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Fassil Fanta and Hasan M Mohsin

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EDITORIAL NOTE

Five papers make up this issue. The first one, titled *Anti-Money Laundering Regulation and Crime: A Two-Period Model of Money-in-the-Utility-Function* by Fasil Fanta and Hasan M Mohsin, presents a two-period model of money-in-the-utility-function to investigate the impact of anti-money laundering policy on crime. Their two-period model reveals that an increase in labor wage in the legal sector unambiguously decrease labor hours allocated for illegal sector. 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 thresholds. These thresholds are a function of the marginal rate of substitution of 'dirty' money for consumption and the responsiveness (elasticity) of illegal income to the policy parameter. Higher threshold implies the need for stringent anti-money laundering policy. 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 governing the formulation of the anti-money laundry policy.

The second paper, titled *Determinants of Trade Flows among D8 Countries: Evidence from the Gravity Model* by Yaghoob Jafari, Mohd Adib Ismail and Morteza Sadegh Kouhestani, identifies the factors affecting export flows among the D8 countries. The results from a gravity model, which is estimated using Panel Correlated Standard Errors (PCSE), demonstrate that the trading partners' Gross Domestic Product (GDP), exchange rate, population of exporter country, border and distance are the notable factors affecting the volume of export flow among the countries in the D8 group. In line with the results, the countries would do better if they focus on exporting more to their neighbouring countries within the group and also undertake the measures which ensure low transportation costs. Additionally, the currency depreciation would increase the trade flows among the members when other adverse effects are taking into account.

The third paper, titled *Determinants of OIC Countries' Custom Revenue vis-à-vis Implementation of WTO Customs Valuation Agreement* by Ahmet Suayb Gundogdu, scrutinizes the determinants of customs revenue in the context of WTO member OIC countries. An econometric model of OLS, fixed effect and random effect calculations is employed with panel data of 1995-2007. The results suggest that increasing tariffs might increase customs revenue for big countries but not for small countries. Besides, the implementation of WTO Customs Valuation Agreement does not decrease

customs revenue as its indirect undervaluation effect would be surpassed by its direct effect of less incentive for tax evasion. He suggests implementing information and communications technologies in the form of integrated single windows to tackle undervaluation issue as an alternative to Preshipment inspection course.

The fourth paper, titled *An Alternative Model of Infrastructure Financing Based on Capital Markets: Infrastructure REITS in Turkey* by Turan Erol and Deniz D. Ozuturk, explores how Real Estate Investment Trusts (REITs) in Turkey can be used as an equity finance vehicle to launch and operate infrastructure projects. They present an overview on infrastructure assets and funds, their operational framework and risk factors related to infrastructure funds in the second section. In the third section they analyze capital market financing of infrastructure projects in Turkey. In the next section, they provide some information on REITs in Turkey. In the fifth and the last section, they propose that REITs can be an alternative tool for financing urban regeneration projects or regional projects such as Southern Anatolia Project.

The last and fifth paper, titled *Is There a Bank Lending Channel in Tunisia ?* by Adnen Chokri, aims to investigate the relevance of bank lending channel of monetary policy in Tunisia by using disaggregated bank level data set. To avoid this ambiguity, a panel of annual balance sheet data on 10 Tunisian banks used to test whether lending responses to a change in monetary policy differs, depending on the balance sheet strength of a bank. The empirical evidence has stated that monetary policy shocks is significantly and negatively influenced the banks' loan supply, and therefore has supported the existence of bank lending channel in Tunisia. In addition, several bank characteristics variables namely capitalization, size and liquidity in the transmission of monetary policy is studied. Size revealed to be an important bank characteristic that affects the way Tunisian banks react to monetary policy changes.

Anti-Money Laundering Regulation and Crime: A Two-Period Model of Money-in-the-Utility-Function

Fassil Fanta and Hasan M Mohsin¹

This paper presents a two-period model of money-in-the-utility-function to investigate the impact of anti-money laundering policy on crime. Our two- period model reveals that an increase in labor wage in the legal sector unambiguously decrease labor hours allocated for illegal sector. 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 thresholds. These thresholds are a function of the marginal rate of substitution of ‘dirty’ money for consumption and the responsiveness (elasticity) of illegal income to the policy parameter. Higher threshold implies the need for stringent anti-money laundering policy. 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 governing the formulation of the anti-money laundry 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 laundering regime can be understood in terms of increased efficiency of the legal system for 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

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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, thereby 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.

Although the relevance of the study of anti-money laundering policy and organized crime seems growing, there is relatively very limited theoretical and empirical work on the issue. Camera (2001) noted that, until now little has been done to construct a model capable of rationalizing such a policy. There is growing 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 (2007) presents a two-period model where an individual practice concomitantly legal and illegal activity in the first period and in the second period there is no profit of illegal behavior. The result of his model unveils that effectiveness of anti-money laundering policies negatively affect the amount of resources obtained from criminal activities. However, the mechanism through which anti-money laundering policies reduce criminal activities is not clear from the model. Moreover, the model does not explicitly specify the illegal and the legal sector to identify the possible incentive or disincentive to work in either sector. The model also implicitly assumes that income generated from illegal activity is readily available for consumption without being laundered.

Araujo and Moreira (2005) present a basic model by which a representative agent chooses to allocate his saving optimally between money of legal origin and dirty money. The authors analyze the welfare of such an economy as result of money laundering. The result of the model indicates that the effectiveness of anti-money laundering regulations positively affects the consumption. Intuitively, it means that as the effectiveness of anti-money laundering improves, the workers

reduce their time in the illegal activities and, therefore, the consumption level increase. In other words, where criminal activity with money laundering is predominant, the welfare of the economy is smaller than the welfare of an economy with a low level of criminality.

Camera (2001) developed a simple general equilibrium model capable of characterizing the links between availability of currency and extent of illegal economic activities. The author attempts to rationalize the policy that promotes replacement of currency with the objective of discouraging illegal economic activities using search theories. His result indicates that stationary monetary equilibria with both legal and illegal production exist, in which case the over-provision of currency may increment the extent of illegal production.

In studying whether anti-money laundry policy reduces crime rate, Ferwerda (2008) 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. The 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 and Nair (2007) examined 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 previous studies (see for example, 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 on crime. It assumes a representative agent involving in both legal and illegal activities concomitantly to acquire goods and services. The agent 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 also assume that the income generated from the illegal sector has no purchasing power² before it is laundered and 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 punishment³ will occur in the second period. In contrast to Araujo and Moreira (2005) work⁴, 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. Therefore, our specification allows for the wider application of the result of our model. We also assume that the same individual who involves in the criminal activity also involves in laundering the ‘dirty’ money. Moreover, we explicitly specify the illegal economy as a function of the probability of being caught and the effectiveness of anti-money laundering, both of which can be understood as an efficiency parameter in the production function.

2. The Model

We consider an agent that maximizes lifetime utility U which depends on period consumptions level and 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 (‘clean’ and ‘dirty’) only in the first period.

$$U = u(c_1, m, \hat{m}) + \beta u(c_2) \quad (4.1)$$

Where c_1 , and c_2 are consumption levels in two periods, and m and $\hat{m}$ are money of legal origin and ‘dirty’ money, respectively. Moreover,

² Araujo and Moreira (2005) also assume that income generated from the illegal sector has no purchasing power.

³ Punishment is a part of enforcement pillar of the anti-money laundry regime. It mostly involves confiscation of the criminal proceeds.

⁴ They assume a representative agent embezzles part of government transfer.

$0 < \beta < 1$ represents the subjective discount or time preference factor. The period utility function is strictly increasing and concave in consumption and money, $u_c, u_m, u_{\hat{m}} > 0$ and $u_{cc}, u_{mm}, u_{\hat{m}\hat{m}} < 0$. 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 $(1 - \alpha)$ is spent in the illegal sector where he commits criminal offense to generate illegal income and involves in money-laundry activities⁶.

Let z represent the illegal sector of the form:

$$z = [(1 - p)(1 - \varepsilon)]^{1-\emptyset}(1 - \alpha)^{\emptyset} \quad (4.2)$$

Where $0 < \emptyset < 1$, $0 < \varepsilon < 1$ and $0 < p < 1$. ε and p are parameters representing effectiveness of anti-money laundering regulation and the effort of the police force and legal system to caught and punish criminals (probability term) respectively. $\emptyset$ 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 probability⁷ that agent is not caught $(1 - p)$. In other words, it indicates the responsiveness of the illegal income to policy parameters. In fact, both proxies as a product can be understood as efficiency parameter in the illegal sector. The rationale for including the ineffectiveness parameter and the probability of being not caught is to emphasis that generating illegal proceeds operates under the limits of such policy parameters. Since we assume an agent does both the predicate crime and laundering activity, we need both parameters in the function of the illegal sector. In the later section we will consider only the case where the probability of not being caught $(1-p)$ will be considered in the illegal sector.

