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# Economic shocks and crime: Evidence from the crash of Ponzi schemes☆

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ABSTRACT

In November 2008, Colombian authorities dismantled a network of Ponzi schemes, making hundreds of thousands of investors lose tens of millions of dollars throughout the country. Using original data on the geographical incidence of the Ponzi schemes, this paper estimates the impact of their breakdown on crime. We find that the crash of Ponzi schemes differentially exacerbated crime in affected districts. Confirming the intuition of the standard economic model of crime, this effect is only present in places with relatively weak judicial and law enforcement institutions, and with little access to consumption smoothing mechanisms such as microcredit. In addition, we show that, with the exception of economically-motivated felonies such as robbery, violent crime is not affected by the negative shock.

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## 1. Introduction

This paper exploits the crash of Ponzi schemes to estimate the causal effect of negative economic shocks on criminal outcomes at the municipal level in Colombia. At the end of 2008 the Financial Oversight Bureau of Colombia with the support of the Attorney General and the National Police dismantled a dozen Ponzi schemes operating as a network of façade firms throughout the country, illegally raising money from people with the offer of unusually high short-term returns. Tens of millions of dollars invested in these firms by hundreds of thousands of individuals were lost, leaving investors broke.

Using data on the geographical presence of the Ponzi schemes and their crash date, we estimate the causal effect of the negative economic shock on crime rates at the municipal level. Consistent with the standard economic model of crime in which criminal behavior depends on the expected gain *vis-à-vis* the probability of capture and likely punishment (Becker, 1968), we find that the shock differentially increased both shoplifting and robbery in affected municipalities, but had no effect on either non-robbery violent crime or grand larceny. We also find that the effect of the shock is exacerbated in

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municipalities with relatively less policing and worse law enforcement, in places with relatively less access to consumption smoothing mechanisms such as poverty-alleviation credits, and in municipalities with greater economic inequality.

There is a large body of literature on the effects of negative economic shocks on people's economic behavior. In the face of credit rationing, negative economic shocks may lead to large consumption drops that harm people's welfare (Flavin, 1981; Zeldes, 1989). Coping strategies range from selling productive assets (Rosenzweig and Wolpin, 1993) to crop diversification in the case of rural households (Larson and Plessmann, 2009; Dercon, 1998) to using child labor (Beegle and Weerdt, 2006; Guarcello et al., 2010). In environments with weak law enforcement, negative economic shocks can increase the incentives for individuals to illegally appropriate someone else's riches (Becker, 1968; Ehrlich, 1973).

There is indeed mounting evidence that negative economic shocks can lead to crime as a way to offset them. This is the case, for instance, of weather shocks. For example, Miguel (2005) finds that economic downturns driven by negative rainfall shocks increase the probability that elderly women (accused of witchcraft) are killed in rural Tanzania as a way of easing the consumption burden of households. In a similar vein, Sekhri and Storeygard (2014) show that droughts in India increase dowry deaths perpetrated by men seeking to re-marry in order to obtain the dowry of their new brides. Mehlum et al. (2006) show that cereal price surges driven by climate shocks in 19th century Bavaria increase the incidence of property crime. Finally, Hidalgo et al. (2010) show that rain-driven negative economic shocks in Brazil make land invasions by landless rural workers more likely.

Similar insights are produced by the empirical literature that exploits the variation given by non climate-related negative shocks. For instance, Bignon et al. (2016) exploit the variation in the timing in which different wine districts had their vineyard harvests ruined by the *phylloxera* parasite in the second half of the 19th century in France, to find that the negative shock increased property crime. Arnio et al. (2012) exploit cross-state variation in the US and show that the increase in mortgage prices has a positive effect on the incidence of robbery. Dube and Vargas (2013) show that negative exogenous changes in the price of coffee (and in general to labor-intensive agricultural commodities) exacerbate appropriative conflict in the Colombian districts in which farmers' income depends more heavily on the coffee harvest.

Common to all these papers is the idea that appropriative crime can substitute the material loss generated by negative shocks. This suggests that the type of criminal behavior in the aftermath of shocks is unlikely to include major violent offenses such as murder, unless the cultural set up is one in which murder leads to increase consumption or income and the expected punishment is very low [such as in Tanzania – Miguel (2005) – or India – Sekhri and Storeygard (2014)]. This is not the case of the crash of Ponzi schemes in Colombia, where the portfolio of redistributive crimes usually excludes murder.

In spite of this large body of literature, to the best of our knowledge, there is no paper that systematically studies the effects of shocks induced by the crash of risky financial businesses. This paper takes advantage of the quasi-natural experiment given by the fall of a dozen Ponzi schemes that affected over 10% of the Colombian territory as well hundreds of thousands of investors, to assess the effect of an aggregate economic shock on crime rates. Using *difference-in-differences* and controlling for municipality and time fixed effects, as well as for potential time-varying confounders; our findings suggest that redistributive crimes such as shoplifting and robbery increased disproportionally in affected areas compared to places that had no Ponzi schemes operating before the crisis. In contrast, other violent crimes as well as grand larceny do not present a systematic differential pattern across treatment and control municipalities. Another contribution of the paper is that we document heterogeneous effects related to the quality of local law enforcement and judicial institutions, to access to poverty-alleviation credit, and to the underlying income inequality. We show that the effect of the shock on crime is exacerbated in municipalities with a relatively weak law enforcement apparatus, with little access to credit and with greater inequality.

All these findings can be rationalized using the standard economic model of crime. Becker (1968)'s canonic economic model of crime predicts that the higher the probability of apprehension (and the expected punishment) the lower the probability of engaging in crime for a given payoff. Moreover, the criminalization incentive of negative economic shocks is exacerbated by the lack of alternative (legal) consumption smoothing strategies such as credit access. Finally, while the opportunity cost of crime is smaller for poorer individuals, the presence of rich targets makes (property) crime more attractive, which suggests that income inequality can intensify the incentives to engage in criminal behavior.

The rest of the paper is organized as follows. Section 2 provides a brief context on Ponzi schemes and their recent development in Colombia. Section 3 describes the empirical strategy and the data used to estimate the effect of the crash in Ponzi schemes on criminal outcomes. Section 4 presents the results and Section 5 concludes.

## 2. Ponzi schemes

Ponzi schemes were named in the US after Charles Ponzi, who created in 1920 a financial scheme that offered extraordinarily high returns to costumers under the motto: "Double the money within three months". In practice Ponzi could sustain such rates by rewarding early investors with the money of later participants (Zuckoff, 2005). Indeed, the reason Ponzi schemes can offer rates of return that are considerably higher than market rates is because they operate under a pyramidal structure in which the deposits from a larger number of investors at the base are used to pay high returns to a smaller number of investors at the peak. Thus, returns to investors come from deposits from subsequent investors rather than from the profit of the firm's business. This is only sustainable as the pyramid becomes larger and larger, which can only happen by ensuring that the business expands at high rates. Investors are encouraged to bring new clients and the return offered

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