E C O N O M I C S B U L L E T I N

A Two-Period Model of Money Laundering and Organized Crime

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Abstract

This paper shows a world where the individual practices concomitantly legal and illegal activities in two period of their lifetime. The results of the two-period model unveil that effectiveness of anti-money laundering policies and increase of probability of the agent to be apprehended and punished at the second period negatively affects the amount of resources obtained from criminal activities.

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1. Introduction

It is widely acknowledged that the linkage between organized crime and money laundering affects society in several ways. Crime erodes basic individual liberties in that it threatens the right to life and the entitlement to property. The consequences of crime and money laundering are noxious for business, development and law. In this sense, activities of organized crime and money laundering have a corrosive effect on a country's economy, government, and social welfare (Lawanda, 2005).

The combat of criminality must be done in two fronts. Firstly, legal authorities must repress organized crime. Secondly, they must also act preventively and repressively against money laundering process. Money laundering is the other facet of organized crime.

The process of money laundering is usually defined as any process that is carried out to disguise or cancel the nature or source of entitlement to money or property from criminal activities. This process is critical to the effective operation of virtually every form of transnational and organized crime. Anti-money laundering efforts, which are designed to prevent or limit the ability of criminals to use their ill-gotten gains, are both a critical and effective component of anti-crime programs (MacDowell and Novis, 2001).

Generally, money launderers tend to seek out areas where there is a low risk of detection due to weak or ineffective anti-money laundering programs. As the objective of money laundering is to get the illegal funds back to the individual who generated them, launderers usually prefer to move funds through areas with stable financial systems. Therefore, money laundering is a threat to the good functioning of financial systems; however, it can also be the Achilles' heel of criminal activities. In this context, the effectiveness of anti-money laundering policies can be evaluated by actions that prevent and repress the organized crime via connections made through financial transaction (FATF, 2007).

This paper presents a model that discusses the impact of legal authorities' effort to combat the criminality via punishment and anti-money laundering policy[1]. The model has a representative agent who is eligible for being involved in both illegal and legal activities, based on an adapted concept of "legal-criminal economy" (Araujo and Moreira, 2005). In the "legal-criminal economy" there are agents belonging to some kind of criminal organization that are mainly devoted to illegal economic activities, but who may also engage in the production of legal goods and services. Agents of the legal sector, by their turn, can be occasionally involved in illegal production (Masciandaro, 2000).

This paper therefore shows a two-period model where the individual practices concomitantly legal and illegal activities in the first period and in the second period there is no profit of illegal behavior anymore. In this sense, we assume that, in the first period, economic agents use income, provided by their legal and illegal activities, for their consumption. However, only in the second period they can be punished, i.e., the process of punishment and of effectiveness of anti-money laundering policy[2] occurs in the last period alone. Furthermore, they may have their legal income in the second period reduced by an amount that reflects effectiveness of both anti-money laundering policies and repression of criminality. Hence, consumption in the last period might be reduced and thus the individual's welfare might be lower.

The Model

Consider that an agent maximizes lifetime utility, U_1^i, which depends on period consumption levels, denoted c^i:

$$U_1^i = u(c_1^i) + \delta u(c_2^i) \quad (1)$$

where c_1^i is the consume of agent i in the period 1, c_2^i is the expected consume of agent i in the period 2, and $0 < \delta < 1$ is a fixed preference parameter, called the subjective discount or time-preference factor, that measures the individual's impatience to consume. As usual, the period utility function is strictly increasing in consumption and strictly concave: $u'(c^i) > 0$ and $u''(c^i) < 0$.

The individual i can acquire goods and services in the first period with its legal income, r_1^i, and with illegal income, x_1^i. Hence, we have that

$$c_1^i = r_1^i + x_1^i \quad (2)$$

In the second period, the individual i can consume the equivalent to its legal income, r_2^i, deduced by value of the illegal income generated in the previous period that can be apprehended by legal authorities in this last period, such as those caused by police force or anti-money laundering policy. In this context, we have that

$$c_2^i = r_2^i - P^i \varepsilon \; x_1^i \quad (3)$$

where $0 < P^i < 1$ denotes the (subjective) probability of the agent be caught and punished at the second period and the parameter $0 < \varepsilon < 1$ denotes the rate that measures the effectiveness of the anti-money laundering policy[3].

