at: http://www.usgs.gov/ (Accessed date: December 2012)

5. Concluding Remarks

Theft crimes impose a huge burden to society. Criminals often target items that should be later converted in cash. This raises the hypothesis that the availability of market for stolen goods might change criminals' incentives by affecting the value of criminal opportunities. In this paper, I offer one of the first systematic empirical investigations of the effect of stolen goods markets on crime. Two main challenges exist for this analysis: first, markets for stolen goods are hard to observe and to measure; second, these markets are also endogenous to the proliferation of crime.

I use a 'forensic' approach, which leverages information from legal operations to provide insights on hidden illegal activities. Specifically, I focus on pawnshops: this is a business that has long being suspected of being involved in the illicit trade of stolen items. The endogeneity of pawnshops to crime is addressed in multiple ways. I first exploit the panel properties of the dataset newly assembled for the analysis. Results confirm that within-county changes in pawnshops are a strong and significant predictor of larceny and burglary. The findings are robust to extensive robustness and falsification tests. I then exploit an exogenous shift in crimes expected benefits, using the rise in gold prices as a quasi-natural experiment. In this setup, the intensity of the treatment is given by the initial concentration of pawnshops in a county. The graphical and empirical analysis, alongside numerous robustness and falsification tests, support the hypothesis that burglars respond more to changes in the value of criminal opportunities, in areas with a larger market for the trade of stolen property.

This paper suggests new directions for future research. A direct spin off for this work would be the analysis of other markets for stolen goods, such as flea markets, junkyards or online web sites such as EBay or Craigslist. Moreover, entering in the 'black box' of the mechanisms that link demand and supply is critical for the deep understanding of criminal behavior. Two separate channels might play an important role in this context. On the one hand, the increase in the size of the market for stolen goods might reduce criminals' transaction costs and – consequently – the expected probability of being arrested while getting rid of the stolen items (i.e negative deterrence effect). On the other hand, the increase in the level of competition in the resale market might push up prices, increasing the expected value of criminal opportunities (i.e price effect). Disentangling these two channels might be of help in shaping policy interventions aimed at reducing the impact that markets for stolen goods have on the propagation of criminal activity.

References

1. Altonji, Joseph G., Todd E. Elder, and Christopher R. Taber. *Selection on observed and unobserved variables: Assessing the effectiveness of Catholic schools*. No. w7831. National bureau of economic research, 2000.

2. Avery, Robert B., and Katherine A. Samolyk. "Payday loans versus pawnshops: The effects of loan fee limits on household use." *Federal Reserve System Research Conference, Arlington, Virginia*. 2011.

3. Ayres, Ian, and Steven D. Levitt. "Measuring Positive Externalities from Unobservable Victim Precaution: An Empirical Analysis of Lojack." *The Quarterly Journal of Economics* 113.1 (1998): 43-77.

4. Becker, Gary S. "Crime and Punishment: An Economic Approach." *Journal of Political Economy* 76.2 (1968): 169-217.

5. Cardoso, Nuno, et al. "EDP distribuição: Smart solutions against the theft of power equipments." *Electricity Distribution (CIRED 2013), 22nd International Conference and Exhibition on*. IET, 2013.

6. Caskey, John P. "Fringe banking and the rise of payday lending." *Credit markets for the poor* 17 (2005): 18-19.

7. Chalfin, Aaron, and Justin McCrary. "Criminal deterrence: A review of the literature." *J Econ Lit* (2014).

8. Comeau, Michelle, and John Klofas. "Analysis of 2011 Rochester-City Pawn Shop Transactions: The Year in Review." *Center for Public Safety Initiatives, Working Paper* (2012).

9. Cook, Philip J., and John MacDonald. "Public safety through private action: an economic assessment of BIDS." *The Economic Journal* 121.552 (2011): 445-462.

10. DellaVigna, Stefano, and Eliana La Ferrara. "Detecting illegal arms trade." *American Economic Journal: Economic Policy* 2.4 (2010): 26-57.

11. Draca, Mirko, and Stephen Machin. "Crime and economic incentives." *Annual Review of Economics* 7.1 (2015): 389-408.

12. Draca, Mirko, Theodore Koutmeridis, and Stephen J. Machin. "The changing returns to crime: do criminals respond to prices?" (2015).

13. Dube, Arindrajit, Ethan Kaplan, and Suresh Naidu. "Coups, Corporations, and Classified Information." *The Quarterly Journal of Economics* (2011): qjr030.

14. Duggan, Mark, Randi Hjalmarsson, and Brian A. Jacob. "The short-term and localized effect of gun shows: Evidence from California and Texas." *Review of Economics and Statistics* 93.3 (2011): 786-799.

15. Durante, Ruben, and Ekaterina Žuravskaja. *Attack when the World is Not Watching?: International Media and the Israeli-Palestinian Conflict*. Centre for Economic Policy Research, 2015.

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. Fisman, Raymond, and Shang-Jin Wei. "Tax rates and tax evasion: Evidence from" missing imports" in China." *Journal of political Economy* 112.2 (2004): 471.

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 Pawn Broking Law.” The Florida Senate, Committee on Criminal Justice (Interim Project Report 2000-26). Washington DC: Government Printing Office.

20. Freedman, Matthew, and Emily G. Owens. "Your friends and neighbors: localized economic development and criminal activity." *Review of Economics and Statistics* 98.2 (2016): 233-253.

21. Glover, S. and E. Larrubia. 1996, November 24. “A System in Hock: Quick Cash with Few Questions.” South Florida Sun-Sentinel, p. 22A.

22. Gonzalez-Navarro, Marco. "Deterrence and geographical externalities in auto theft." *American Economic Journal: Applied Economics* 5.4 (2013): 92-110.

23. Gould, Eric D., Bruce A. Weinberg, and David B. Mustard. "Crime rates and local labor market opportunities in the United States: 1979–1997." *Review of Economics and statistics* 84.1 (2002): 45-61.

24. Hammond, B. 1997, December 3. “Pawnshops Link Addicts and Crime.” The Oregonian, p. 5A.

25. Hsieh, Chang-Tai, and Enrico Moretti. "Did Iraq Cheat the United Nations? Underpricing, Bribes, and the Oil for Food Program." *The Quarterly Journal of Economics* 121.4 (2006): 1211-1248.

26. Lochner, Lance, and Enrico Moretti. "The effect of education on crime: Evidence from prison inmates, arrests, and self-reports." *The American Economic Review* 94.1 (2004): 155-189.