⁵ Assume crime and works are substitute activities.

⁶ In many cases, it is not unusual to assume that the offender himself involves in money laundering (see Gilmore, 1999).

⁷ The effort of the police force and legal system to caught and punish criminals is measured by the probability p .

We have the legal economy of the form:

$$Y = \alpha L, \text{ per capita form } y = \alpha \quad (4.3)$$

Where L is labor and $\alpha > 0$

Hence, in the first period we have

$$c_1 = \alpha w + z - m - \hat{m} \quad (4.4)$$

A representative agent can hold its wealth in the form of m and $\hat{m}$. And αw is the income from legal sector, where w represent wage rate in the legal sector. The agent saves part of the income in the form of money. There is no incentive for the representative agent to hold part of his income from legal origin in the form of ‘dirty’ money. With our assumption of no immediate purchasing power of illegal income in the first period, we have

$$\hat{m} = z \quad (4.5)$$

Equation (4.5) 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 the expected illegal income which is the fraction of illegal income expressed in terms of the ineffectiveness of the anti-money laundering regulation and the probability of not to be caught by the legal system minus the value of expected illegal income that can be apprehended by legal authorities in the second period (cost due to anti-money laundering regulation⁸ and the probability of being caught). Measure against money laundering facilitates detection of financial trails through financial transaction record that allow hidden asset to be located and indentify the criminals. Here, the effectiveness of the anti-money laundering policy is measured by the proportion that the illegal income is apprehended, $\varepsilon \hat{m}$, and the effort of the police and legal system to caught and punish criminals is

⁸ The cost of money laundering will therefore depend on the effectiveness of anti-money laundry regulation.

measured by the probability p . The term $\varepsilon p \hat{m}$ reveals aspects of prevention and repression for combating illegal market.

What is important in here is the expected income of illegal origin and the expected loss, if caught, as described above. Our assumption of high positive correlation of the anti-money laundering policy and the probability of the agent be apprehended and punished makes our specification more tractable. This is because we may not consider the case where there is very effective (high value) anti-money laundering policy and the probability of being caught to be low. However, we can still make sense of our second period constraints for different values of the parameters.

Let us take numerical example. If both ε and p are close to zero, the agent would get all illegal income ($\hat{m}$). And if they are close to 1, then the agent would lose his legal income by the amount equals to the income generated by the criminal activities (punishment). For the case where the police force and the legal system is less effective to catch and punish criminal (assume $p=0$) and where we have very effective anti-money laundering regulation ($\varepsilon = 1$), then the individual will lose all of his illegal proceed ($\hat{m}$). The converse is also true. Intuitively it means that anti-money laundering help to confiscate ill-gotten money and increase the efficiency of the legal system to catch and punish criminals. This in, in fact, reduces the incentive to practice criminal activities. Therefore, we have

$$c_2 = (1 - \varepsilon)(1 - p)\hat{m}/(1 + \pi) - \varepsilon p \hat{m}/(1 + \pi) + m/(1 + \pi) \quad (4.6)$$

A representative agent solves the following Lagrangian maximization problem:

Max:

$$u(c_1, m, \hat{m}) + \beta u(c_2) + \lambda [\alpha w + (1 - \varepsilon)(1 - p)\hat{m}/(1 + \pi) - \varepsilon p \hat{m}/(1 + \pi) - m + m/(1 + \pi)] \quad (4.7)$$

FOC:

$$c_1 : u'_{c_1} = \lambda \quad (4.8)$$

$$c_2 : \beta u'_{c_2} = \lambda \Rightarrow \beta u'_{c_2} = u'_{c_1} \Rightarrow \frac{u'_{c_2}}{u'_{c_1}} = \frac{1}{\beta} \quad (4.9)$$

Equation (4.9) is a standard intertemporal Euler equation. The left hand side represents consumer's marginal rate of substitution of period one (present) for period two (future) consumption, while the right-hand side can be understood as the price of future consumption in terms of present consumption. High value of the discount factor implies the agent place more value to present consumption. Further, first order condition with respect to m yields

$$u'_m = \lambda \left[1 - \left(\frac{1}{1+\pi} \right) \right] \quad (4.10)$$

This implies

$$\frac{u'_m}{u'_{c_1}} = \left[1 - \left(\frac{1}{1+\pi} \right) \right], \quad (4.11)$$

The left hand side of equation (4.11) 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. The right hand side of equation (4.11) represents the relative price holding additional clean money or the opportunity cost of holding one additional unit of clean money.

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

$$u'_{\hat{m}} = \lambda \left(\frac{(\varepsilon+p)-1}{(1+\pi)} \right) \quad (4.12)$$

this implies

$$\frac{u'_{\hat{m}}}{u'_{c_1}} = \left(\frac{(\varepsilon+p)-1}{(1+\pi)} \right), \quad (4.13)$$

The left hand side of equation (13) represents the marginal rate of substitution⁹ ($MRS_{\hat{m}c_1}$) of dirty money for consumption. It is the ratio of marginal utility of holding one additional unit of dirty money to the marginal utility of consuming one more unit of good. The right hand side of equation (4.13) indicates the relative price of holding one additional unit of dirty money or an opportunity cost of holding one more unit of dirty money in terms of the forgone consumption in the first period. It is an increasing function of ε and p . It implies that strong anti-money laundering policy (high value of ε) and high probability of being caught (high value of p) make it costly for agent to engage in illegal activities. In other words, the relative price of holding additional dirty money is higher when we have effective anti-money laundering regulation, which in turn reduces criminality.

Finally, FOC with respect to α yields:

$$\lambda w + \lambda \left(\frac{((1-\varepsilon)(1-p)\phi(1-\alpha)^{\phi-1}[(1-\varepsilon)(1-p)]^{1-\phi})}{(1+\pi)} \right) - \lambda \left(\frac{\varepsilon p \phi (1-\alpha)^{\phi-1} [(1-\varepsilon)(1-p)]^{1-\phi}}{(1+\pi)} \right) = 0 \quad (4.14)$$

From (4.14) we obtain the optimal fraction of time allocated to the legal activity

$$\alpha^* = 1 - (1-\varepsilon)(1-p) \left[\frac{\phi[(\varepsilon+p)-1]}{(1+\pi)w} \right]^{\frac{1}{1-\phi}} \quad (4.15)$$

Let $A = \frac{\phi[(\varepsilon+p)-1]}{(1+\pi)w} = \frac{\phi MRS_{\hat{m}c_1}}{w}$, and rewrite equation (4.15) as:

$$\alpha^* = 1 - (1-\varepsilon)(1-p) [A]^{\frac{1}{1-\phi}} \quad (4.16)$$

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

$$\frac{\partial \alpha^*}{\partial w} = \frac{[(1-\varepsilon)(1-p)]}{1-\phi} A^{\frac{\phi}{1-\phi}} \left[\frac{\phi[(\varepsilon+p)-1]}{(1+\pi)w^2} \right] > 0 \quad (4.17)$$

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

Our comparative statics result (equation 4.17) shows that an increase in wage rate in the legal sector unambiguously reduces labor hours allocated for legal activity. Our result has an important implication that substitution effect dominates the income effect. That is, the agent supply more labor hours as wage rate increase. An increase in the wage rate can be understood as an increase in the opportunity cost for illegal activities.

And

$$\frac{\partial \alpha^*}{\partial \varepsilon} = (1 - p) \left[A^{\frac{1}{1-\phi}} - \frac{\phi(1-\varepsilon)}{(1+\pi)(1-\phi)w} A^{\frac{\phi}{1-\phi}} \right] > 0 \quad (4.18)$$

The condition¹⁰ gives

$$\varepsilon > 1 - [(1 - \phi)(1 + \pi)MRS_{\hat{m}_{c_1}}] \quad (4.19)$$

The right-hand side of equation (4.19) represents the critical or threshold value ε_c . The comparative statics (4.18) 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 (4.19). Equation (4.19) indicates that ε must be above this threshold to have a positive impact (i.e. $\varepsilon > \varepsilon_c$). Higher marginal rate of substitution ($MRS_{\hat{m}_{c_1}}$) and higher elasticity term $(1 - \phi)$ implies lower threshold (ε_c^l). Institutively, this also mean that when the agent is highly responsive to policy parameter and if the cost of illegal activity is high (in terms of current consumption), anti-money laundry can be effective at the lower threshold¹¹.

Further, FOC with respect to p gives:

$$\frac{\partial \alpha^*}{\partial p} = (1 - \varepsilon) \left[A^{\frac{1}{1-\phi}} - \frac{\phi(1-p)}{(1+\pi)(1-\phi)w} A^{\frac{\phi}{1-\phi}} \right] > 0 \quad (4.20)$$

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

¹¹ The converse is also true.