In law enforcement investigations into organized criminal activity, it is often the connections made through financial transaction records that allow hidden assets to be located and the identity of the criminals and the criminal organization responsible to be established (FATF, 2007). Here, the effectiveness of the anti-money laundering policy is measured by the proportion that the illegal income is apprehended, $\varepsilon \; x_1^i$, and the effort of the police force and legal system to caught and punish criminals is measured by the probability P^i.

On one hand, if the effectiveness of the anti-money laundering policies is very high, $\varepsilon \to 1$, and the probability of the agent be apprehended and punished is also high, $P^i \to 1$, then the consumption of the individual i in the second period will be equivalent to its legal income deduced by the term "$P^i \varepsilon \; x_1^i$" that approaches x_1^i. In this circumstance, the incentive for practicing criminal activities will be reduced. On the other hand, if the effectiveness of the anti-money laundering policies, as well as the probability of the agent be apprehended and punished are very low, i. e., $\varepsilon \to 0$ and $P^i \to 0$, then the consumption of individual i in the second period will be equivalent to its legal income, r_2^i, and the incentive for practicing criminals activities will be increased.

The term "$P^i \varepsilon \; x_1^i$" reveals aspects of repression and prevention for combating illegal markets. It shows law enforcement aspects present in each society in its different degrees of effectiveness against illegal activities. It seems acceptable to assume that, if a given society adopts strong disposition for combating criminals' activities, then the values

of the parameters P^i and ε will be high. Otherwise, they will be low. In this context, we assume that both parameters are strongly correlated where $P^i \approx \varepsilon$. Without loss of generality, we admit that

$$P^i = \varepsilon . \tag{4}$$

We can rewrite the equation (3) as

$$c_2^i = r_2^i - \varepsilon^2 \; x_1^i \tag{5}$$

The sum of equations (2) and (5) results in the budget constraint

$$c_1^i + c_2^i = r_1^1 + r_2^i + (1 - \varepsilon^2) \; x_1^i \tag{7}$$

or, alternatively, replacing equation (2) into equation (5) results

$$c_2^i = r_2^i - \varepsilon^2 (c_1^i - r_1^i) . \tag{8}$$

Given c_1^i and c_2^i, we have a equation for illegal income

$$x_1^i = f(r_1^i, r_2^i, P^i, \varepsilon) \tag{9}$$

The illegal income generated in the first period is a function of the legal income generated in both periods, the probability of the agent be apprehended and the parameter that measures the effectiveness of the anti-money laundering policy. It is expected that $\partial x_1^i / \partial r_1^i < 0$, $\partial x_1^i / \partial r_2^i > 0$, $\partial x_1^i / \partial P^i < 0$ and $\partial x_1^i / \partial \varepsilon^i{}_1 < 0$. These inequalities are consistent with the following propositions, respectively:

i) The amount of illegal resources reduces (increases) when the level of current legal income increases (reduces). The higher the legal income, the higher is the opportunity cost to practice illegal activities and, consequently, the lower is the incentive to practice it.

ii) The amount of illegal resources increases (reduces) when the level of expected legal income increases (reduces). Given that the agent knows that the punishment is applied in the second period, i.e., given $P^i \varepsilon \; x_1^i$, the incentive to practice illegal activities improves if the expected consumption in the second period improves as well. At first, this result seems to be counterintuitive, but it is, in fact, correct. Notice that, in the first period, the criminal expects to consume c_2^i. Given that he practices illicit activities in the first period, if the expected legal income, r_2^i, is only marginally higher that the value of $P^i \varepsilon \; x_1^i$, then the incentive for practicing crime is very small, since the difference between these values, the expected consume c_2^i, is small as well.

iii) The amount of illegal resources increases (reduces) when the probability of punishment and the effectiveness of anti-money laundering policies reduces (increases). The higher the effectiveness of law enforcement, the lower is the incentive to practice illegal activities.

In this context, to solve the problem of maximizing equation (1) subject to equation (8), the agent's optimization problem reduces to $\max_{c_1^i} \; u(c_1^i) + \delta u[r_2^i - \varepsilon^2 (c_1^i - r_1^i)]$.