27. Miles, Thomas J. "Markets for stolen property: Pawnshops and crime." *Unpublished PhD Dissertation Chapter, University of Chicago Law School* (2007).

28. Nunn, Nathan, and Leonard Wantchekon. "The slave trade and the origins of mistrust in Africa." *The American Economic Review* 101.7 (2011): 3221-3252.

29. Van Ours, Jan C., and Ben Vollaard. "The Engine Immobiliser: A Non-Starter for Car Thieves." *The Economic Journal* 126.593 (2016): 1264-1291.

30. Bos, Marieke, Susan Carter, and Paige Marta Skiba. "The pawn industry and its customers: The united states and europe." *Vanderbilt Law and Economics Research Paper* 12-26 (2012).

31. Parey, Mathias, and Rasul Imran. "Measuring the Market Size for Cannabis: A New Approach Using Forensic Economics". Working Paper (2016).

32. Scott, D. June 26. *" Pawnshops Multiply Despite Seedy Image: Big Chains Gobble Mom and Pops, Spawn Industry Transformation." Dallas Business Journal* (1992): 1.

33. 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.

34. Sidebottom, Aiden, et al. "Theft in price-volatile markets: On the relationship between copper price and copper theft." *Journal of Research in Crime and Delinquency* 48.3 (2011): 396-418.

35. Sorensen, David WM. "Rounding Up Suspects in the Rise of Danish Burglary." (2011).

36. Sutton, Michael. *Stolen goods markets*. Washington, DC: US Department of Justice, Office of Community Oriented Policing Services, 2010.

37. Sukhtankar, Sandip. "Sweetening the deal? political connections and sugar mills in India." *American Economic Journal: Applied Economics* 4.3 (2012): 43-63.

38. Uniform Crime Report, Crime in the United States, US Department of Justice, 2010

39. Vollaard, Ben, and Jan C. Van Ours. "Does Regulation of Built-in Security Reduce Crime? Evidence from a Natural Experiment." *The Economic Journal* 121.552 (2011): 485-504.

40. Walters, Jennifer Hardison, Andrew Moore, M. Stat, Marcus Berzofsky, and Lynn Langton. “Household Burglary, 1994-2011.”

41. Warner, Bill. "No Questions Asked: Sarasota Pawn Shop Businesses Charged in Sting Operation, Black-Market Fencing Easy Cash for Burglars & Armed Robbers." (2011).

42. 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.

43. Wheat, Willis J. "A Study on the Status of the Pawnbrokers Industry in the State of Oklahoma." *Consumer Finance Law Quarterly Report* 52 (1998): 87-92.

44. Wright, Richard T., and Scott H. Decker. *Burglars on the job: Street life and residential break-ins*. UPNE, 1996.

45. Zitzewitz, Eric. "Forensic economics." *Journal of Economic Literature* 50.3 (2012): 731-769.

Table I
Descriptive Statistics – Pawnshops, Crime, and Socio-Economic Controls

	Observations	Mean	Standard Deviation
	(1)	(2)	(3)
Pawnshops	28,430	5.88	6.32
Larcenies	28,430	1,840	1,046
Burglaries	28,430	654.2	394.7
Robberies	28,430	52.74	73.96
Motor/Vehicle Thefts	28,430	190.4	180
Murders	28,430	3.86	5.43
Rapes	28,430	27.28	22.44
Assaults	28,430	237.2	203.2
Arsons	28,430	18.13	20.81
% White – Not Hispanic	28,430	0.79	0.18
% White – Hispanic	28,430	0.06	0.12
% Black – Hispanic	28,430	0	0
% Black – Not Hispanic	28,430	0.1	0.14
% Asian – Hispanic	28,430	0.01	0.02
% Asian – Not Hispanic	28,430	0	0
% American Indian – Hispanic	28,430	0	0
% American Indian – Not Hispanic	28,430	0.01	0.06
% Unemployment	28,430	6	2.7
Income per capita	28,430	27,365	7,852
People below the poverty line	28,430	16,278	53,982
Number of banks and savings institutions	28,430	39.82	17.73
% people below poverty line	28,430	0.146	0.06
Social Security recipients	28,430	20,488	47,166
Density	28,430	318.5	2,019
Social security average monthly payment	28,430	411.2	75.6
Amount of deposits ($ million)	28,430	2.42	11.87

Notes: Crimes and pawnshops standardized per 100,000 people, by county. Source NACJD, 1997-2010.

Table II
Pawnshops and Crime: Theft vs. Non-Theft Crimes

Panel A	(1)	(2)	(3)	(4)	(5)
	Outcome: Pooled Measure of Theft Crimes				
	Baseline	+ County FE	+ County Observables	+ State Trends	+ State FE * Year FE
Pawnshops	16.74***	9.839***	8.543***	6.124***	5.598***
	(5.472)	(2.091)	(2.112)	(2.088)	(2.087)
Panel B	(1)	(2)	(3)	(4)	(5)
	Outcome: Pooled Measure of Non-Theft Crimes				
	Baseline	+ County FE	+ County Observables	+ State Trends	+ State FE * Year FE
Pawnshops	3.002***	0.200	0.211	0.0629	0.0874
	(0.663)	(0.471)	(0.479)	(0.478)	(0.467)
Observations	28,430	28,430	27,466	27,466	27,466
Year FE	YES	YES	YES	YES	YES
County FE	NO	YES	YES	YES	YES
County Observables	NO	NO	YES	YES	YES
State Trends	NO	NO	NO	YES	NO
State FE * Year FE	NO	NO	NO	NO	YES

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the county level. Pawnshops and reported crimes are in per capita terms. The pooled measure of theft-related crimes (Panel A) is constructed as the sum of larcenies, robberies, burglaries and motor–vehicle thefts. The pooled measure of other non-theft crimes (Panel B) is constructed as the sum of murders, rapes, aggravated assaults and arsons. County observables include percentages of Whites Hispanics, Whites not Hispanics, Blacks Hispanics, Blacks not Hispanics, Asians Hispanics, Asians not Hispanics, American Indians Hispanics, American Indians not Hispanics, income per capita, percentage of people below the poverty line, unemployment, social security recipients, average monthly payment per subsidy, commercial banks and saving institutions per capita, amount of banking and saving deposits, population density. Column 1 shows the baseline specification with year FE. In column 2 I add county FE, in column 3 I include all county observables. Column 4 adds state-linear trends, column 5 includes state FE * year FE.