The condition gives

$$p > 1 - [(1 - \emptyset)(1 + \pi)MRS_{\hat{m}_{c_1}}] \quad (4.21)$$

The right-hand side of equation (21) represents the critical or threshold value p_c . Higher marginal rate of substitution ($MRS_{\hat{m}_{c_1}}$) and elasticity term $(1 - \emptyset)$ implies lower threshold (p_c^l). Intuitively, this also means that when the agent is highly responsive to policy parameter and if the cost of illegal activity is high, the subjective probability of being caught discourages the agent to engage in criminal activities at lower threshold.

Taking equation (4.2) and (4.5) and substituting α^* (equation 4.16) implies:

$$\hat{m}^* = [(1 - \varepsilon)(1 - p)]^{(1-\emptyset)}(1 - \alpha^*)^\phi = [(1 - \varepsilon)(1 - p)]A^{\frac{\phi}{1-\emptyset}} \quad (4.22)$$

Equation (4.22) indicates the optimal stock of ‘dirty’ money. In other words, the optimal labor hour determine the amount of income generated in the illegal sector which is equal to the amount of dirty money in the first period. The proportion of income that goes to the consumption of the second period depends on the effectiveness of anti-money laundering regulation.

Where

$$\frac{\partial \hat{m}^*}{\partial w} = - \frac{[(1-\varepsilon)(1-p)]}{(1-\emptyset)} \frac{\emptyset^2[(\varepsilon+p)-1]}{(1+\pi)w} A^{\frac{2\phi-1}{1-\emptyset}} < 0 \quad (4.23)$$

Equation (4.23) shows that an increase in wage in the legal sector reduces the stock of ‘dirty’ money by increasing the opportunity cost of illegal activity. In other words, the economic agent supply more labor hour in the legal sector as wage rate increases which in turn reduces the optimal stock of dirty money.

$$\frac{\partial \hat{m}^*}{\partial \varepsilon} = (1 - p) \left[\frac{\emptyset^2(1-\varepsilon)}{(1+\pi)(1-\emptyset)w} A^{\frac{2\phi-1}{1-\emptyset}} - A^{\frac{\phi}{1-\emptyset}} \right] < 0 \quad (4.24)$$

The condition gives

$$\varepsilon > 1 - \left[\frac{(1-\phi)(1+\pi)MRS_{\widehat{m}c_1}}{\phi} \right] = \varepsilon'_c \quad (4.25)$$

Let the right-hand side of equation (4.25) represented by ε'_c showing the critical value. Anti-money laundering policy reduces the optimal stock of dirty money only if it is above the critical value. As in the previous case (ε_c), this is also the function of the marginal rate of substitution between dirty money and consumption (i.e. the rate at which an individual is ready to give up consumption to hold one additional unit of dirty money), the responsiveness of illegal income to the policy parameter.

$$\frac{\partial \widehat{m}^*}{\partial p} = (1 - \varepsilon) \left[\frac{\phi^2(1-p)}{(1+\pi)(1-\phi)w} A^{\frac{2\phi-1}{1-\phi}} - A^{\frac{\phi}{1-\phi}} \right] < 0 \quad (4.26)$$

The condition gives

$$p > 1 - \left[\frac{(1-\phi)(1+\pi)MRS_{\widehat{m}c_1}}{\phi} \right] \quad (4.27)$$

p'_c represents the threshold value which is the right-hand side of equation (4.27). The comparative statics from (4.23) 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 (4.25). As usual, equation (4.25) indicates that ε must be above this threshold to reduce the amount of dirty money¹².

We also re-examine our optimal labor allocation and the associated comparative statics for different specification of illegal sector:

$$z = (1 - p)^{1-\phi}(1 - \alpha)^\phi \quad (4.28)$$

¹² The same line of argument applies to the subjective probability term p

The rationale for the above specification is that we should only allow the probability of being not caught to enter into the illegal sector and consider the anti-money laundering policy in the money laundering process. Using our equation (4.28), our optimal labor supply is given by:

$$\alpha^* = 1 - (1 - p)[A]^{\frac{1}{1-\theta}} \quad (4.29)$$

Our comparative statics with respect to wage w gives the same qualitative result as before. However, we have ambiguous result with respect to ε .

2.1 A Specific Case

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), Anti-money laundering (AML) regime as it has evolved over some thirty years has two basic pillars: prevention and enforcement¹³. 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)¹⁴ empirically studied which aspect of the anti-money laundry regulation matters the most and found out the enforcement pillar¹⁵ is found out to be the most important one.

¹³ Lopez-de-Silanes and Chong (2007) noted that the two are not mutually exclusive.

¹⁴ They admit the limitation of their data to capture different aspects of prevention and enforcement

¹⁵ Particularly criminalizing the feeding activities and improved confiscation

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

$$p = \varepsilon \quad (4.28)$$

Given equation (4.28), we rearrange and resolve the previous maximization model and the results are presented below.

Our illegal sector will take the following form:

$$z = [(1 - \varepsilon)^2]^{1-\emptyset} (1 - \alpha)^{\emptyset} \quad (4.29)$$

Consumption in the first period (Equation 4.4) remains the same and consumption in the second period is given by:

$$c_2 = (1 - \varepsilon)^2 \hat{m} / (1 + \pi) - \varepsilon^2 \hat{m} / (1 + \pi) + m / (1 + \pi) \quad (4.30)$$

Based on our optimization result, the first-order condition with respect to c_1 , c_2 and m and remain the same as given by equation (4.8), (4.9) and (4.10).

FOC with respect to $\hat{m}$ yield:

$$u'_{\hat{m}} = \lambda \left(\frac{2\varepsilon - 1}{(1 + \pi)} \right) \quad (4.31)$$

this implies

$$\frac{u'_{\hat{m}}}{u'_{c_1}} = \left(\frac{2\varepsilon - 1}{(1 + \pi)} \right) \quad (4.32)$$

The left hand side of equation (4.30) represents the marginal rate of substitution¹⁶ ($MRS_{\hat{m}c_1}$) of dirty money for consumption, while the right

¹⁶ Assuming a positive $MRS_{\hat{m}c_1}$ implies $\frac{(2\varepsilon - 1)}{(1 + \pi)} > 0$

hand side is the price of present dirty money in terms of current consumption or it represents the relative price of holding one additional unit of dirty money. We note that the higher the effectiveness of the anti-money laundering 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:

$$\alpha^* = 1 - (1 - \varepsilon)^2 \left[\frac{\phi[2\varepsilon-1]}{(1+\pi)w} \right]^{\frac{1}{1-\phi}} \quad (4.34)$$

Let $B = \frac{\phi[2\varepsilon-1]}{(1+\pi)w} = \frac{\phi MRS_{\bar{m}c1}}{w}$, and rewrite equation (31) as

$$\alpha^* = 1 - (1 - \varepsilon)^2 [B]^{\frac{1}{1-\phi}} \quad (4.35)$$

The partial derivatives of α^* with respect to ε and w give the same result as given above (equation 4.17 and 4.18).

Taking equation (4.2), (4.5) and (4.31) implies:

$$\hat{m}^* = [(1 - \varepsilon)^2]^{(1-\phi)} (1 - \alpha^*)^\phi = (1 - \varepsilon)^2 B^{\frac{\phi}{1-\phi}} \quad (4.36)$$

The partial derivatives of m^* with respect to ε and w give same result as given above (equation 4.23 and 4.24).

In general, our assumption of high correlation between anti-money laundering policy and legal system to prosecute and punish criminals gives the same result without lose of generality. Therefore, we can argue that our special case captures the two aspects of the anti-money laundering regime (prevention and enforcement) allow us to specifically study the impact of AMR to combat crime.

3. 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 the 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 values. These thresholds are a function of the marginal rate of substitution¹⁷ ($MRS_{\hat{m}_{c_1}}$) of ‘dirty’ money for consumption and the elasticity (responsiveness) parameter in the illegal sector.

Higher marginal rate of substitution implies that a representative agent places a higher value on holding one extra unit of ‘dirty’ money (higher opportunity cost). In other words, agent with a characteristic of higher marginal rate of substitution (holding dirty money is costly) may easily be discouraged from committing a crime as compared to a person with lower marginal rate of substitution for a given level of anti-money laundering regime. Higher effectiveness of anti-money laundering policy and a well organized effort by the police force and legal system to catch criminals drive the value (price) of dirty money (in terms of current consumption) up. In other words, higher values of both parameters make criminal activities costly.

Higher value of the elasticity term ($1 - \emptyset$) implies more inelastic or less responsive of the illegal income to the policy parameters. In this case, we expect that criminals are more likely to engage in criminal activities due to less responsiveness of such activities to policy parameters.

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.

