Crime and Conspicuous Consumption

Daniel Mejía   Pascual Restrepo

Universidad de los Andes and CEDE

Outline

Mejía, Restrepo   Crime and Conspicuous Consumption

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

Motivation
Related Literature

Motivation: The criminals' problem.

Criminals choose their potential victims relying on visible (outward) signs.

"[whether or not I decide to rob a particular person] depends on what they got; like if they are wearing nice clothes, jewelry, and you know, that's basically it. You can look at a person and just tell if they've got money...." [Robber named Lisa Jones, quoted by Wright and Decker (1997)].

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

Motivation
Related Literature

Motivation: Individuals' problem.

- By consuming more conspicuous goods individuals obtain higher status (Veblen (1899)).
- But... they also increase the likelihood of becoming targets of criminals (Wright and Decker (1996, 1997))
- This trade-off exists as long as individuals cannot perfectly discriminate between the receivers of their signals.

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

Motivation
Related Literature

Contribution

- We build a signaling model incorporating this trade-off.
- We propose an information channel through which crime affects individual's consumption decisions: individuals do not only reduce their consumption of conspicuous goods because criminals may steal them, but because it reveals information about individuals' wealth to criminals that is used to select their victims.
- We use U.S. data at the household level in order to test the main prediction of the model. We find strong empirical support for the channel proposed in this paper.

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

Motivation
Related Literature

Related Literature

- In general this paper is related to the literature on the economics of crime (Becker (1968), Ehrlich (1996), and many others).

- In particular, this paper is related to the literature about the effects of crime on individual behavior. (De Mello and Zilberman (2008), Pshiva and Suarez (2006), Camacho and Rodriguez (2009), Cullen and Levitt (1999), Di Tella et al. (2009)).

- Also, the paper is related to the literature on concerns for status and signaling (Glazer and Konrad (1996), Charles et al. (2009), Ireland (1994), Mailath (1987))

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

The model: Basic setup
Model analysis

Basic setup and timing

The timing of the model is as follows:

1. Each individual receives a wealth level, $w \in [w_{min}, w_{max}]$, which is private information.

2. Individuals observe their type (w) and decide their consumption of visible goods, z (price p), and a non visible numeraire good y (price normalized to 1).

3. The criminal and status audience observe z and form expectations about individual's wealth. The criminal audience decides the amount of time allocated to steal goods from each individual, and the status audience grants status to each individual.

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

The model: Basic setup
Model analysis

The model: The criminal audience

The criminal audience's strategy is summarized by a function $t(\widehat{w})$, describing the time allocated to steal goods from individuals with expected wealth $E(w|z) = \widehat{w}$.

- $0 < a(t) < 1$ is the fraction of both goods stolen by the criminals when they allocate t units of time to criminal activities.
- $t(\widehat{w})$ solves: $\max_t E\left[(pz + y)a(t) - t|z\right] = \widehat{w}a(t) - t$.
- By the implicit function theorem, $t(\widehat{w})$ is increasing in $\widehat{w}$. Thus, the fraction of goods not stolen from an individual, $\gamma(\widehat{w}) = 1 - a(t(\widehat{w}))$, is decreasing in $\widehat{w}$.

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

The model: Basic setup
Model analysis

The model: The status audience

The status audience simply forms beliefs about individual's wealth conditional on their conspicuous consumption:
$\widehat{w} = E(w|z)$

- Status is given by $S = \widehat{w}$. There is competition between individuals because expectations are formed taking into account other individual's actions.
- We assume that the status audience's beliefs are the same as the criminal audience's. Thus, signals are observed by everyone and reveal the same information (all we need is a positive correlation).

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

The model: Basic setup
Model analysis

The model: Individuals' problem

Individuals maximize utility, which is given by:

$$V(w, \widehat{w}, z) = U(z\gamma(\widehat{w}), (w - pz)\gamma(\widehat{w})) + \lambda\widehat{w}. \quad (1)$$

- $U(z\gamma(\widehat{w}), (w - pz)\gamma(\widehat{w}))$ captures the private utility from consumption.
- $\lambda\widehat{w}$ captures the utility from status.
- The term $\frac{\partial V}{\partial \widehat{w}} = \lambda + \gamma'(\widehat{w})(zU_z + yU_y)$ captures the trade-off between status and security.