Table III
Pawnshops and Crime, Disaggregation by Type of Crime

Panel A	(1)	(2)	(3)	(4)
	Outcome: Theft Related Crimes			
	Larceny	Burglary	Robbery	M/V Theft
Pawnshops	6.719***	1.651**	0.0153	0.159
	(1.639)	(0.643)	(0.0569)	(0.172)
Panel B	**(1)**	**(2)**	**(3)**	**(4)**
	Outcome: Non-Theft Related Crimes			
	Murder	Rape	Assault	Arson
Pawnshops	0.0223	0.0196	0.135	0.0334
	(0.0183)	(0.0498)	(0.455)	(0.0421)
Observations	27,466	27,466	27,466	27,466
Year FE	YES	YES	YES	YES
County FE	YES	YES	YES	YES
County Observables	YES	YES	YES	YES

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the county level. Pawnshops and reported crimes are in per capita terms. Panel A shows results for theft crimes: larcenies, robberies, burglaries and motor–vehicle thefts. Panel B displays results for murders, rapes, aggravated assaults and arsons. I include year Fe, county Fe, and all county observables. County observables include percentages of Whites Hispanics, Whites not Hispanics, Blacks Hispanics, Blacks not Hispanics, Asians Hispanics, Asians not Hispanics, American Indians Hispanics, American Indians not Hispanics, income per capita, percentage of people below the poverty line, unemployment, social security recipients, average monthly payment per subsidy, commercial banks and saving institutions per capita, amount of banking and saving deposits, population density.

Table IV-A
Functional Forms, Geographical Spillovers, and Heterogeneity (Outcome: Larceny)

	(1) Linear Weighted	(2) Log-Lin	(3) Log-Log	(4) Geographical Spillovers	(5) State Level	(6) State Level Weighted
Pawnshops	18.26**	0.00480**	0.0266**	5.727***		
	(7.129)	(0.00247)	(0.0117)	(1.839)		
Other Pawnshops in the State				38.05**		
				(17.59)		
All the Pawnshops in the State					35.3*	63.69**
					(21.95)	(28.76)
Year FE	YES	YES	YES	YES	YES	YES
County FE	YES	YES	YES	YES	State FE	State FE
County Observables	YES	YES	YES	YES	State Obs	State Obs

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the county level, unless otherwise specified. All the specifications include year FE, county FE, all county observables. The outcome measured is larceny. Column 1 shows the result of a linear specification, weighted by the county population, with the outcome and the number of pawnshops expressed in per-capita terms (as in table II and III). In column 2 I transform the outcome in log(1+y), where y is crime per 100,000 people. Column 3 reports the pawnshops-crime elasticity, computed with log-transformations as in column 2. In column 4 I include the number of all the other pawnshops in the state per capita, alongside the number of pawnshops in the same county (where crime is also measured). Standard errors are clustered at the state level. Column 5 reports the results of state-level specifications; I use state FE and collapse all the county level control at the state-year level. Standard errors are clustered at the state level. Column 6 reports the same specification as in column 5, weighted by state population. Standard errors are clustered at the state-level.

Table IV-B
Functional Forms, Geographical Spillovers, and Heterogeneity (Outcome: Burglary)

	(1) Linear Weighted	(2) Log-Lin	(3) Log-Log	(4) Geographical Spillovers	(5) State Level	(6) State Level Weighted
Pawnshops	1.849	0.00407**	0.0244**	1.631***		
	(2.255)	(0.00201)	(0.0105)	(0.631)		
Other Pawnshops in the State				0.737		
				(9.564)		
All the Pawnshops in the State					-0.26	6.29
					(9.008)	(11.8)
Year FE	YES	YES	YES	YES	YES	YES
County FE	YES	YES	YES	YES	State FE	State FE
County Observables	YES	YES	YES	YES	State Obs	State Obs

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the county level, unless otherwise specified. All the specifications include year FE, county FE, all county observables. The outcome measured is burglary. Column 1 shows the result of a linear specification, weighted by the county population, with the outcome and the number of pawnshops expressed in per-capita terms (as in table II and III). In column 2 I transform the outcome in log(1+y), where y is crime per 100,000 people. Column 3 reports the pawnshops-crime elasticity, computed with log-transformations as in column 2. In column 4 I include the number of all the other pawnshops in the state per capita, alongside the number of pawnshops in the same county (where crime is also measured). Standard errors are clustered at the state level. Column 5 reports the results of state-level specifications; I use state FE and collapse all the county level control at the state-year level. Standard errors are clustered at the state level. Column 6 reports the same specification as in column 5, weighted by state population. Standard errors are clustered at the state level.

Table V
A Difference-in-Differences Design: Burglaries Responses to Changes in Gold Prices (Via Pawnshops)

Panel A	(1)	(2)	(3)	(4)	(5)	(6)
	Outcome: Burglary (Sample 1997-2005)					
	Baseline	+ All Controls 1997 * Gold Prices	+ Burglary 1997 * Gold Prices	+ Burglary/Crime 1997 * Gold Prices	+ Police 1997 * Gold Prices	Weighted by Population
Pawnshops 1997 * Gold Prices	1.000**	1.173**	1.894***	1.776***	1.380**	5.325***
	(0.492)	(0.536)	(0.530)	(0.533)	(0.561)	(0.917)
Panel B	(1)	(2)	(3)	(4)	(6)	(7)
	Outcome: Burglary (Sample 2006-2010)					
	Baseline	+ All Controls 1997 * Gold Prices	+ Burglary 1997 * Gold Prices	+ Burglary/Crime 1997 * Gold Prices	+ Police 1997 * Gold Prices	Weighted by Population
Pawnshops 1997 * Gold Prices	0.431***	0.306**	0.339**	0.313**	0.352**	0.604**
	(0.135)	(0.144)	(0.146)	(0.145)	(0.151)	(0.236)
Year FE	YES	YES	YES	YES	YES	YES
County FE	YES	YES	YES	YES	YES	YES
County Observables	YES	YES	YES	YES	YES	YES

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the county level. All the specifications include year FE, county Fe, all county observables. Panel A reports the results for the sample 1997-2005, panel B for the sample 2006-2010. Outcome of interest is the per-capita measure of burglaries. I show the results of the interaction between gold prices and the number of pawnshops in the county, fixed at year 1997, expressed in per capita terms. Column 1 is the baseline specification. In column 2 I add the interaction of all socio-economic controls (fixed at 1997) with gold prices. County observables include percentages of Whites Hispanics, Whites not Hispanics, Blacks Hispanics, Blacks not Hispanics, Asians Hispanics, Asians not Hispanics, American Indians Hispanics, American Indians not Hispanics, income per capita, percentage of people below the poverty line, unemployment, social security recipients, average monthly payment per subsidy, commercial banks and saving institutions per capita, amount of banking and saving deposits, population density. In column 3 I add the interaction of gold prices with the initial number of burglaries in 1997. In column 4 I include the gold prices interaction with the ratio between burglary in 1997 and total crime in 1997, while in column 5 I add the interaction with the number of police officers in 1997. Finally, column 6 shows the results of the most demanding specification (column 5) weighted by county population.