Lower $MRS_{\hat{m}c_1}$ (marginal rate of substitution) and, less responsive illegal income to anti-money laundry policy and the probability to be caught, imply that anti-money laundering regulation only reduce the incentive for illegal activity if the policy parameter (ε) is above some critical or threshold value ε_c^h (higher threshold). In other words, we need a stringent anti-money laundering regulation and effective legal system to deter criminals with high tendency of engaging in criminal activities (money laundering and organized crimes).

Higher marginal rate of substitution (high opportunity cost of holding dirty money) and, more responsive illegal income to anti-money laundry regulation and the probability of being caught, imply that anti-money laundering policy only discourage illegal activities if the policy parameter (ε) is above some critical or threshold value ε_c^l (lower threshold). And, we have already established that $\varepsilon_c^h > \varepsilon_c^l$, which implies the need for tough anti-money laundry regulation for the case with high tendency of criminal activities.

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. However, it is very difficult to observe and measure both factors to formulate policy prescriptions based on the attributes of criminals. The severity and frequency of the problem among different groups of people, sectors and countries should be carefully identified before allocating resources to combat money laundering and organize crime. More specifically, countries may formulate different punishment mechanisms to discourage such criminal behavior. For instance, formulating severe punishment for repeated offenders (high tendency criminals, ε_c^h) rather than having the same punishment for first time offender. Moreover, due to the nature of the crime, countries may also need to seek international cooperation to effectively fight money laundering and the predicate crimes.

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 anti-money laundering regulation: prevention and enforcement. Some policy makers may argue that countries with effective legal system may effectively fight criminal activities without having anti-money laundering regulations. However, our results imply that anti-money laundering regulations help combating criminality by increasing the cost of engaging in criminal activities and help to prevent and repress illegal activities which justify resource allocation for anti-money laundering regime.

Future research may focus on introducing other forms of punishment mechanisms in addition to confiscation of the proceeds from illegal activities.

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Determinants of Trade Flows among D8 Countries: Evidence from the Gravity Model

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A special grouping within the Organisation of Islamic Countries (OIC) – the so called D8 Group comprises of eight developing countries – has formed an economic development alliance. Among its objectives are to improve member countries' positions in the world economy, diversify and create new opportunities in trade relations, and enhance participation in decision-making at the international level. In this context, the present paper identifies the factors affecting export flows among the D8 countries. The results from a gravity model, which is estimated using Panel Correlated Standard Errors (PCSE), demonstrate that the trading partners' Gross Domestic Product (GDP), exchange rate, population of exporter country, border and distance are the notable factors affecting the volume of export flow among the countries in the D8 group. In line with the results, the countries would do better if they focus on exporting more to their neighbouring countries within the group and also undertake the measures which ensure low transportation costs. Additionally, the currency depreciation would increase the trade flows among the members when other adverse effects are taking into account.

1 Introduction

The Organization of Islamic Countries (OIC) is the second largest inter-governmental organization which comprises of 57 members. The member countries have undertaken several efforts to enhance trade among them. A special group within the OIC, known as the Developing 8 (D8) was formed in 1997 within the larger OIC community with the

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purpose of strengthening the economic relations and providing the forward motion for greater economic integration.

The D8 group comprises eight major countries within the OIC, namely Malaysia, Iran, Turkey, Indonesia, Egypt, Bangladesh, Pakistan, and Nigeria. The trade relation amongst the D8 countries is not showing hopeful sign for the desirable share towards the volume of world trade. The countries do not trade with or invest in each other's economy as much as they do with the industrialized or other developing countries (Jamal and Yaghoob, 2009). However, in recent years, the D8 members have come up with an attempt to broaden and strengthen their economic cooperation. Clear efforts have been made to enhance the trade within the D8 in order to develop member countries' economy and also empower the countries to participate more actively in the globalization process (Group of Developing 8 Countries, 2010). This study is an attempt to find out major factors determining the trade relations among the D8 countries by applying a gravity model to estimate an export equation among the countries by using a pooled panel of data.

This study is organized as follows. Section 1 provides the background of trade flows within the D8 members. Section 2 discusses the existing literature on determinants of trade flows. Section 3 provides a review of the gravity model, followed by section 4 which presents the methodology and data used in estimating the main factors determining the trade relations among the D8 countries. Section 5 presents the conclusion and policy implication of the study.

1 Trade Performance in D8

Table 1 depicts the trends in the D8's merchandise trade during the last two decades. As shown in the table, most economies in the region have registered steady improvement in their merchandise trade performance during the 1995-2007 period. The most open economies in the region, Malaysia and Egypt, recorded merchandise trade (as a share of gross domestic product or GDP) of more than 200 percent and 60 percent by 2007, respectively and consequently recorded a higher total trade than the rest of the world on average. On the other hand, other D8 economies, particularly Pakistan, recorded a relatively lower trade in comparison to the world trade on average.

Table 1: Merchandise trade of D8 members (percentage of GDP)

Country	1995	2000	2005	2006	2007
Bangladesh	28.2	33.21	39.63	44.21	46.48
Egypt, Arab Rep.	50.25	39.02	62.95	61.52	65.08
Pakistan	36.13	28.13	35.25	38.45	35.53
Indonesia	53.96	71.44	63.99	56.65	54.83
Iran, Islamic Rep.	34.83	40.14	57.72	56.86	53.72
Malaysia	192.11	220.41	212.1	210.98	200.74
Nigeria	59.33	49.83	46.43	-	-
Turkey	44.24	43.2	47.21	50.25	49.8
World	42.02	49.08	53.83	56.58	57.35

Source: World Bank, 2010

As indicated in Table 2, overall, intra-trade within the D-8 forms only 3.7 percent, relative to 6 percent with the Rest of Other Islamic Countries (ROIC) and 90 percent with the Rest of the World (ROW). It is clear that those Islamic countries especially the D8 members do not trade with each other as they do with the rest of the world. All other bilateral trades between the D8 countries have only been very small; mainly less than 1 percent of each country's total trade (Badri & Terrie, 2008). It clearly indicates that intra trade among the D8 countries has been dismally minute. However, trade with ROW is overwhelmingly high at about 90 percent on average.

Table 2: Bilateral Export at World Prices (in percent value)

	D8	ROIC	ROW	Total
D8	3.7	6.0	90.2	100
ROIC	6.2	7.3	86.4	100
ROW	3.7	3.8	92.5	100
Total	3.8	4.0	92.1	100

Source: Badri & Terrie, 2008

Table 3 shows the decomposition of intra trade levels among the D8 countries. Among the grouping members, Egypt-Turkey and Indonesia-Malaysia trade have been the top trading pairs. Malaysian trade with Indonesia accounts for 59.66 percent of total trade while Indonesian

trade with Malaysia is somewhat smaller at 59.29 percent. Turkey is the main trade partner for D8 members, except for Malaysia and Indonesia, while Nigeria is a very small market for export of the D8 members. Other top trading pairs within the D8 grouping are Iran-Turkey and Egypt-Turkey, while, all other bilateral trade between the D8 countries has been very small, mainly less than 1 percent of each country's total trade.

**Table 3: Decomposition of Trade among D8 (percentage)
(based on year 2007)**

		Partner Country								
		Bangladesh	Egypt	Indonesia	Iran	Malaysia	Nigeria	Pakistan	Turkey	Total
Reporter Country	Bangladesh	0.0000	0.0527	0.0791	0.1595	0.0528	0.0075	0.1806	0.4678	1
	Egypt	0.0067	0.0000	0.0524	0.0046	0.0199	0.0168	0.1087	0.7909	1
	Indonesia	0.0618	0.0670	0.0000	0.0451	0.5929	0.0228	0.1059	0.1044	1
	Iran	0.0291	0.0977	0.0765	0.0000	0.0447	0.0130	0.3509	0.3882	1
	Malaysia	0.0619	0.0502	0.5966	0.0646	0.0000	0.0092	0.1235	0.0939	1
	Nigeria	0.1414	0.0076	0.0621	0.0158	0.2108	0.0000	0.1254	0.4370	1
	Pakistan	0.2631	0.0715	0.0611	0.1763	0.0601	0.0334	0.0000	0.3345	1
	Turkey	0.0413	0.3187	0.0382	0.4793	0.0269	0.0373	0.0582	0.0000	1

Source: United Nations, 2010

However, intra-regional trade of D8 has been growing considerably in recent years (see Table 4). For instance, intra-regional trade in D8 expanded from US\$ 7263 million in 1990 to 103056.6 US\$ million in 2010. Turkey and Malaysia had the biggest share in intra-regional trade at 25% in 2010 followed by Indonesia (24%), Turkey (19 %) and Iran (14%), while Pakistan, Egypt, Bangladesh and Nigeria had relatively low shares in intra regional trade (Table 4).

