Anti-Money Laundry regulation and Crime: A two-period model of money-in-the-utility-function

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Abstract

The paper presents a two period model with two types of money i.e. dirty and cleans (legal) money in utility function. Clean money is earned from working in legal sector and dirty from illegal sector. Our two-two period model reveals that an increase in labor wage in legal sector unambiguously decease the labor hours allocated for illegal sector by increasing the opportunity cost for illegal activities. However, the crime-reducing impact of anti-money laundry regulation and the probability of the agent to be caught require both parameters should be above some threshold. This finding is extension to the existing literature. This threshold is a function of the marginal rate of substitution of 'dirty' money for consumption and the responsiveness of illegal income to the policy parameter. Higher threshold implies the need for tougher anti-money laundry regime. Therefore, the marginal rate of substitution between 'dirty' money and consumption, and the elasticity of illegal income to the policy parameter are the key in the formulation of anti money laundering policy.

1. Introduction

Anti-money laundering policy has become a major issue in most part of the world, particularly in developed countries and has become an important front in the fight against crime. According to Wasserman (2002), measures against money laundering can facilitate detection of financial trails that provide important source of evidence, potentially linking the members of a criminal organization. In this sense, anti-money laundry regime can be understood in terms of increased efficiency of the legal system or catching offenders who otherwise would escape. Moreover, finding and seizing money or assets that result from criminal activity can discourage crime. Moreira (2007) pointed out two ways of combating criminality: repressing organized crime by legal authorities and by acting preventively and repressively against money laundering process.

Lopez-de-Silanes and Chong (2007) describe money laundering as any process that tries to legitimize the proceeds of illegal activities maintaining the value of the acquired asset. In other words, it is carried out to disguise or conceal the nature or source of entitlement to money or property from criminal activities .This process, in fact, is critical to the effective execution of organized crime. Anti-money laundry regime can be understood in terms of increased efficiency of the legal system or catching offenders who otherwise would escape.

Although the relevance of the study of anti-money laundering policy and organized crime seem growing, there is relatively very limited theoretical and empirical work on the issue. Camera (2001) has noted that, until now little has been done to construct a model capable of rationalizing such a policy. There is a need for appropriate policy measures to establish both local and international institutes to effectively combat organize crime and money laundering.

There are some theoretical and empirical studies that have attempted to model and empirically test the link between anti-money laundry regulation and organized crime. Moreira's (2007) result of the two-period model unveil that effectiveness of anti-money laundering policies negatively affects the amount of resources obtained from criminal activities. Araujo and Moreira (2005) present a basic growth model. Their results are: (i) the effectiveness of anti-money laundering regulations positively affects consumption, (ii) there exist equilibrium solutions where legal and illegal activities coexist, and (iii) when the steady state results of two economies in a Sidrauski framework, the proportion between consumption and the capital stock is the same, but the level of consumption and capital stock is greater in a legal economy.

Ferwerda (2008) studied whether anti-money laundry policy reduces crime rate. He employed the basic model of 'economics of crime', which explains criminal behavior on the assumption of rational choice, based on the expected utility framework and extends the model by including money laundry and models `the economics of crime and money laundry'. His theoretical model shows that anti-money laundering policy deters potential criminals to commit not only the illegal act of laundering money, but crime in general. His empirical evidence shows that the crime level in a country can be reduced by improving anti-money laundering policies, especially if it focuses on international cooperation. However, Lopez-de-Silanes and Chong (2007) found out that measures that criminalize feeding activities and improve confiscation tend to matter more than other features of legislation.

Vaithilingam & Nair (2007) examines the factors that underpin the pervasiveness of money laundering, using a sample of 88 developed and developing countries, and found out that efficient legal framework with good corporate governance lower the pervasiveness of money laundering activities and a high-innovative capacity contribute negatively to the pervasiveness of money laundering activities. Masciandro (1999) also highlighted the inverse relationship between the degree of diffusion of money laundering activities and the effectiveness of anti-money laundering regulation in a given economy.