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

The model: Basic setup
Model analysis

Private iformation case

In this case $\widehat{w} = w$ does not depend on z; the status and the crime burden are given; and we have the standard optimality condition:

$$\frac{U_z}{U_y} = p. \tag{2}$$

- Implicitly defines $z(w)$, which is increasing in w.
- If preferences are homothetic then $z(w)$ does not depend on crime (γ). We assume that this is the case in order to isolate the information channel.

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

The model: Basic setup
Model analysis

A separating equilibrium
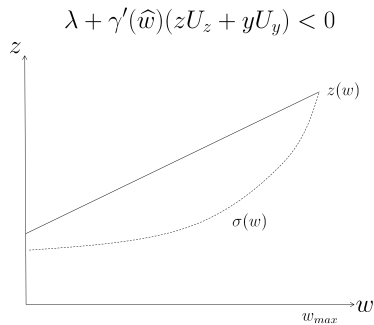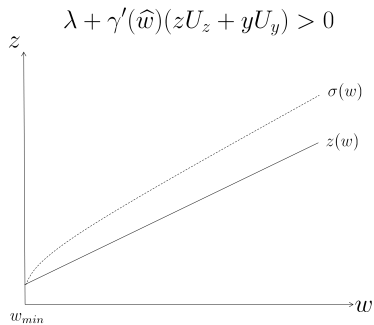
We focus on a separating equilibrium:

- Given by a 1-1 function $\sigma : [w_{min}, w_{max}]$ describing the conspicuous consumption $z = \sigma(w)$ of an individual with wealth w.
- Since beliefs must be consistent with equilibrium behavior, both audiences expectations are given by $\widehat{w} = E(w|z) = \sigma^{-1}(z)$.
- $z = \sigma(w)$ maximizes individuals utility given the audiences' beliefs (incentive compatibility).

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

The model: Basic setup
Model analysis

A separating equilibrium (cont)

- Equilibrium strategies are characterize by the following differential equation (local incentive compatibility):
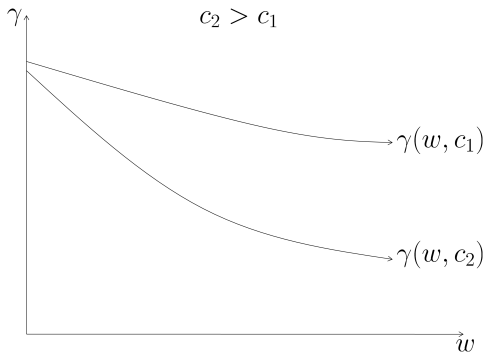
$$\sigma'(w) = \frac{\lambda + \gamma'(w)(zU_z + (w - p\sigma(w))U_y)}{\gamma(pU_y - U_z)}, \qquad (3)$$

- A boundary condition implies that this equilibrium is unique.
- Also requires SCC (in the paper).

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

The model: Basic setup
Model analysis

$$\lambda + \gamma'(\widehat{w})(zU_z + yU_y) > 0$$

$$\lambda + \gamma'(\widehat{w})(zU_z + yU_y) < 0$$

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

The model: Basic setup
Model analysis

The private information case (cont)

In order to understand the effects of crime on conspicuous consumption, we model the level of criminal activities, c, as a parameter that increases the term γ' (in absolute value) and γ.