Table 4: Merchandise Trade Performance among D8 (USD Million)

Year	1990	1995	2000	2005	2006	2007	2008	2009	2010	Share (%)
Malaysia	1334	3843	5367	10931	12573	15916	19577	16814	25613	25
Indonesia	1390	4889	4998	9088	10406	16920	21695	17699	24770	24
Turkey	1502	2245	2503	8034	11136	14077	17964	13363	19818	19
Iran, Islamic Republic of	1550	1741	1835	5469	7712	9013	13246	8616	14551	14
Pakistan	857	2050	1585	3120	3273	4328	5382	4980	6419	6
Egypt	345	641	1159	1636	1447	1457	4166	4645	5761	6
Bangladesh	260	389	586	1056	1298	1389	2000	2536	3562	4
Nigeria	25	282	697	1695	808	1645	2067	1993	2564	3
Total	7263	16079	18730	41028	48653	64746	86096	70646	103057	1

Source: International Monetary Fund (2011)

2 The Determinants of Trade

Trade flows between countries depend on a number of factors. Bilateral trade flows between two countries are assumed to be proportional to the level of their GDP. The GDP takes into account the fact that higher income economies tend to be more interested in product differentiation and specialization, thus they trade more (Fujimura & Edmonds, 2006).

In the traditional trade theory, such as the Heckscher-Ohlin model, patterns of trade between countries depend on natural resources, skills, and factors of production. It is assumed that trade takes place in a perfectly competitive and frictionless world without distance or geographic features (Salvatore, 1998). However, traditional explanations are thus incapable to explain the diverse patterns of exports across countries (Matthee & Naudé, 2008).

New theories of international trade have incorporated the distance (physical geography) to explain the determinants of trade flows between countries. Theoretical and empirical studies have found significant effects of distance on international trade (Beckerman, 1956; Yeates, 1969; Harrigan 1993; Hummels and Levinsohn 1995; Harrigan 1996;

Radelet and Sachs 1998; Hummels 1999; Hoffmann 2002; Lima~o and Venables 2001; Clark, Dollar and Micco 2004). The most beneficial of those studies was conducted by Linneman (1966) who extensively investigated the role of distance on trade flows. Additionally, Krugman (1991) considers the distance between two countries to be an important determinant of geographical patterns of trade. In Krugman's view, trading partners located far apart from each other will have to require more cost in their bilateral trade, which erodes possible gains from trade and consequently discourages trade.

Loungani et al. (2002) and Filippini and Molini (2003) state that distance is much more than geography. In their view, distance can represent the history, culture, language, social relations and many other aspects. For example, the mere existence of a border has negative effects on trade. Furthermore, Blum and Goldfarb (2006) find that distance is a good proxy for differences in tastes and preferences. Their results provide a new explanation for the persistence effect of distance in gravity regressions. This suggests that the distance effect in gravity will persist for a number of products even if transport costs, search costs and other trade barriers associated with distance are reduced to zero, which is the case to some extent for Internet trade.

Frankel (1997) explains that countries with large populations tend to be more inwardly oriented than smaller countries because they are more competent to take advantage of scale economies in their large domestic markets. This may explain why bilateral trade flows generally have an inverse relationship to population size.

Other studies pointed toward the impact of exchange rate on trade flows. In the area of international trade, it is widely known that a change in the real exchange rate will affect exports and imports under the generalized Marshall-Lerner condition. In theory, currency devaluation can improve trade flows if the relative prices among the country and its trading partners, and other factors are unchanged. Wilson and Takacs (1979), Warner and Kreinin (1983), Bahmani –Oskoei (1986), Asserery and Peel (1991), Ghura and Grennes (1993), Clarida (1994), Reinhart (1995), Chua and Sharma (1998), Himarios (1989), and Tegene (1989, 1991) found that trade flows responded to the exchange rate. However, some consensus has emerged among researchers as they did not find any significant effects of exchange rate on trade (Miles, 1979; Rose, 1990;

Rose, 1991). The gravity equation is a useful approach to explain the role of exchange rate as well as the other determinants of trade flows between countries.

3 The Gravity Model

The gravity model provides a simple but robust approach to identify the main factors influencing trade among the countries (Greenaway and Milner, 2002). The model is, indeed, one of the most successful models in empirical economics so far (Frankel and Rose, 2002). In the early inception of the model, Tinbergen (1962) introduces the main determinants of bilateral trade flows, among others, economic size of trading partners, and measures of “trade resistance” between them. Trade resistance measured by the geographical distance as a representative proxy for cost of international trade, and by a dummy variable to account for common borders. Later, the gravity model was extended to include the variables to account for population of trading partners (Bergstrand, 1985), and exchange rate of the trading partners (Bergstrns, 1985; Dell’Ariccia, 1999). The basic model (Martinez-Zarsoso & Nowak-Lehman, 2003; Jakab et al., 2001) is specified as follows:

$$X_{ij} = A_0 (Y_i)^{\alpha_1} (Y_j)^{\alpha_2} (E_{ij})^{\alpha_3} (EX_j)^{\alpha_4} (EX_i)^{\alpha_5} (N_i)^{\alpha_6} (N_j)^{\alpha_7} (D_{ij})^{\alpha_8} (R_{ij})^{\alpha_9} u_{ij} \quad (1)$$

Where, X_{ij} is the export value from country i to the country j , Y_i (Y_j) is the value of GDP in the country i (j), E_{ij} represents the similarity of economic size, measured by an absolute differences of trading partner’s GDP. EX_i (EX_j) and N_i (N_j) are the exchange rate for the country i (j) and the population in country i (j), respectively. D_{ij} is the distance between country i and country j ; measured in kilometres, R_{ij} indicates dummy variable which restricts (or foster) the trade between country i and country j . u_{ij} is a random effect term. Linearising (1) gives the empirical version of the model which can be written as follows:

$$\ln X_{ij} = a_0 + \alpha_1 \ln Y_i + \alpha_2 \ln Y_j + \alpha_3 \ln E_{ij} + \alpha_4 \ln EX_i + \alpha_5 \ln EX_j + \alpha_6 \ln N_i + \alpha_7 \ln N_j + \alpha_8 \ln D_{ij} + \alpha_9 \ln R_{ij} + \ln u_{ij} \quad (2)$$

In this specification, an adjacency dummy variable R_{ij} is included. Border takes the value of unity when the country i has a geographical border with the country j and zero otherwise. Each of the exogenous variables in equation 2 has a predictable effect on the trade flows between trading partners. It is expected that the income variables have positive effect on the trade flows (Oguledo and Macphee, 1994; Karemera et al., 1999). In the view of demand side of the economy, an increase in income will result in a rise in import while, on the supply side, the raise in income may lead to the greater domestic production available for export. Therefore, positive signs are expected for both α_1 and α_2 . Additionally, it seems that the more similar the countries in terms of economic wealth, the larger are the volume of this bilateral trade. Thus, the value of α_3 is expected to be negative.

Currency depreciation (increase in exchange rate) of a country is expected to increase the amount of its export as export would be cheaper. Besides this, the currency appreciation of a trading partner may result in a contraction of exporter's country as the import for the trading partner would be more expensive. In view of this argument, it is expected that α_4 and α_5 may take positive and negative values respectively. With regard to the size of the domestic market (population), higher population is expected to enhance the domestic demand, while inhibiting the export. According to this argument, α_6 and α_7 are expected to be positive and negative, respectively.

Transport cost between countries is proxied by the distance between any given pair of countries. Therefore, distance between a pair of countries naturally determines the volume of trade between two countries; larger transportation cost is expected to have a negative impact on trade flows. Thus, α_8 is expected to be negative. The distances are not only a proxy for transport cost but the larger distances might indicate the larger psychological distances (Papazoglou et al., 2006). The common border means lower cost and easier market access and thereby, α_8 is expected to have positive signs.

4 Methodology and Data

This paper attempts to analyse the determinants of bilateral trade flows among the D8 community based on gravity model and a panel of data

for years 1990 to 2007. As time series data and cross section analysis do not control for individual heterogeneity and might give a bias estimation, a panel framework is designed to cover trade variations among the D8 members. Panel data offers more variability, more degree of freedom, and reduces the collinearity among the explanatory variables thus improving the efficiency of econometric estimates. Panel analysis also can measure the effects that are not detectable in cross section and time series data (Baltagi, 2005).

Following Papazoglou (2006) and Marques (2008), we utilize the Prais-Winsten regression with Panel Corrected Standard Errors (PCSE) which assumes that the disturbances are heteroskedastic (each country has its own variance) and contemporaneously correlated across countries (each pair of countries has their own covariance). The present study uses the related information on all the D8 members for the period from 1990 to 2007. The trade data, which is in the US dollar (USD) is gathered from the United Nations (UN) Comtrade Database (United Nation, 2010), covering trade flows among the countries. Estimates of the distance between capitals and border sharing are obtained from the John Haveman's website for gravity model (Haveman, 2010). The information on common borders for Malaysia and Indonesia is corrected for the database, and we consider the common border between these two countries. The common land border is in Borneo, between Kalimantan (Indonesia) and Sabah and Sarawak (Malaysia) and there are a significant number of transports crossing between the two countries in Borneo. Data for the remaining variables are collected from the International Financial statistics' database and its browser on CD-ROM (International Monetary Fund, 2008). The exchange rates for the countries are based on their national currency per USD for the average of each period. The endowment variable is calculated based on absolute GDP differences between the trading partners.