Following the previous studies (e.g., Araujo and Moreira, 2005; & Moreira, 2007), this paper presents a two period model in the classical framework of money- in- the- utility function to study the impact of anti-money laundry regulation to combat crime. As in the previous studies, it assumes a representative agent involving in both legal and illegal activities concomitantly to acquire goods and services. He uses the criminal sector to carry out criminal offenses and uses money laundry to hide the revenues of these activities in the formal economy. However, we assume that the income generated in the illegal sector has no purchasing power[1] before it is laundered and is used in the second period. Ferwerda (2008), for instance, noted that money laundering (at least to some extent) is needed in order to spend the money derived from illegal activities. Therefore, the agent involves in criminal activities only in the first period and the punishment[2] will occur in the second period. In contrast to Araujo and Moreira (2005) work[3], we do not make any specific assumption on the nature of the criminal activities. Such activities must meet the only requirement of producing 'dirty' money.

[1] Notice similar assumption by Araujo and Moreira, 2005.
[2] Punishment is a part of enforcement pillar of the anti-money laundry regime. It mostly involves confiscation of the criminal proceeds.
[3] They assume a representative agent embezzles part of government transfer.

2. The Model

We consider an agent that maximizes lifetime utility U which depends on period consumptions level and on money holdings. The basic framework follows the classic work by Sidrauski (1967) on money- in- the- utility function. We assume that agents derive utility from money (both 'clean' and 'dirty' money) only in the first period.

$$U = u\left(c_{1,} m, \widehat{m}\right) + \beta u(c_2) \tag{1}$$

Where $c_{1,}$ and c_2 are consumption levels in two periods, and m and $\widehat{m}$ are money of legal origin and 'dirty'[4] money. Moreover, 0<β<1 represents the subjective discount or time preference factor. The period utility function is strictly increasing and concave in consumption and money, $u_{c,} u_m, u_{\widehat{m}} > 0$ and $u_{cc}\ , u_{mm}, u_{\widehat{m}\widehat{m}} < 0$. The agent allocates his one unit of time between legal and illegal activities. A fraction α[5] of his time is spent in the legal sector. The remaining fraction of his time (1- α) is spent in the illegal sector where he commits criminal offense to generate illegal income and involves in money-laundry activities[6].

Let z represent the illegal sector of the form:

$$z = [(1-p)(1-\varepsilon)]^{1-\emptyset}(1-\alpha)^{\emptyset} \tag{2}$$

Where 0 <$\emptyset$ <1, 0 < ε <1 and 0 < p <1. Here $\emptyset$ represents elasticity between illegal income and the time allocated for illegal activity and $(1-\emptyset)$ represents elasticity between illegal income and proxies to the ineffectiveness of the anti-money laundry regulation$(1-\varepsilon)$ and the subjective

[4] Dirty money refers to money obtained illegally.
[5] Assume crime and work are substitute activities.
[6] In many cases, it is not unusual to assume that the offender himself involves in money laundering (see Gilmore, 1999).

probability[7] that agent is not caught$(1-p)$. In fact, both proxies as a product can be understood as efficiency parameter in the illegal sector.

We have the legal economy of the form:

$$Y = \alpha L, \text{ per capita form: } y = \alpha \quad (3)$$

Where L is labor and $\alpha > 0$

Hence, in the first period we have

$$c_1 = \alpha w + z - m - \widehat{m} \quad (4)$$

Where m and $\widehat{m}$ are money of legal origin and 'dirty' money respectively. A representative agent can hold its wealth in the form of m and $\widehat{m}$. And αw is the income from legal sector, where w represent wage rate in the legal sector. With our assumption of no purchasing power of illegal income in the first period, we have

$$\widehat{m} = z \quad (5)$$

Equation (5) states that a representative agent saves all its illegal income in the form of dirty money. In the second period, the individual can consume an amount equal to saving from legal (m) and illegal income minus the value of illegal income that can be apprehended by legal authorities in the second period (*cost due to anti-money laundering regulation*[8]). Therefore, we have

$$c_2 = (1-\varepsilon)(1-p)\widehat{m}/(1+\pi) - \varepsilon p\widehat{m}/(1+\pi) + m/(1+\pi) \quad (6)$$

[7] The effort of the police force and legal system to caught and punish criminals is measured by the probability p.
[8] The cost of money laundering will therefore depend on the effectiveness of anti-money laundry regulation.