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

The model: Basic setup
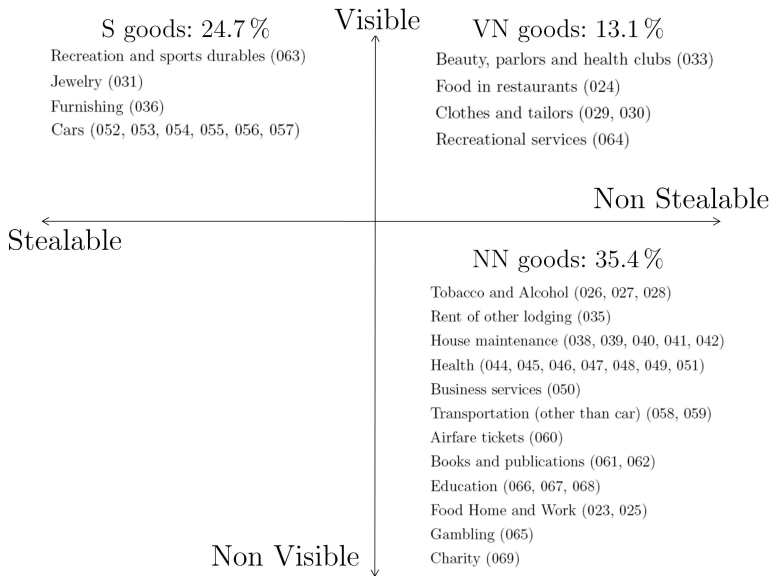**Model analysis**

Main proposition:

Proposition 2: Let $\sigma(w, c)$ be the unique separating equilibrium when the crime level is c. Then, for any $w \in (w_{min}, w_{max})$, conspicuous consumption for an individual with wealth w is strictly decreasing in c.

- Intuition: Crime increases the expected cost of signaling wealth $\gamma'(\widehat{w})(zU_z + yU_y)$.

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

Data
Empirical strategy
Results

Empirical evidence

Data:

- 1986-1999 CEX family level extracts. Includes consumption expenditures in several categories and household characteristics.

- We merge state-level controls and crime variables (from the FBI UCR) corresponding to the state and the year in which each household was surveyed.

- We construct a Property Crime (PC) measure using the average rate of robberies, larceny-thefts and burglaries .

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

Data
Empirical strategy
Results

S goods: 24.7 %

Visible

VN goods: 13.1 %

Recreation and sports durables (063)

Jewelry (031)

Furnishing (036)

Cars (052, 053, 054, 055, 056, 057)

Beauty, parlors and health clubs (033)

Food in restaurants (024)

Clothes and tailors (029, 030)

Recreational services (064)

Non Stealable

Stealable

NN goods: 35.4 %

Tobacco and Alcohol (026, 027, 028)

Rent of other lodging (035)

House maintenance (038, 039, 040, 041, 042)

Health (044, 045, 046, 047, 048, 049, 051)

Business services (050)

Transportation (other than car) (058, 059)

Airfare tickets (060)

Books and publications (061, 062)

Education (066, 067, 068)

Food Home and Work (023, 025)

Gambling (065)

Non Visible

Charity (069)

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

Data
Empirical strategy
Results

Identification strategy

- In order to isolate the information channel, we focus on visible goods which cannot be stolen, but reveal information about individuals' wealth.

- We compare the consumption of visible, non-stealable goods (*VN*) with that of non-visible, non-stealable goods (*NN*). The real test for our channel would be to find that *VN* will be lower relative to *NN* for households facing higher property crime rates.

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

Data
Empirical strategy
Results

Empirical strategy (cont)

We estimate the following baseline specification:

$$\ln\left(\frac{VN_{i,t,s}}{NN_{i,t,s}}\right) = \beta_0 + \beta_1 \ln PC_{s,t} + \beta_2 \ln W_{i,s,t} + \Phi Z_{i,s,t} + \gamma X_{s,t} + \varepsilon_{i,s,t},$$
(4)

- $\ln\left(\frac{VN_{i,t,s}}{NN_{i,t,s}}\right)$ is the ratio of visible and non stealable consumption to non visible non stealable consumption for household i, in State s, and year t.
- $PC_{s,t}$ is the property crime rate.
- $W_{i,s,t}$ is the household permanent income.
- $Z_{i,s,t}$ are household characteristics.
- $X_{s,t}$ are state level controls.
- We use year and state fixed effects in all our specifications. Errors are clustered at the state level.