The entire variables are entered as natural logarithm, except for the dummy variable. The method has the double advantages of not assuming that data for all pairs of countries bear the same degree of autocorrelation and also of correcting for contemporaneous error correlation across country pairs. Table 5 shows the estimated results².

² The export equation is estimated using the statistic package, STATA Version 11

Table 5: Gravity Model Results

$\ln X_{ij}$	Coefficient	Het-corrected Std .Err
$\ln Y_i$	1.299*	0.128
$\ln Y_j$	0.408*	0.093
$\ln E_{ij}$	0.1102	0.077
$\ln D_{ij}$	-0.530*	0.136
$Border_{ij}$	1.301*	0.242
$\ln EX_i$	0.127*	0.230
$\ln EX_j$	-0.054**	0.027
$\ln N_i$	-0.927*	0.114
$\ln N_j$	0.163*	0.139
Constant	16.47*	1.47
Number of observation.	733	
Number of Country Pairs	56	
R-Squared	0.373	
F	512	

*Notes:*Dependent variable: Exports in logarithm term $\ln X_{ij}$.

Regression model: Paris Wintsen with panel Corrected Standard errors.

Significance levels: *Significant at 1 percent; **significant at 5 percent.

The coefficient of GDP for the exporter countries takes the value of higher than 1 and it is about 1.3; suggesting that if the GDP goes up by 1 percent, the amount of exports will go up by 1.3 percent. The GDP for importer country takes the significant positive elasticity value about 0.41, indicating that export will increase by 0.41 percent when the partners' country's economic size increase by 1 percent. Nonetheless, the D8 exports could rise significantly if the trading partners maintain strong economic growth. The export elasticity of own GDP is higher than the export elasticity of partner GDP. This indicates the existences of stronger home market effects. The estimated coefficient of the log of absolute differences of two countries GDP is not significant. This indicates that similar economic wealth does not guarantee the export to increase", perhaps this is due to high variability in GDP among D8 members. The result confirmed that the distance effects are still not died out to influence the trade relations. The variable has taken a significant negative value of -0.53, indicating that when the distance between two countries increases by 1 percent, the exports flow between them decrease by -3.91 percent. The coefficient value of a common border

dummy variable is strongly significant. The value of this coefficient is 1.3, *ceteris paribus*, meaning that two countries sharing a common border trade 1.3 percent more than two otherwise similar countries.

The exchange rate coefficients capture the influence of currency appreciation and depreciation in a country. The value of their coefficients is in line with theory where the effect of changes in exporter's exchange rate is higher than the similar effect on the importer's exchange rate, *ceteris paribus*. The higher effect of exporter's exchange rate confirms the stronger effect of home currency appreciation or devaluation. Population coefficients for the exporter's country have the expected sign values. However, the importer's population does not have a statistically significant value.

5 Conclusion and Policy Remarks

The objective of this study is to estimate the effects of factors influencing the export flows among the D8 members. In order to meet this objective, the gravity model was applied, and consequently the model coefficients were estimated based on the panel data analysis for the period from 1990 to 2007. The results show that the export flows among the D8 members are positively determined by the trading partners' GDP, exporter population and its currency depreciation, and the common border effect. However, the export flows among the D8 members are negatively determined by transportation costs and importers currency appreciation. Moreover, the difference in the countries' economic size which is measured by absolute differences in GDP was found to be insignificant. This shows that similar economic wealth does not warrant an increase in the export, perhaps this is due to high variability in GDP among the D8 members.

Since there is a strong effect of economic growth on the exports in the D8 region, the policies which promote the economic growth in the region should be undertaken. Additionally, the stronger effect of exporter compared to importer currency depreciation on export in the region somewhat suggests that the devaluation of the currency would promote the trade flows in the D8 group. Nevertheless, other adverse effects, such as domestic inflation brought about by devaluation would be taken into account.

As the transportation cost was found to be an important factor affecting the trade relations in the region, policy measures need to be undertaken to ensure low transportation costs, thereby further promoting trade in the region. The policy measures might include improving both the physical infrastructure and the efficiency of transportation systems, and ensuring the low level fuel prices which significantly reduce trade costs and enhance trade flows. In addition, the export flows of the countries were found to be influenced to a great extent by the border variable, indicating that these countries would increase their trade flows if they trade with their neighbour countries within the group.

It is worthwhile to mention that since the export flows are not independent of country specific effects, all the partner countries' propensities to export must be taken into account sufficiently and adequately before trade policy comes into the practice. Apart from this, there are trade-offs when the alternative policy recommendations are directed at the system's endogenous variables such as real exchange rates, domestic and foreign real income. For example, a policy measure to increase trade flows in the region may adversely affects the economic growth of trading partners. The avenue for future research may include consideration of such trade-offs.

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Determinants of OIC Countries' Customs Revenue vis-à-vis Implementation of WTO Customs Valuation Agreement

Ahmet Suayb Gundogdu¹

This paper scrutinizes the determinants of customs revenue in the context of WTO member OIC countries. An econometric model of OLS, fixed effect and random effect calculations is employed with panel data of 1995-2007. The results suggest that increasing tariffs might increase customs revenue for big countries but not for small countries. Besides, the implementation of WTO Customs Valuation Agreement does not decrease customs revenue as its indirect undervaluation effect would be surpassed by its direct effect of less incentive for tax evasion. This paper suggests implementing information and communications technologies in the form of integrated single windows to tackle undervaluation issue as an alternative to Preshipment inspection course.

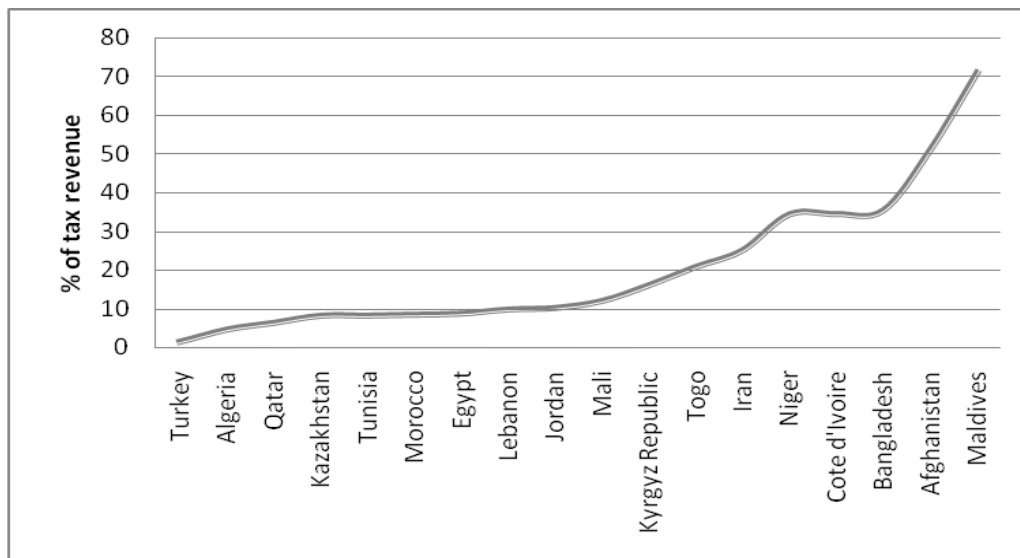
1. Introduction

Organization of Islamic Conference (OIC) countries are sometimes hesitant to transform in their customs as public authorities tend to associate any transformation in the form of trade liberalization or facilitation with decreased customs revenue. This worry is especially

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intense with Least Developed Countries as the customs revenue constitutes the bulk of the tax revenue (Figure 1). Among the OIC countries, share of customs revenue in tax is as meager as 2 per cent in the case of Turkey to 71 per cent in the case of Maldives. As WTO members, both are obliged to implement the WTO Customs Valuation Agreement. WTO defines customs valuation as a customs procedure applied to determine the customs value of imported goods as per the WTO Customs Valuation Agreement which intends to provide fair, neutral and uniform valuation in order to protect importers from the risk of arbitrary valuation by customs authorities. However, introduction of this agreement may give rise to some concern especially for those OIC countries having high customs revenue to tax revenue ratio as it may lead to revenue loss due to under invoicing by traders.²

Figure 1: Customs and other import duties (% of tax revenue) in 2007



Source: World Development Indicators (2007).