The first-order condition for this problem is

$$u'(c_1^i) = \varepsilon^2 \delta u'(c_2^i) \tag{10}$$

or

$$\frac{\delta\ u'(c_2^i)}{u'(c_1^i)} = \frac{1}{\varepsilon^2} \tag{11}$$

which is known as an *intertemporal Euler equation*. This equation is familiar. The left-hand side is the consumer's marginal rate of substitution of present (date 1) for future (date 2) consumption, while the right-hand side can be understood as the price of future consumption in terms of present consumption.

To know how x_1^i reacts to change of r_1^i, r_2^i and ε is necessary to make an exercise of comparative static with the differentiation of equation (10) considering equations (2) and (5). Hence, we have that

$$dx_1^i = \frac{1}{\theta_x}(\theta_{r1} dr_1^i + \theta_{r2} dr_2^i + \theta_\varepsilon d\varepsilon) \tag{12}$$

where

$$\theta_x = u^{"}(c_1^i) + \delta\ \varepsilon^4 u''(c_2^i) < 0 \tag{13}$$

$$\theta_{r1} = -u^{"}(c_1^i) > 0 \tag{14}$$

$$\theta_{r2} = \delta\,\varepsilon^2\, u''(c_2^i) < 0 \tag{15}$$

$$\theta_\varepsilon = 2\delta\ \varepsilon\ [u'(c_2^i) - \varepsilon^2 x_1^i\, u''(c_2^i)] > 0 \tag{16}$$

The comparative static analysis shows that

$$\frac{\partial x_1^i}{\partial r_1^i} = \theta_{r1} < 0 \tag{17}$$

$$\frac{\partial x_1^i}{\partial r_2^i} = \theta_{r2} > 0 \tag{18}$$

$$\frac{\partial x_1^i}{\partial \varepsilon} = \theta_\varepsilon < 0 \tag{19}$$

As expected, an increment in the legal income at the second period increases the criminal activities, which does not happen with an increment of the current legal income. Finally, the effectiveness of anti-money laundering policies and a higher probability of punishment for the criminal acts reduce the incentive to illegal activities.

Conclusions

The results of the two-period model unveil that effectiveness of anti-money laundering policies and increase of probability of the agent to be apprehended and punished at the second period negatively affects the amount of resources obtained from criminal activities. The corollary of such results is that law enforcement organizations must improve their services of repression, prevention, investigation and dissuasion of organized crime and money laundering activities.

Moreover, in the initial period, the higher the legal income, the higher is the opportunity cost to practice illegal activities and, consequently, the lower is the incentive to practice it. However, as the consume in the second period is determined by the difference between the expected legal income in this period and the value of the illegal income generated in the previous period that can be apprehended by legal authorities in this same period, than the higher is the expected legal income, given the expected illegal income apprehended by legal authorities, the higher is the consume in the final period. In this sense,

the higher the expected legal income in the final period, the higher is the incentive to practice criminals' activities in the initial period.

In other words, the higher is the income of the organized crime, the higher is the necessity to present legal activities for justifying the status and the successful life of their business man, i.e., the criminals that command the organization. Of course, these criminals need to look as winners in the legal business world to disguise the nature or source of entitlement to money or property from criminal activities and to pass as respectable businessmen. In this context, the greater legal income in the second period works as an incentive to practice the illegal activities in the first one.

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[1] There exists an institution known as "The Financial Action Task Force (FATF)". It is an inter-governmental body whose purpose is the development and promotion of national and international policies to combat money laundering and terrorist financing. Hence, the FATF is "policy-making body" that works to generate the necessary political will to bring about legislative and regulatory reforms in these areas (FATF, 2007).

[2] If the agent practices illegal activities in the second period as well, the probability of the agent be punished will increase as the anti-money laundering activities and the probability of the agent be punished will occur in the last period alone. In this sense, the agent can be punished for the criminal acts in the first period or in the second period. Hence, we assume that the individual stop this type of activities in the second period.

[3] Of course, we need to impose a condition which $c_2^i = r_2^i - P^i \varepsilon \; x_1^i \geq 0$. Hence, the representative agent only practices illegal activities if this condition is satisfied.