Table VI
Gold Prices, Pawnshops, and Other Crimes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: 1997-2005						
	Larceny	Robbery	MV Theft	Murder	Assault	Rape	Arson
Pawnshops 1997 * Gold	-0.113	0.0300	0.0831	-0.0165	0.216	0.00808	0.0673
	(1.476)	(0.0501)	(0.204)	(0.0138)	(0.368)	(0.0432)	(0.0425)
	Panel B: 2006-2010						
	Larceny	Robbery	MV Theft	Murder	Assault	Rape	Arson
Pawnshops 1997 * Gold	0.377	-0.0251	-0.0432	-0.00275	0.0251	-0.00295	0.0244**
	(0.370)	(0.0177)	(0.0521)	(0.00382)	(0.0925)	(0.0165)	(0.0117)
Year FE	YES	YES	YES	YES	YES	YES	YES
County FE	YES	YES	YES	YES	YES	YES	YES
Controls 1997 * Gold	YES	YES	YES	YES	YES	YES	YES
County Observables	YES	YES	YES	YES	YES	YES	YES

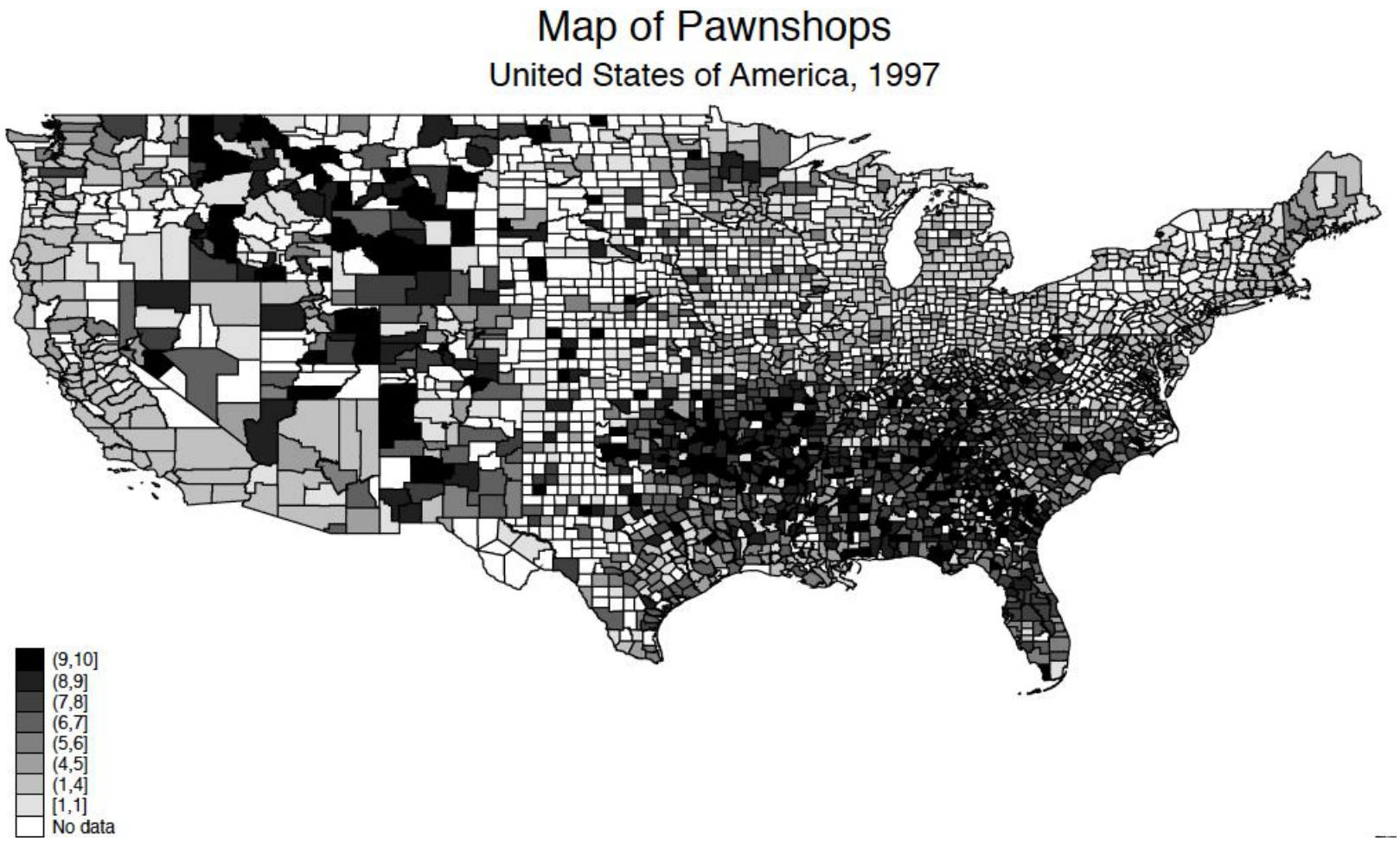
Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the county level. All the specifications include year FE, county FE, all county observables, and all socio-economic controls (fixed at 1997) interacted with gold prices. Panel A shows the results from 1997 to 2005, panel B shows the results for 2006-2010.