² According to Country Policy Review of WTO, Turkey implemented, albeit with some reservation, the WTO Customs Valuation Agreement as of 07/01/2003, while not surprisingly, Maldives did not.

A debate between domestic spinners and fiber importers to influence government for public discourse in their favor is a common issue and a good example of custom valuation matters. Customs duties can be in the form of specific duty such as USD 1 per kilo, ad valorem duty which depends on the value of the goods, or the mix of these two methods. For customs transaction under the ad valorem duty, determination of the value of the goods is very sensitive as the customs duty is calculated by multiplying customs valuation with ad valorem rate of the duty (e.g. 10 per cent of the customs valuation). Hence, the issue of customs valuation has implication far ahead of tax collection or transfer pricing as it can distort the prices in favor of some parties, while depriving others. For example, domestic spinners would pressure the government to sustain minimum price for customs value of fiber imported by arguing otherwise they cannot survive. In the same fashion, fiber importers, mainly textile and apparel producers, would ask government to accept actual price paid for customs value of the imported fiber so that they can stay competitive in the global market and retain their share in export markets. Given the sensitivity of the issue, customs valuation has been in the agenda of international trade negotiations for quite some time.

Formal discussions on customs valuation goes back to the establishment of League of Nations but it was the general conference of United Nations for Trade and Employment in 1947 when the discussions on customs valuation issue had a common base to be incorporated in Article VII of General Agreement on Tariffs and Trade (GATT). The article defines the general principles of customs valuation based on the “actual value” of the imported merchandise on which duty is assessed, or of like merchandise while discouraging valuation based on the value of merchandise of national origin or on arbitrary or fictitious values. However, GATT contracting parties end up with different valuation

systems as the article allows countries substantial flexibility in defining the "actual value" of imports. The first international standards on customs valuation according to the Article-VII is developed in 1950, when 13 European governments then developed the Brussels Definition of Value (BDV), based on the concept of "normal price", in an effort to achieve greater harmonization of customs valuation practices. Many other countries adopted the same for their customs valuation practices.³ Indeed, the BDV suggests invoice price to be used for customs valuation purposes but flexibility is given to customs authorities in case invoice price cannot be used.⁴ Alternatively, customs authorities can use another method based on the normal price which can be determined by customs on the basis of the available information to them in the context of conditions and other circumstances for the specific valuation transaction.⁵ The application of the BDV caused widespread dissatisfaction among traders. Customs, with reference to normal price in her price list, would have had accept any declared price by importers to be up to 10 percent less than the normal price in the price list of customs. On the other, hand upward variation was fully taken into account. For example, customs taxes for declared value of polypropylene for \$80 would be calculated from price of \$90 in the best case if the normal price in the reference list of customs was \$100. On the other hand, in case of declared value of polypropylene for \$150, customs would calculate the tax based on declared price, that is, \$150. The level of traders' dissatisfaction would have grown even more when price changes were not reflected in the reference list by customs authorities on

3 Against the normal price concept of BDV, on the other hand, big countries such as Australia, New Zealand, Canada and United States used a "positive" concept of valuation laying down the standards based on the price actually agreed on in sale.

4 This clause is embedded to impede suspiciously under invoicing, transaction between related importer and export, goods on consignment, etc.

5 A normal market price is defined as "the price that a good would fetch in an open market between a buyer and seller independent of each other". Goorman, A and Wulf, L 2005, 'Customs Valuation in Developing Countries and the World Trade Organization Valuation Rules', in L Wulf and J Sokol (eds), *Customs Modernization Handbook*, World Bank, Washington D.C., pp.155-181.

time and subject transaction contains new or rare products not captured in the list. Obviously, more flexible and uniform valuation method was needed as per the Tokyo Round objective for achieving the expansion and ever greater liberalization of world trade through the progressive dismantling of obstacles to trade. In 1979, The Tokyo Round Valuation Code, or the Agreement on Implementation of Article VII of the GATT, concluded. The system introduced was based on the price actually paid or payable, namely “transaction value”, for the imported goods in order to provide a fair, uniform and neutral system for the valuation of goods for customs purposes, while accommodating commercial realities. Many developing countries were reluctant to join the new valuation agreement due to the fear of substantial loss of customs revenue triggered by undervaluation of imported goods by traders.⁶ This aversion came to an end with the establishment of WTO after Marrakesh Agreement which also replaced the Tokyo Round Code by the WTO Agreement on Implementation of Article-VII of the GATT (also known as WTO Custom Valuation Agreement) as the agreement became binding for all WTO members.⁷ WTO Customs Valuation Agreement (WTO CVA) is not intended to be used for combating dumping nor does it bring provisions for purpose of determining export duties, quota administration, internal taxation and foreign exchange controls. In essence, it is the same as the Tokyo Round Valuation Code which applied solely for levying ad valorem duties on imported goods.

6 The agreement officially came into force on January 1, 1981 and was adopted by various signatories from the mid 1980s onward. The Tokyo Round Valuation Code was signed by more than 40 contracting parties.

7 Came at the end of Uruguay Round, Marrakesh Agreement offered least developed countries an extra flexibility in implementing WTO agreements. Agreement on Implementation of Article-VII of GATT 1994, also known as WTO Customs Valuation Agreement, provides contracting developing countries with certain flexibility for implementation. For example, it is stated in Article-20 of the said agreement that developing countries not party to the Tokyo Round Valuation Code may delay application of the provisions of WTO Customs Valuation Agreement (CVA) for period up to five years. Besides, they may delay application of paragraph 2(b).iii of Article-1 and Article-6 (provisions related to computed value method) for additional three years.

This paper aims to shed light on the effect of tariffs reduction, imports and implementation of WTO Customs Valuation Agreement on customs revenue of OIC countries. Besides, relationship among tariffs reduction, imports and the agreement is to be scrutinized in the context of the OIC countries. The determinants of the OIC countries' customs revenue shall be examined with an econometric model where the level of customs revenue is explained by imports, tariffs and implementation of WTO Customs Valuation Agreement.

The paper is organized as follows: Section two goes through the WTO Custom Valuation Agreement. Section three briefly presents a review of the recent literature on customs valuation and revenue. Section four introduces the model specification, variables, the methodology and expected signs. Section five presents the results of the regressions. The final chapter concludes with some policy suggestions.

2. WTO Customs Valuation Framework

In order to give a clear picture of the issue, concise explanation on the customs valuation system introduced by the new agreement (WTO CVA from the Annex-1A of Marrakesh Agreement) is provided below.⁸ The methods provided by the provisions in the Part-I of the agreement are organized as follows:

(a) Transaction value method governed by Article 1

The primary method of custom valuation is proposed to be transaction value. As stated in Article 1, the value is to be determined on the basis of the price actually paid or payable for the goods when sold for export

⁸ World Trade Organization (WTO) 1994, *Agreement on Implementation of Article VII of the General Agreement on Tariffs and Trade*, viewed 28 July 2009, http://www.wto.org/english/res_e/booksp_e/analytic_index_e/cusval_02_e.htm.

to country of importation after adjusted in accordance with Article 8.⁹ Price actually paid refers to total payment made or to be made in future by seller. Payment does not need to be in the form of money transfer. That is, payment can be direct or indirect. It can be in the form of Letter of Credit or bill of exchange for Documentary Collection. Transaction Value method would not be implemented in case:

- There are restrictions for the disposition or use of the goods.
- The sale of price is subject some condition or consideration for which a value cannot be determined with respect to the goods being valued.
- The part of any subsequent resale, disposal or use of the goods by the buyer is to be accrued by seller and appropriate adjustments cannot be made in accordance with the provisions of Article 8 of the agreement.
- The buyer and seller are related.

Article 15 defines the relatedness. Accordingly, persons are deemed to be related if they are officers or directors of one another's businesses; legally recognized partners in business or employer and employee. Besides, in cases where

- any person directly or indirectly owns, controls or holds 5 per cent or more of the outstanding voting stock or shares of both of them;
- one of them directly or indirectly controls the other;
- both of them are directly or indirectly controlled by a third person;
- together they directly or indirectly control a third person; or
- they are members of the same family;

⁹ Article-8 elaborates on portion to be added or subtracted to the price actually paid to be paid under the provision of Article-1. Among many of them are commissions, brokerage, cost of handling charges associated with the transport of the goods to the place of importation, the cost of packing, royalties and fees which are not included in the price actually paid or payable.

The parties in above mentioned standing are deemed to be related. However, relatedness itself would not necessarily make transaction value unacceptable if importer can demonstrate that the relationship did not influence the price.