A representative agent solves the following Lagrangian maximization problem:

$$Max: u(c_1, m, \widehat{m}) + \beta u(c_2) + \lambda[\alpha w + (1-\varepsilon)(1-p)\widehat{m}/(1+\pi) - \varepsilon p\widehat{m}/(1+\pi) - m + m(1+\pi) \tag{7}$$

FOC:

$$c_1 : u'_{c_1} = \lambda \tag{8}$$

$$c_2 \colon \beta u'_{c_2} = \lambda \Rightarrow \beta u'_{c_2} = u'_{c_1} \Rightarrow \frac{u'_{c_2}}{u'_{c_1}} = \frac{1}{\beta} \tag{9}$$

the latter being a standard intertemporal Euler equation. Further, first order condition with respect to m yields

$$u'_m = \lambda\left[1 - \left(\frac{1}{1+\pi}\right)\right] \tag{10}$$

This implies

$$\frac{u'_m}{u'_{c_1}} = \left[1 - \left(\frac{1}{1+\pi}\right)\right], \tag{11}$$

Equation (11) represents the marginal rate of substitution between money (clean) and consumption. u'_m and u'_{c_1}denotes the marginal benefit of holding additional money and the marginal benefit of an additional consumption in the first period respectively.

Moreover, FOC with respect to $\widehat{m}$ gives:

$$u'_{\widehat{m}} = \lambda\left(\frac{(\varepsilon+p)-1}{(1+\pi)}\right) \tag{12}$$

this implies

$$\frac{u'_{\widehat{m}}}{u'_{c_1}} = \left(\frac{(\varepsilon+p)-1}{(1+\pi)}\right), \tag{13}$$

Equation (13) represents the marginal rate of substitution[9] ($MRS_{\hat{m}c_1}$) of dirty money for consumption.

Finally, FOC with respect to α yields:

$$\lambda w + \lambda \left(\frac{(1-\varepsilon)(1-p)\emptyset(1-\alpha)^{\phi-1}[(1-\varepsilon)(1-p)]^{1-\phi}}{(1+\pi)} \right) - \lambda \left(\frac{\varepsilon p \emptyset(1-\alpha)^{\emptyset-1}[(1-\varepsilon)(1-p)]^{1-\emptyset}}{(1+\pi)} \right) = 0 \qquad (14)$$

From (12) we obtain the optimal fraction of time allocated to the legal activity

$$\alpha^* = 1 - (1-\varepsilon)(1-p)\left[\frac{\emptyset[(\varepsilon+p)-1]}{(1+\pi)w}\right]^{\frac{1}{1-\emptyset}} \qquad (15)$$

Let $A = \frac{\emptyset[(\varepsilon+p)-1]}{(1+\pi)w} = \frac{\emptyset\, MRS_{\hat{m}c_1}}{w}$, and rewrite equation (15) as:

$$\alpha^* = 1 - (1-\varepsilon)(1-p)[A]^{\frac{1}{1-\emptyset}} \qquad (16)$$

The partial derivatives of α^* with respect to ε and *w*:

$$\frac{\partial \alpha^*}{\partial w} = \frac{[(1-\varepsilon)(1-p)]}{1-\emptyset} A^{\frac{\phi}{1-\emptyset}} \left[\frac{\emptyset[(\varepsilon+p)-1]}{(1+\pi)w^2}\right] > 0 \qquad (17)$$

and

$$\frac{\partial \alpha^*}{\partial \varepsilon} = (1-p)\left[A^{\frac{1}{1-\emptyset}} - \frac{\emptyset(1-\varepsilon)}{(1+\pi)(1-\emptyset)w} A^{\frac{\phi}{1-\emptyset}}\right] > 0 \qquad (18)$$

The condition[10] gives $\varepsilon > 1 - \left[(1-\emptyset)(1+\pi)MRS_{\hat{m}c_1}\right]$ (19)

The right-hand side of equation (19) represents the critical or threshold value ε_c.The comparative statics (18) implies that an increase in effectiveness of anti-money laundry policy will increase the time allocated for the legal activity, only if the effectiveness of anti-money laundry regulation satisfies equation (19). Equation (19) indicates that ε must be above this threshold to have a positive impact (i.e., $\varepsilon > \varepsilon_c$).