Table VII
Falsification Test Using Copper Prices

	(1)	(2)	(3)	(4)
	1997-2005		2006-2010	
	Outcome: Burglary			
	Baseline	+ Pawnshops 1997 * Gold Prices	Baseline	+ Pawnshop 1997 * Gold Prices
Pawnshops 1997 * Gold Prices		1.267		0.344**
		(0.936)		(0.147)
Pawnshops 1997 * Copper Prices	0.802	-0.334	-2.004***	-1.820***
	(0.516)	(0.912)	(0.437)	(0.418)
Year FE	YES	YES	YES	YES
County FE	YES	YES	YES	YES
County Observables	YES	YES	YES	YES

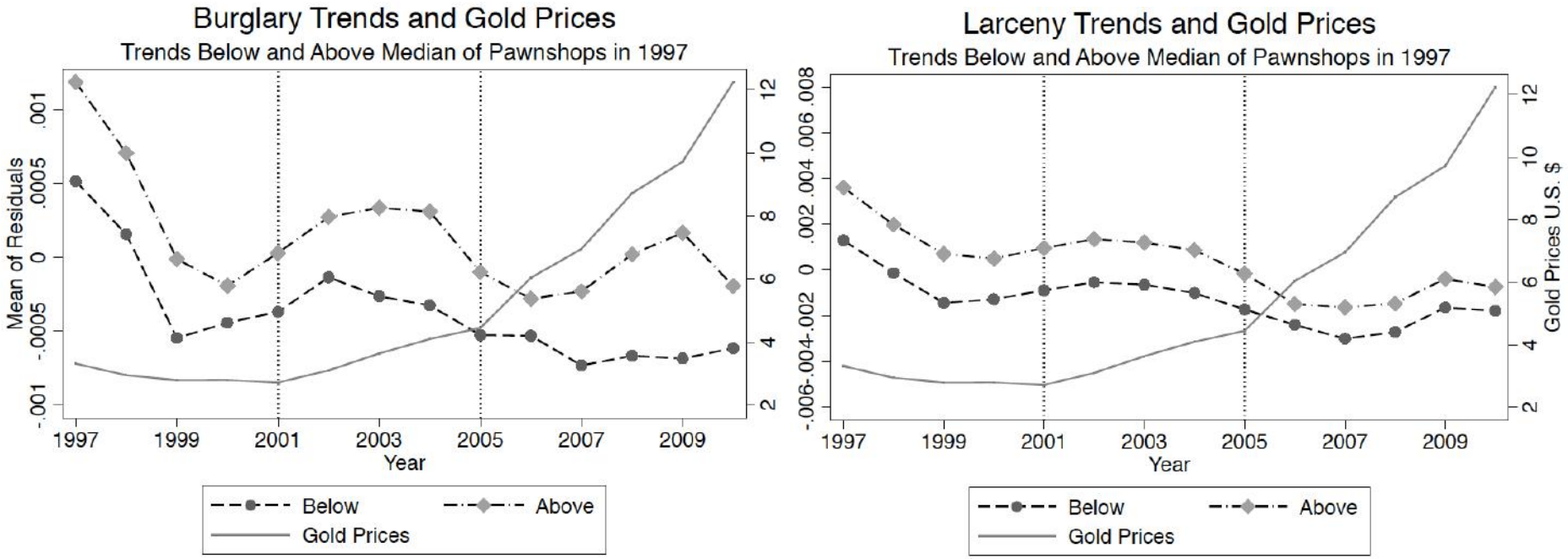
Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the county level. Burglary measured in per capita terms is the dependent variable. In column 1 and 2 I show the results for the first part of the sample (1997-2005) while in column 3 and 4 I show the results for the second part of the sample (2006-2010). In the baseline specification, I estimate the interaction between copper prices and pawnshops per capita in the county, fixed in 1997. In Columns 2 and 4 I add to the baseline specification the interaction between gold prices and pawnshops per capita in the county, fixed at 1997.

Figure 1



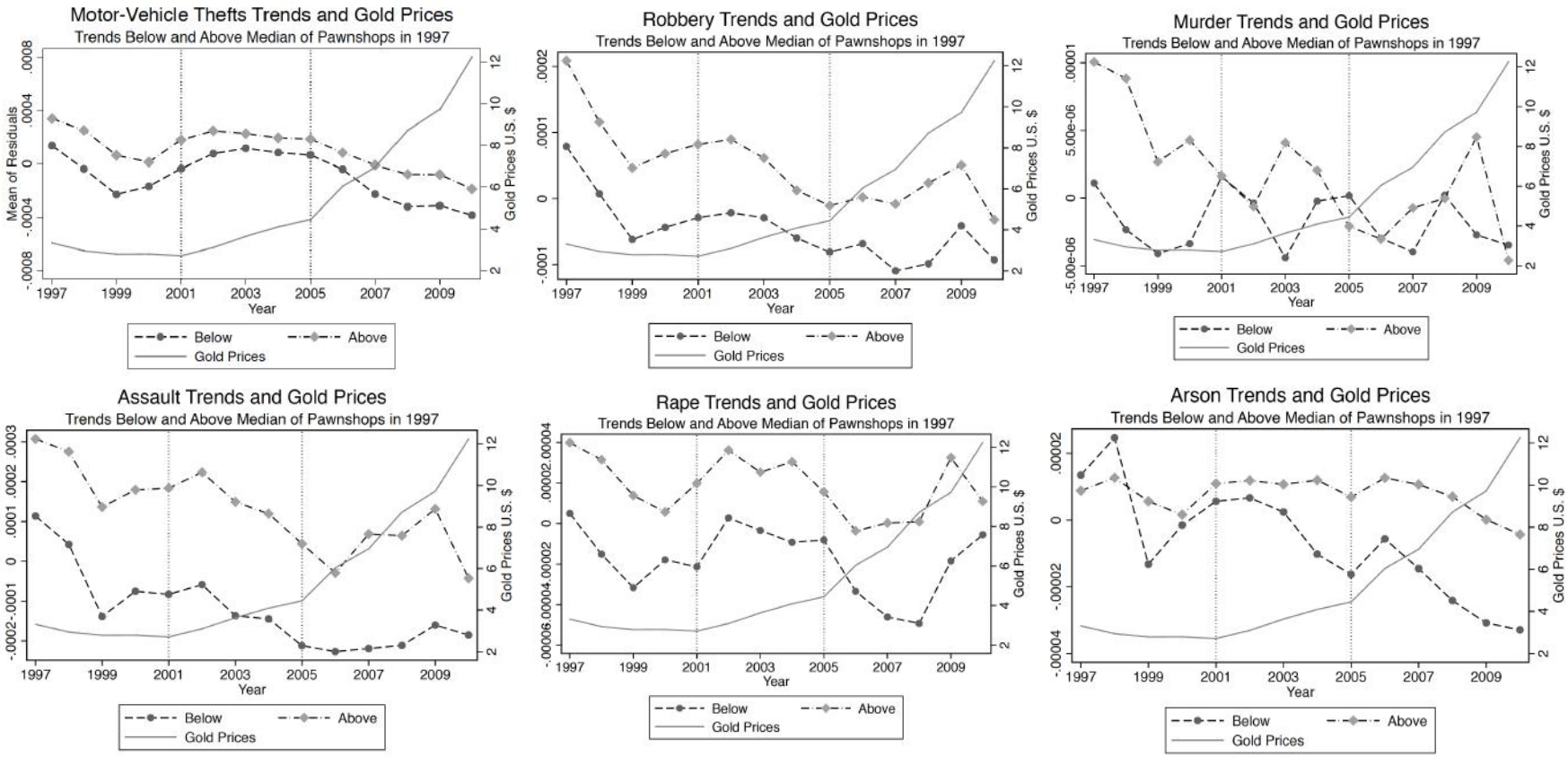
Notes: This figure shows the geographical distribution of pawnshops in the United States for the year 1997. In this figure, I show the pawnshops distribution by deciles computed using the normalized measure of pawnshops per 100,000 inhabitants. Alaska and Hawaii are eliminated from the map for illustrative purposes only.