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

Data
Empirical strategy
Results

Empirical strategy (cont)

Identification and Econometric Issues 1:

- $PC_{s,t}$ is exogenous to individual consumption... BUT measurement error could attenuate OLS coefficients. We instrument PC using homicides and arrest rates (for burglaries).
- the CEX income measure for $W_{i,s,t}$ does not perform well, so we use total quarterly consumption as a proxy.
- However, total consumption is a "bad proxy" because crime might affect the relation between permanent income and consumption.
- In order to solve the bad proxy problem we instrument total consumption using the CEX income measure, occupational dummies, and household head education level (Charles et al. (2009)).

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

Data
Empirical strategy
Results

Table: Effect of Property Crime on the ratio VN/NN.

	OLS	Instrumenting Crime	Instrumenting Consumption	Instrumenting both
	(1)	(2)	(3)	(4)
Property Crime	-0.173***	-0.293***	-0.162***	-0.252***
	(0.047)	(0.073)	(0.050)	(0.077)
Total Consumption	0.473***	0.473***	0.872***	0.872***
	(0.012)	(0.012)	(0.020)	(0.020)
R-squared	0.196	0.196	0.113	0.113
Observations	38876	38876	38876	38876
First stage:				
F (Property crime)	-	32.77	-	21.75
F (Total consumption)	-	-	598.39	726.62

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

Data
Empirical strategy
Results

Table: Effect of property Crime on VN/NN with aditional controls.

	(1)	(2)	(3)	(4)	(5)	(6)
Property Crime	-0.252***	-0.241***	-0.181*	-0.257***	-0.251***	-0.201**
	(0.077)	(0.078)	(0.099)	(0.079)	(0.077)	(0.096)
Total Consumption	0.872***	0.820***	1.320***	0.934***	0.871***	1.442***
	(0.020)	(0.027)	(0.041)	(0.022)	(0.020)	(0.070)
Stealable Consumption		0.005				-0.051***
		(0.006)				(0.010)
Housing Expenditures			-0.420***			-0.440***
			(0.021)			(0.029)
Liquid Position				-0.007***		-0.006***
				(0.001)		(0.001)
Avg. State Visible Cons.					0.027	0.005
					(0.044)	(0.051)
R-squared	0.113	0.101	0.018	0.087	0.113	.
Observations	38876	35626	38356	38876	38875	35188

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

Data
Empirical strategy
Results

Table: Effect of Property Crime on *NN* goods (falsification test).

	Publications, and books	Education	Other Lodging	Airfare tickets	Charity	All NN goods
	(1)	(2)	(3)	(4)	(5)	(6)
Property Crime	-0.222	0.803*	0.171	0.556*	-0.056	0.055
	(0.188)	(0.444)	(0.225)	(0.294)	(0.298)	(0.041)
Total Consumption	1.676***	1.642***	1.722***	1.343***	1.945***	0.713***
	(0.038)	(0.112)	(0.070)	(0.096)	(0.090)	(0.009)
R-squared	0.283	0.119	0.173	0.136	0.156	0.736
Observations	36213	15322	17545	11196	15030	38876

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

Data
Empirical strategy
Results

Table: The effect of violent crime on *VN*/*NN*.

	Property Crime not instrumented			Instrumenting Property Crime			Excluding Property Crime		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Property Crime	-0.183***	-0.139**	-0.223***	-0.295***	-0.205***	-0.403***			
	(0.056)	(0.055)	(0.054)	(0.099)	(0.069)	(0.091)			
Violent Assaults rate	0.043			0.075			-0.011		
	(0.047)			(0.057)			(0.042)		
Forcible Rape rate		-0.034			-0.017			-0.069	
		(0.055)			(0.052)			(0.053)	
Suicide rate			0.080			0.114			0.039
			(0.085)			(0.088)			(0.089)
Total Consumption	0.872***	0.871***	0.902***	0.871***	0.871***	0.902***	0.872***	0.871***	0.902***
	(0.020)	(0.020)	(0.022)	(0.020)	(0.020)	(0.022)	(0.019)	(0.020)	(0.022)
R-squared	0.114	0.113	0.119	0.113	0.113	0.119	0.113	0.113	0.118
Observations	38876	38202	31897	38876	38202	31897	38876	38202	31897

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

Data
Empirical strategy
Results

Robustness

Our results are robust to:

- Different specifications (levels).
- Different treatment of permanent income.
- Modified consumption categories.
- Modified property crime measure.