Further, FOC with respect to p gives:

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[9] Assuming a positive $MRS_{\hat{m}c_1}$ implies $\frac{(\varepsilon+p)-1}{(1+\pi)} > 0$

[10] Assume $\pi = 0$ gives the reduced form, $\varepsilon > 1 - \left[(1-\emptyset)MRS_{\hat{m}c_1}\right]$

$$\frac{\partial \alpha^*}{\partial p} = (1-\varepsilon)\left[A^{\frac{1}{1-\emptyset}} - \frac{\emptyset(1-p)}{(1+\pi)(1-\emptyset)w} A^{\frac{\phi}{1-\emptyset}}\right] > 0 \quad (20)$$

The condition gives $p > 1 - \left[(1-\emptyset)(1+\pi)MRS_{\widehat{m}c_1}\right]$ (21)

The right-hand side of equation (21) represents the critical or threshold value p_c

Taking equation (2) and (5) and substituting α^* implies:

$$\widehat{m}^* = [(1-\varepsilon)(1-p)]^{(1-\emptyset)}(1-\alpha^*)^{\phi} = [(1-\varepsilon)(1-p)] \; A^{\frac{\phi}{1-\emptyset}} \quad (22)$$

where

$$\frac{\partial \widehat{m}^*}{\partial w} = -\frac{[(1-\varepsilon)(1-p)]}{(1-\emptyset)} \frac{\emptyset^2[(\varepsilon+p)-1]}{(1+\pi)w} A^{\frac{2\phi-1}{1-\emptyset}} < 0 \quad (23)$$

$$\frac{\partial \widehat{m}^*}{\partial \varepsilon} = (1-p)\left[\frac{\emptyset^2(1-\varepsilon)}{(1+\pi)(1-\emptyset)w} A^{\frac{2\phi-1}{1-\emptyset}} - A^{\frac{\phi}{1-\emptyset}}\right] < 0 \quad (24)$$

The condition gives $\varepsilon > 1 - \left[\frac{(1-\emptyset)(1+\pi)MRS_{\widehat{m}c_1}}{\phi}\right]$ (25)

Let the right-hand side of equation (25) represented by ε_c' showing the critical value.

$$\frac{\partial \widehat{m}^*}{\partial p} = (1-\varepsilon)\left[\frac{\emptyset^2(1-p)}{(1+\pi)(1-\emptyset)w} A^{\frac{2\phi-1}{1-\emptyset}} - A^{\frac{\phi}{1-\emptyset}}\right] < 0 \quad (26)$$

The condition gives $p > 1 - \left[\frac{(1-\emptyset)(1+\pi)MRS_{\widehat{m}c_1}}{\phi}\right]$ (27)

p_c' represents the threshold value which is the right-hand side of equation (27). The comparative statics from (23) indicates that an increase in wage reduces the optimal stock of dirty money by increasing the opportunity cost of illegal activities. However, anti-money laundry regulation discourages illegal activities, only if the anti-money laundry regulation satisfies equation (25). As usual, equation (25) indicates that ε must be above this threshold to reduce the amount of dirty money[11].

[11] The same line of argument applies to the subjective probability term *p*

2.1 A General of the Model

Our model in the previous section makes a distinction between efforts of the legal system to prosecute and punish criminals (p) and anti-money laundering policy (ε) to prevent criminals from laundering their ill-gotten proceeds. However, as pointed out by Reuter and Truman (2004), AML as it has evolved over some thirty years has two basic pillars: prevention and enforcement[12]. The prevention pillar of the AML regime is designed to deter criminals from using private individuals and institution to launder the proceeds of their crime. Enforcement is designed to punish criminals when, despite prevention effort, they have facilitated the successful laundering of those proceeds. As criminals gather the proceeds of their predicate crimes, the investigation, prosecution and punishment, and confiscation elements of the enforcement pillar are employed to combat the underlying crime as well as to tighten the screws on the money laundering process (see Truman & Reuter, 2004). Lopez-de-Silanes and Chong (2007)[13] empirically studied which aspect of the anti-money laundry regulation matters the most and found out the enforcement pillar[14] is found out to be the most important one.

Therefore, we assume that p and ε are strongly correlated and can be understood as the two pillar of the anti-money laundry policy. As in the case of Moreira (2007), without the loss of generality, we admit that

$$p = \varepsilon \qquad (28)$$

Given equation (28), we rearrange and resolve the previous maximization model and the results are presented below.