Figure 2



Notes: This figure shows the mean of residuals, averaged by year and by whether the county is below or above the median of the distribution of pawnshops in 1997. Residuals are obtained from a specification where I include state and year FE, and all county-level controls. The left panel uses as an outcome burglary; the right panel uses larceny. In both panels, I also show the evolution of gold prices, from 1997 to 2010. I use as unit of measurement the normalized price of gold in US dollars, averaged over the entire year, per troy ounce.

Figure 3



Notes: This figure shows the mean of residuals, averaged by year and by whether the county is below or above the median of the distribution of pawnshops in 1997. Residuals are obtained from a specification where I include state and year FE, and all county-level controls. I also show the evolution of gold prices, from 1997 to 2010. I use as unit of measurement the normalized price of gold in US dollars, averaged over the entire year, per troy ounce.

Data Appendix – For Online Publication Only

Crimes Definition

1. Murder (criminal homicide): The willful (non-negligent) killing of one human being by another.
2. Forcible rape: The carnal knowledge of a female forcibly and against her will.
3. Robbery: 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.
4. Aggravated assault: An unlawful attack by one person upon another for the purpose of in inflicting severe or aggravated bodily injury. This type of assault usually is accompanied by the use of a weapon or by means likely to produce death or great bodily harm.
5. Burglary: The unlawful entry of a structure to commit a felony or a theft.
6. Larceny: The unlawful taking, carrying, leading, or riding away of property from the possession or constructive possession of another. Common types of larcenies include 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.
7. Motor vehicle theft: The theft or attempted theft of a motor vehicle.
8. Arson: any willful or malicious burning or attempting to burn, with or without intent to defraud, a dwelling house, public building, motor vehicle or aircraft, personal property of another, etc.

Hierarchy Rule

In some cases, a single incident may have consisted of two distinct offenses. For example, during the course of a robbery, a victim may have been fatally shot. In cases in which multiple offenses are committed by the same offender against the same victim during a given felonious act, the hierarchy rule is employed to determine how the crime is classified. A crime is classified according to the most serious offense committed. Importantly, the hierarchy rule does not apply to the offense of arson. In fact, when arson is involved in a multiple offense situation, the reporting agency must report two-part I offenses, the arson as well as the additional part I offense. The preceding list is ranked according to the hierarchy rule.

Table A1
Collateral by Category (Carter and Skiba, 2012)

Category	Observations	Relative %	Average Loan	Standard Deviation
Jewelry	199,288	49.98%	$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
Miscellaneous	3,666	0.92%	$51.50	62.46

Note: This table 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 US dollars. The sample of observations is from a pawnshop lender in Texas between 1997 and 2002 (Carter and Skiba, 2012).

Table A2
OLS Further Robustness on Larceny

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
				Panel A			
Pawnshops	6.719***	6.610***	4.602***	4.603***	2.341**	6.278***	4.601**
	(1.746)	(1.548)	(1.615)	(1.615)	(1.146)	(1.588)	(2.045)
				Panel B			
Pawnshops	5.852***	5.559***	5.313***	6.692***	6.566***	6.370***	4.227**
	(1.479)	(1.476)	(1.527)	(1.644)	(1.645)	(1.653)	(2.088)
Year FE	YES	YES	YES	YES	YES	YES	YES
County FE	YES	YES	YES	YES	YES	YES	YES
County Observables	YES	YES	YES	YES	YES	YES	YES

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the county level, unless otherwise specified. All the specifications include year FE, county FE, all county observables. The outcome measured is larceny per capita. In panel A I show results: (1) clustering at the state-level; (3) dividing pawnshops by the county population fixed in 1997; (3) adding state quadratic trends; (4) state cubic trend; (5) county-specific linear trends (6) weighting by the FBI coverage indicator, a measure of the precision of the information related to reported crimes (see footnote 28 for more information); (7) state linear trends. In Panel B I show the results trimming the sample at the 1%, 2%, and 5% of the distribution of pawnshops (columns 1 to 3); and of the population distribution (columns 4 to 6); Percentiles are computed using the distribution fixed in year 1997. Column 7 shows the results including the interaction of state Fe*year Fe.

Table A3
OLS Further Robustness on Burglary

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
				Panel A			
Pawnshops	1.651**	1.617**	1.507**	1.507**	0.801	1.633***	1.507**
	(0.649)	(0.628)	(0.628)	(0.628)	(0.534)	(0.631)	(0.636)
				Panel B			
Pawnshops	1.395**	1.484**	1.286*	1.655**	1.616**	1.595**	1.380**
	(0.634)	(0.634)	(0.663)	(0.644)	(0.646)	(0.649)	(0.631)
Year FE	YES	YES	YES	YES	YES	YES	YES
County FE	YES	YES	YES	YES	YES	YES	YES
County Observables	YES	YES	YES	YES	YES	YES	YES

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the county level, unless otherwise specified. All the specifications include year FE, county FE, all county observables. The outcome measured is burglary per capita. In panel A I show results: (1) clustering at the state-level; (3) dividing pawnshops by the county population fixed in 1997; (3) adding state quadratic trends; (4) state cubic trend; (5) county-specific linear trends (6) weighting by the FBI coverage indicator, a measure of the precision of the information related to reported crimes (see footnote 28 for more information); (7) state linear trends. In Panel B I show the results trimming the sample at the 1%, 2%, and 5% of the distribution of pawnshops (columns 1 to 3); and of the population distribution (columns 4 to 6); Percentiles are computed using the distribution fixed in year 1997. Column 7 shows the results including the interaction of state Fe*year Fe.