Introduction and contribution
The Model
Empirical Evidence
Concluding remarks

Data
Empirical strategy
Results

Robustness: Consumption categories

Table: IV Estimates of the effect of crime on the ratio VN/NN modifying VN

	Clothing		Food out		Recreational servs.		Health and beauty	
		IV		IV		IV		IV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Property Crime	-0.293***	-0.371***	-0.231**	-0.349***	-0.166**	-0.200*	0.011	0.278
	(0.071)	(0.139)	(0.107)	(0.109)	(0.071)	(0.110)	(0.093)	(0.181)
Total Consumption	0.438***	0.857***	0.511***	0.955***	0.548***	1.044***	0.081***	0.483***
	(0.017)	(0.037)	(0.014)	(0.027)	(0.024)	(0.036)	(0.017)	(0.040)
R-squared	0.112	0.060	0.210	0.159	0.174	0.120	0.076	0.029
Observations	38114	38114	37346	37346	36725	36725	33924	33924

Summary

- This paper proposes and empirically tests a new channel through which criminal activities affect individual behavior. In particular, we develop the idea that individuals face a trade-off between status and security when making (observable) consumption decisions.

- More precisely, the proposed channel argues that crime affects consumption decisions not because consumption can be directly targeted by criminal activities, but because the level of (observable) consumption reveals information about individual's wealth that criminals may actually use to target their potential victims.

- We find robust empirical evidence supporting the proposed model.

Becker, G. S. (1968). Crime and punishment: An economic approach. *Journal of Political Economy*, 76:pages 169.

Camacho, A. and Rodriguez, C. (2009). Firm exit and the armed conflict in colombia. Mimeo, Universidad de los Andes, Mimeo.

Charles, K. K., Hurst, E., and Roussanov, N. (2009). Conspicuous consumption and race. *The Quarterly Journal of Economics*, 124(2):425–467.

Cullen, J. B. and Levitt, S. D. (1999). Crime, urban flight, and the consequences for cities. *The Review of Economics and Statistics*, 81(2):159–169.

De Mello, J. M. and Zilberman, E. (2008). Does crime affect economic decisions? an empirical investigation of savings in a high-crime environment. *The B.E. Journal of Economic Analysis & Policy*, 8(1):pp.

Di Tella, R., Galiani, S., and Schargrodsky, E. (2009). Crime distribution and victim behavior during a crime wave. Working Papers 0044, CEDLAS, Universidad Nacional de La Plata.

Ehrlich, I. (1996). Crime, punishment, and the market for offenses. *Journal of Economic Perspectives*, 10(1):43–67.

Glazer, A. and Konrad, K. A. (1996). A signaling explanation for charity. *American Economic Review*, 86(4):1019–28.

Ireland, N. J. (1994). On limiting the market for status signals. *Journal of Public Economics*, 53(1):91–110.

Mailath, G. J. (1987). Incentive compatibility in signaling games with a continuum of types. *Econometrica*, 55(6):1349–65.

Pshiva, R. and Suarez, G. A. (2006). 'captive markets': the impact of kidnappings on corporate investment in colombia. Finance and Economics Discussion Series 2006-18, Board of Governors of the Federal Reserve System (U.S.).

Veblen, T. (1899). *The Theory of the Leisure Class*. Penguin Classics.

Wright, R. T. and Decker, S. H. (1996). *Burglars on the job: streetlife and residential break-ins*. Northeastern.

Wright, R. T. and Decker, S. H. (1997). *Armed robbers in action: stickups and street culture*. The Northeastern Series in Criminal Behavior.