[12] Lopez-de-Silanes and Chong (2007) noted that the two are not mutually exclusive.
[13] They admit the limitation of their data to capture different aspects of prevention and enforcement
[14] Particularly criminalizing the feeding activities and improved confiscation

Our illegal sector will take the following form:

$$z = [(1-\varepsilon)^2]^{1-\emptyset}(1-\alpha)^{\emptyset} \quad (29)$$

Consumption in the first period (Equation 4) remains the same and consumption in the second period is given by:

$$c_2 = (1-\varepsilon)^2\widehat{m}/(1+\pi) - \varepsilon^2\widehat{m}/(1+\pi) + m/(1+\pi) \quad (30)$$

We can rewrite the agent's optimization problem (equation 7) as

$$Max{:}\, u(c_{1,}m,\widehat{m}) + \beta u(c_2) + \lambda[\alpha w + (1-\varepsilon)^2\widehat{m}/(1+\pi) - \varepsilon^2\widehat{m}/(1+\pi) - m + m(1+\pi) \quad (31)$$

The first-order condition with respect to c_1 , c_2 and m and remain the same as given by equation (8), (9) and (10).

FOC with respect to and $\widehat{m}$ yield:

$$u'_{\widehat{m}} = \lambda\left(\frac{2\varepsilon-1}{(1+\pi)}\right) \quad (29)$$

this implies

$$\frac{u'_{\widehat{m}}}{u'_{c_1}} = \left(\frac{2\varepsilon-1}{(1+\pi)}\right) \quad (30)$$

The left hand side of equation (30) represents the marginal rate of substitution[15] ($MRS_{\widehat{m}c_1}$) of dirty money for consumption, while the right hand side can be understood as the price of present dirty money in terms of current consumption. It is easy to note that the higher the effectiveness of the AML policy, the higher the price of dirty money with respect to the current consumption.

First-order condition with respect to α yields the following optimal (equilibrium) value of labor allocation in the legal sector.

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[15] Assuming a positive $MRS_{\widehat{m}c_1}$implies $\frac{(2\varepsilon-1)}{(1+\pi)} > 0$

$$\alpha^* = 1 - (1-\varepsilon)^2 \left[\frac{\emptyset[2\varepsilon-1]}{(1+\pi)w}\right]^{\frac{1}{1-\emptyset}} \quad (31)$$

Let B = $\frac{\emptyset[2\varepsilon-1]}{(1+\pi)w} = \frac{\emptyset\, MRS_{\widehat{m}c_1}}{w}$, and rewrite equation (31) as

$$\alpha^* = 1 - (1-\varepsilon)^2 [B]^{\frac{1}{1-\emptyset}} \quad (32)$$

The partial derivatives of α^* with respect to ε and *w*:

$$\frac{\partial \alpha^*}{\partial w} = \frac{(1-\varepsilon)^2}{1-\emptyset}\left[\frac{\emptyset[2\varepsilon-1]}{(1+\pi)w^2}\right] B^{\frac{\phi}{1-\emptyset}} > 0 \quad (33)$$

and

$$\frac{\partial \alpha^*}{\partial \varepsilon} = 2(1-\varepsilon)\left[B^{\frac{1}{1-\emptyset}} - \frac{\emptyset(1-\varepsilon)}{(1+\pi)(1-\emptyset)w} B^{\frac{\phi}{1-\emptyset}}\right] > 0 \quad (34)$$

The condition gives $\varepsilon > 1 - \left[(1-\emptyset)(1+\pi)MRS_{\widehat{m}c_1}\right]$ (35)

It is not surprising that equation (35) is the same as equation (17) showing equal threshold value[16].

Taking equation (2), (5) and (31) implies:

$$\widehat{m}^* = [(1-\varepsilon)^2]^{(1-\emptyset)}(1-\alpha^*)^{\phi} = (1-\varepsilon)^2 \; B^{\frac{\phi}{1-\emptyset}} \quad (36)$$

where

$$\frac{\partial \widehat{m}^*}{\partial w} = -\frac{(1-\varepsilon)^2}{(1-\emptyset)}\frac{\emptyset^2(2\varepsilon-1)}{(1+\pi)w} B^{\frac{2\phi-1}{1-\emptyset}} < 0 \quad (37)$$

$$\frac{\partial \widehat{m}^*}{\partial \varepsilon} = 2(1-\varepsilon)\left[\frac{\emptyset^2(1-\varepsilon)}{(1+\pi)(1-\emptyset)w} B^{\frac{2\phi-1}{1-\emptyset}} - B^{\frac{\phi}{1-\emptyset}}\right] < 0 \quad (38)$$

The condition gives $\varepsilon > 1 - \left[\frac{(1-\emptyset)(1+\pi)MRS_{\widehat{m}c_1}}{\phi}\right]$ (39)

A close look to the equation (39) indicates that it is exactly a similar condition as equation (25).