Table A4
Items stolen during burglaries - (Burrel and Wellsmith, 2010)

Cash	40%	Documents	5%
Jewelry	**31%**	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%		

Notes: This table shows the 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 A5
A Difference-in-Differences Design: Burglaries Responses to Changes in Gold Prices (Via Pawnshops)

Panel A	(1)	(2)	(3)	(4)	(5)	(6)
	Outcome: Burglary (All Sample 1997-2010)					
	Baseline	+ All Controls 1997 * Gold Prices	+ Burglary 1997 * Gold Prices	+ Burglary/Crime 1997 * Gold Prices	+ Police 1997 * Gold Prices	Weight by Population
Pawnshops 1997 * Gold Prices	0.274**	0.155	0.374***	0.358***	0.402***	1.160***
	(0.118)	(0.123)	(0.119)	(0.120)	(0.122)	(0.223)
Year FE	YES	YES	YES	YES	YES	YES
County FE	YES	YES	YES	YES	YES	YES
County Observables	YES	YES	YES	YES	YES	YES

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the county level. All the specifications include year FE, county Fe, all county observables. Outcome of interest is the per-capita measure of burglaries. The sample includes all years from 1997 to 2010. I show the results of the interaction between gold prices and the number of pawnshops in the county, fixed at year 1997, expressed in per capita terms. Column 1 is the baseline specification. In column 2 I add the interaction of all socio-economic controls (fixed at 1997) with gold prices. County observables include percentages of Whites Hispanics, Whites not Hispanics, Blacks Hispanics, Blacks not Hispanics, Asians Hispanics, Asians not Hispanics, American Indians Hispanics, American Indians not Hispanics, income per capita, percentage of people below the poverty line, unemployment, social security recipients, average monthly payment per subsidy, commercial banks and saving institutions per capita, amount of banking and saving deposits, population density. In column 3 I add the interaction of gold prices with the initial number of burglaries in 1997. In column 4 I include the gold prices interaction with the ratio between burglary in 1997 and total crime in 1997, while in column 5 I add the interaction with the number of police officers in 1997. Finally, column 6 shows the results of the most demanding specification (column 5) weighted by county population.

Table A6
A Difference in Differences Design: Further Robustness Checks (1)

	(1)	(2)	(3)	(4)	(5)	(6)
			Panel A: 1997 to 2005			
Pawnshop 1997 * Gold Prices	2.444***	2.446***	1.277*	1.872***	2.263***	2.926***
	(0.816)	(0.816)	(0.726)	(0.703)	(0.742)	(0.846)
			Panel B: 2006 to 2010			
Pawnshop 1997 * Gold Prices	-1.662***	-1.664***	-1.462**	0.407**	0.498***	0.444**
	(0.565)	(0.565)	(0.609)	(0.177)	(0.191)	(0.220)
			Panel C: 1997 to 2010			
Pawnshop 1997 * Gold Prices	0.545***	0.545***	0.224	0.579***	0.683***	0.864***
	(0.206)	(0.206)	(0.177)	(0.142)	(0.151)	(0.169)
Year FE	YES	YES	YES	YES	YES	YES
County FE	YES	YES	YES	YES	YES	YES
County Observables	YES	YES	YES	YES	YES	YES
County Observables 1997 * Gold	YES	YES	YES	YES	YES	YES

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the county level. All the specifications include year FE, county Fe, all county observables, and all county observables fixed at 1997 and multiplied by gold prices. Outcome of interest is the per-capita measure of burglaries. Panel A refers to the period 1997 to 2005. Panel B to the period 2006 to 2010. Panel C to the entire sample: 1997 to 2010. Column 1 shows results when linear trends multiplied by the initial stock of pawnshops are included. Column 2 includes quadratic trends multiplied by the initial stock of pawnshops. Column 3 included county specific linear trends. Column 4 to 6 report results when the distribution of the initial stock of pawnshops is trimmed at the top 1%, 2%, and 5% respectively.

Table A7
A Difference in Differences Design: Further Robustness Checks (2)

	(1)	(2)	(3)	(4)	(5)	(6)
			Panel A: 1997 to 2005			
Pawnshop 1997 * Gold Prices	1.238**	1.382**	1.368**	1.326**	1.408**	1.213**
	(0.568)	(0.562)	(0.564)	(0.565)	(0.559)	(0.588)
			Panel B: 2006 to 2010			
Pawnshop 1997 * Gold Prices	0.352**	0.353**	0.345**	0.326**	0.348**	0.155
	(0.151)	(0.151)	(0.151)	(0.152)	(0.159)	(0.162)
			Panel C: 1997 to 2010			
Pawnshop 1997 * Gold Prices	0.368***	0.406***	0.406***	0.400***	0.405***	0.198*
	(0.121)	(0.122)	(0.122)	(0.123)	(0.121)	(0.119)
Year FE	YES	YES	YES	YES	YES	YES
County FE	YES	YES	YES	YES	YES	YES
County Observables	YES	YES	YES	YES	YES	YES
County Observables 1997 * Gold	YES	YES	YES	YES	YES	YES

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the county level. All the specifications include year FE, county Fe, all county observables, and all county observables fixed at 1997 and multiplied by gold prices. Outcome of interest is the per-capita measure of burglaries. Panel A refers to the period 1997 to 2005. Panel B to the period 2006 to 2010. Panel C to the entire sample: 1997 to 2010. Column 1 shows results when the year 1997 is excluded from the sample. Column 2 to 4 report results when the distribution of the initial population in a county is trimmed at the top 1%, 2%, and 5% respectively. Column 5 shows the result weighted by the FBI coverage indicator. Column 6 includes state linear trends.