In general, we can argue that our model in *Section2.1* captures the two aspects of the AMR and allow us to specifically study the impact of AMR to combat crime. Moreover, it allows us to

[16] This result, in fact, validate our assumption given by equation (28)

reach the same conclusion without having considerable differences in our solution to the optimization problem.

4. Conclusion

This paper presents a two-period model based on the classic framework of money- in- the- utility function, whereby, an individual is assumed to engage concomitantly in both legal and illegal activities. Our model reveals that an increase in labor wage in legal sector unambiguously decrease the labor hours allocated for illegal sector by increasing the opportunity cost for illegal activities. However, the crime-reducing impact of anti-money laundry regulation and probability of the agent to be caught and punished require that both parameters should be above some critical or threshold value. This threshold is a function of the marginal rate of substitution[17] ($MRS_{\hat{m}c_1}$) of 'dirty' money for consumption and the elasticity parameter in the illegal sector. Higher marginal rate of substitution implies that a representative agent places higher value on holding one extra unit of 'dirty' money (higher opportunity cost). Higher effectiveness of anti-money laundry policy and probability (subjective) of being caught drive the value of dirty money (in terms of current consumption) up. In effect, it may discourage criminality. Moreover, higher value of the elasticity term implies more inelastic or less responsive of the illegal income to the policy parameters.

Therefore, lower $MRS_{\hat{m}c_1}$ and less responsive illegal income to anti-money laundry policy and the probability to be caught imply that the anti-money laundering regulation reduce the incentive for illegal activity if the policy parameter (ε) is above some critical or threshold value ε_c^h (higher

[17] Higher marginal rate of substitution ($MRS_{\hat{m}c_1}$) of dirty money for consumption implies that the individual is willing to give up more of consumption to have an additional unit of dirty money.

threshold). Moreover, higher marginal rate of substitution and more responsive illegal income to the anti-money laundry regulation and the probability of being caught, imply that effectiveness of anti-money laundering policy discourage illegal activities if the policy parameter (ε) is above some critical or threshold value ε_c^l (lower threshold). Therefore, we see that $\varepsilon_c^h > \varepsilon_c^l$, which implies the need for stringent anti-money laundry regulation. In sum, the marginal rate of substitution between 'dirty' money and consumption and the responsiveness of illegal income to the policy parameter are the key in governing the formulation of the anti-money laundry policy.

Finally, the assumption of strong correlation between anti-money laundry policy effectiveness and the probability of being caught for the predicate crime doesn't considerably change our result and conclusion. However, it captures, in a better sense, the two aspect of AMR: prevention and enforcement.

References

Araujo, R.A. and S.T.Moreira, 2005, An Inter-Temporal Model of Dirty Money, Journal of Money Laundry Control, Vol.8, Issue 8, 260-262.

Camera, G., 2001, Dirty money, Journal of Monetary Economics 47, 377-415.

Ferwerda, J., 2008, The Economics of Crime and Money Laundering: Does Anti-Money Laundering Policy Reduce Crime? Tjalling C. Koopmans Research Institute, Discussion Paper Series 08-35.

Gilmore, W., 1999, Dirty Money: The Evolution of Money Laundering Countermeasures, Strasbourg, France: Council of Europe Publishing.

Lopez-de-Silanes, F. and A. Chung, 2007, Money laundering and Its Regulation, Inter-American Development Bank, Research department, working paper # 590.

Masciandaro, D., 1999, Money Laundering: the Economics of Regulation, European Journal Of Law and Economics.

Masciandaro, D., 1999, "Illegal Sector, Money Laundering and Legal Economy: A Macroeconomic Analysis." *Journal of Financial Crime* 2: 103-112.

Moreira, S. T., 2007, A Two-Period Model of Money Laundering and Organized Crime, Economics Bulletin*,* Vol. 11, No. 3,1-5.

Reuter, P. and Truman, E.M. 2004. Chasing dirty money: The fight against money laundering. Washington D.C.: Institute for International Economics

Sidrausky, M., 1967, Rational Choice and Pattern of Growth in Monetary Economics, American Economic Review, Vol.57, No.2, 534-544.

Vaithilingam, S. and M. Nair, 2007, Factors affecting money laundering: lesson for developing Countries, Journal of Money Laundering Control, Vol. 10, No. 3.

Wasserman, W., 2002, Dirty Money, Regional Review Q1.