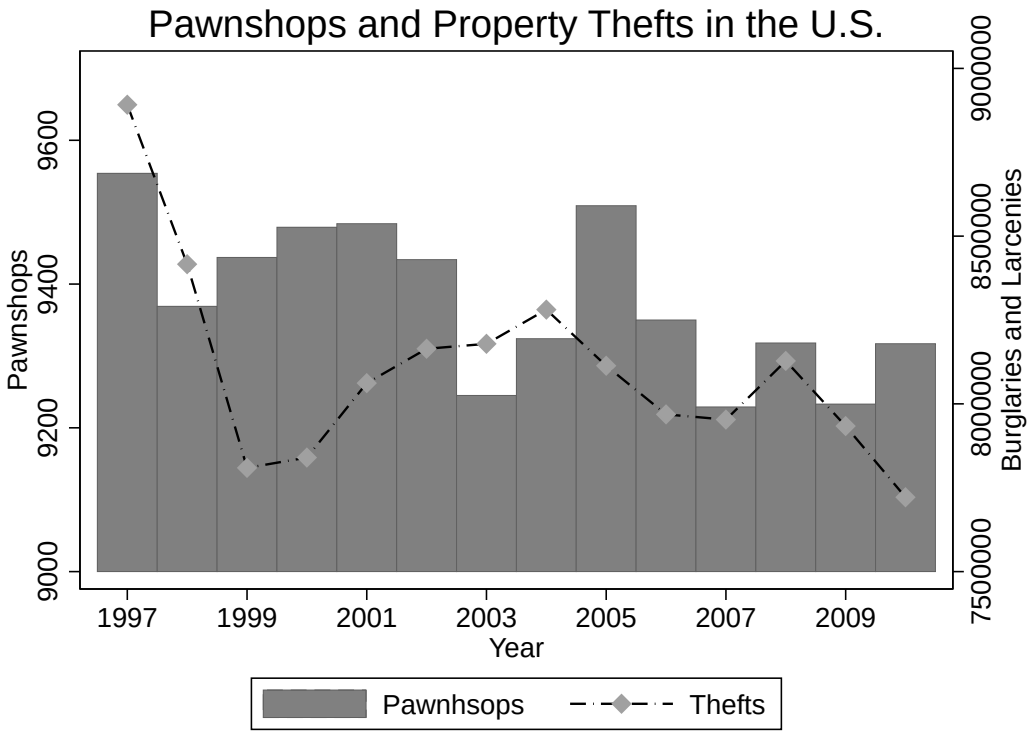
Table A8
Falsification Test Using Copper Prices (All the Sample: From 1997 to 2010)

	(1)	(2)
	Burglary	
Pawnshops 1997 * Gold Prices		0.561***
		(0.133)
Pawnshops 1997 * Copper Prices	0.202	-0.611**
	(0.219)	(0.241)
Observations	27,466	27,466
Year FE	YES	YES
County FE	YES	YES
County Observables	YES	YES

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the county level. Burglary measured in per capita terms is the dependent variable. Year Fe, County Fe, and all socio-economic controls are used in the analysis. Column 1 shows the result for the interaction of pawnshops in 1997 and copper prices. Column 2 shows the results when the interaction of pawnshops in 1997 and gold prices is included.

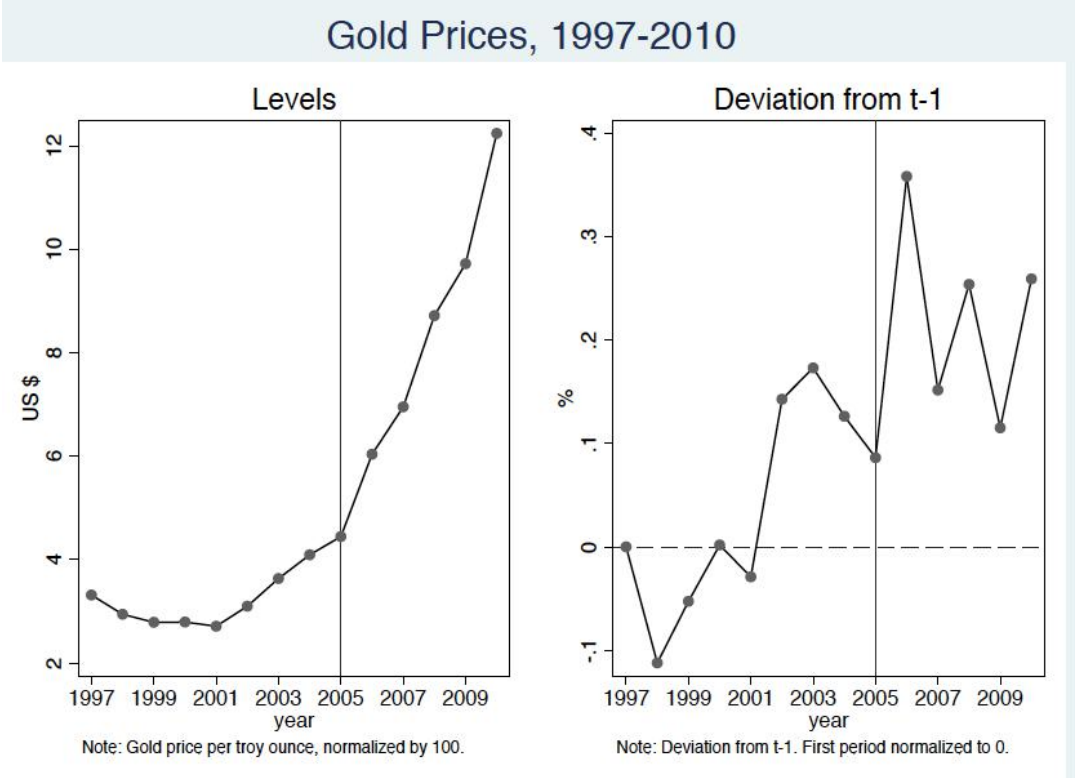
.

Figure A1



Notes: This figure shows the number of pawnshops and of burglaries and larcenies in the estimating sample from 1997 to 2010.

Figure A2



Notes: This Figure shows the evolution of gold prices, from 1997 to 2010. I use as unit of measurement the normalized price of gold in US dollars, averaged over the entire year, per troy ounce. The left-hand side figure shows the gold prices dynamic in levels, while the right-hand figure shows the gold prices evolution expressed as percentage changes from t-1. After 2005, the percentage annual increase is always above 10% with a pick of 37% increase in 2006 with respect to 2005.

Figure A3

Notes: Two examples of pawnshops' demand for gold items.

Figure A4

Notes: This pictures shows the refinement process where gold items are melted in bars of the precious metal.

Figure A5

Notes: This figure shows signs of copper thefts.