(b) Transaction value of benchmark from identical or similar goods method by Article 2&3

In case the customs value of the imported goods could not be determined from the provisions of Article 1, importer may demonstrate the price of sales to any unrelated buyer in the same country for identical or similar goods at about the same time as the goods being valued. Transaction value of identical or similar goods needs to be at the same commercial level and in substantially the same quantity. If benchmark in the same commercial level and/or quantity is not possible, adjustment needs to be done accordingly. For example, exporter may apply certain discount for each quantity level. Upward or downward adjustment to the value can be done according to this information while benchmarking. This process is to be carried out by consultation between importer and custom authorities.

(c) Deductive value method by Article-5

In case the custom value of the imported goods could not be determined from the provisions of Article-1, Article-2 and Article-3, importer may ask for benchmark from the value of the identical or similar imported goods in the country. Benchmark is to be based on unit price of benchmarked imported goods in the “greatest aggregate quantity”. For example, in case benchmarked imported goods sold in two sales (first in 600 units with a price of 95 currency unit and second in 300 unit 100 currency unit), as the greatest number of unit sold is 600 the unit price in the greatest aggregate quantity of 95 currency unit would be base for

customs valuation. Then this would be subject to further deduction as the additions usually made for profit and general expenses such as transport, insurance, taxes, etc within the country in connection with domestic sale. Note that in any case, benchmark should be at or about the same time and between unrelated persons.

(d) Computed value method by Article-6

Again, in case the customs value of the imported goods could not be determined from the provisions of Article 1, Article 2, Article 3 and Article 5 importer may request for application of Article 6 for computed value method. However, as accorded in Article 4, importer may request to reverse the order of application of Article 5 and Article 6.

Computed value is consist of the cost/value of input used in production process, profit and general expenses of producer/exporter located out of the jurisdiction of importation country.¹⁰ Accordingly, use of computed value method is likely to be confined for those cases where the importer and exporter are related. Hence, exporter is ready to supply the necessary costings and provide facilities for any subsequent verification for the customs authorities of importation country.¹¹

In case customs value could not be determined from the provisions of Article 1 through Article 6, customs value is to be determined by reasonable means consistent with the provisions of Article 1 through Article 6 on the basis of data available in the importation country. That is, customs value is to be determined, to the greatest extent possible,

¹⁰ Where figures provided by the exporter on its own profit and general expenses are not consistent with those reflected in sales of the same class or kind of goods produced by the exporter for the importation country, customs authorities of importation country may base upon relevant information other than supplied from the exporter. On the other hand, whether certain goods are “of the same class of kind” as other goods is be determined arbitrarily on a case-by-case basis.

¹¹ Developing countries not party to the Tokyo Round Valuation Code are given option to delay the application of provisions related to computed value method for additional three years after five years of grace period of implementation of other provisions as stated in the Article-20 of the WTO CVA.

based on previously determined customs values. This is defined as Fall-back method by WTO. However, reference to Article 7, customs authorities need to refrain from customs valuation based on:

- Selling price of domestically produced products in domestic market
- Selling price of the goods in the market of exportation country
- Selling price of the goods in the third market
- The cost of production other than provisions of Article-6
- Arbitrary or fictitious values
- Minimum values

Developing countries are allowed suspend the application of minimum value restriction by making reservation. The provisions of the agreement consistently state that customs authorities are to select lower value of two alternatives. Accordingly, Article 7 restricts customs authorities to apply a system which provides for the higher of two alternatives.

Part-II of the agreement elaborates on administration, consultations and dispute settlement issues. Legal framework of WTO Committee on Customs Valuation and WCO Technical Committee of Custom Valuation is also provided in this part. Accordingly, WTO Committee on Customs Valuation shall annually review and inform the Council for Trade in Goods on implementation issues. Besides, flexibility with deadline for implementation of the agreement for developing countries is defined.

Obviously, WTO valuation system is very favorable for importers as it restrains customs authorities from challenging the declared value without documentary evidence and increasing value without opportunity to claim against.

3. Literature Review

Walsh (2003) defines Customs Valuation as an integral part of trade facilitation together with issues related to charges levied on imports, quota, licensing arrangement and the application of preference systems. He also explained provisions, together with their implementation procedures, of the WTO Customs Valuation Agreement. Finger and Schuler (2000) presents customs valuation within the wider sphere of reforms which are based on transparency, accountability, objectivity and balance. Rege (2002), after presenting historical background of customs valuation issue, accounts the resentment of developing countries for application of transaction values as it would supposedly decrease the customs revenue due to undervaluation.

Indeed, tax evasion in customs through misclassification and undervaluation of imports is a momentous issue especially in developing countries. King (2003) indicated common under invoicing and lack of effective valuation process in developing countries. He highlighted the importance of capacity building for implementation of any customs valuation system. On the other hand, Filmer (2003) presents the concerns of importers as there exist some threat of assuming higher value as well as delaying clearance in customs so as to direct importers for illegal settlements. In the same fashion, Ghimire (2005) identified the discretionary power of customs authorities as a major issue with customs valuation process. Finger and Schuler (2000) observes the lack of remedy and diagnose with WTO Custom Valuation Agreement for least developed countries for their problem with customs administrations. They suggest capacity building in the form of computer systems and database for sound implementation of the agreement as proper administrative environment does not exist in many developing countries.

There are many studies on tariffs and customs revenue. According to Pritchett and Sethi (1994) importers tend to evade tariffs as it gets higher. Hence, tariffs revenue increase less than proportionate to increase in tariffs. Accordingly, a decrease in tariffs would not necessarily mean decrease in revenue as lower tariffs decrease the marginal benefit to avoid taxation. Hence, customs revenue may increase as a result of increase in tax base. Both Ebrill et al. (1999) and Khattry and Rao (2002) worked on revenue-maximizing optimum tariffs rate. In regional focus, Abgeyegbe et al. (2004) examine the effect of trade liberalization on customs tax for not only aggregate but also subcategories for Sub-Saharan Africa. On the other hand, not much has been done for the quantitative effect of WTO Customs Valuation Agreement, tariffs and imports on OIC countries customs revenue.

4. Methodology and Data

4.1 Model specification

The functional form for determinants of customs revenue employed in this study is as follows:

$$CR^{it} = F_t(IMP^{it}, TRF^{it}, CVA^{it}, VAT^{it}, OCD^{it})$$

CR stands for customs revenue of OIC member countries. It is expected to depend on imports, tariffs, implementation of WTO Customs Valuation Agreement, value-added tax and other customs duties. According to Baunsgaard and Keen (2005), often more than half or more of the VAT is collected at the border in many developing countries. Although it is an important component of customs revenue for some countries, both other customs duties and value-added tax is dropped due to the difficulty in obtaining data. Then basic equation is augmented by including indirect effect of tariffs and implementation of WTO CVA through imports in order to fulfill the objectives of this study. Natural

logarithms of the variables are taken. Hence, customs revenue of of OIC countries is expressed in a log-linear form:

$$\ln CR^{it} = \beta_0 + \beta_1 \ln IMP^{it} + \beta_2 \ln(100 + TRF^{it}) + \beta_3 \ln IndTRF^{it} + \beta_4 CVA^{it} + \beta_5 \ln IndCVA^{it} + e^{it}$$

where superscripts i stands for the importer (an OIC member country) t denotes years.

Dependent variable is customs revenue of country i , an OIC member country, for the period of 1995-2007. IMP^{it} is imports of country i at year t . TRF^{ht} is weighted tariffs rate of country i imposed on products imported in year t .¹²The coefficient for tariffs is expected to be positive as revenue is calculated in ad valorem.

One variable as proxy for the effect of implementation of WTO Customs Valuation Agreement is introduced. CVA^{it} is dummy variable taking the value of 1 for the observations if country i implemented WTO Customs Valuation Agreement in year t .¹³This dummy variable captures the change in customs revenue as a result of the implementation of the agreement. Hence, if there is decrease in customs revenue it should be interpreted as negative direct effect of the implementation of WTO CVA and vice versa.

Both tariffs and Implementation of WTO CVA is expected to have indirect effect on customs revenue through imports. An increase in tariffs or the implementation of WTO CVA may decrease imports, hence, decrease customs revenue. In order to estimate the indirect effects, two variables are created through multiplying existing tariffs and CVA

12 This variable denotes weighted average tariff rate in the percent ad valorem term which is specific to the trading partners, product categories and year and includes the lowest applicable rates as well as all available preferential rates. Bilateral trade values are used as weight. To avoid log zero in case tariff level is zero, 100 is added.

13 All countries of destination, importers, in this model are OIC members.

variables by existing imports variable. $IndTRF^{it}$ captures the indirect effect of tariffs thorough imports on customs revenue while $IndCVA^{it}$ captures the indirect effect of the implementation of WTO CVA through imports on customs revenue.¹⁴ For both, coefficient would be negative if higher tariffs and the implementation of WTO CVA lead to less import.

4.2 Data and data sources

Imports and weighted average of applied tariffs rates is obtained from the World Integrated Trade Solutions (WITS).¹⁵ Customs revenues are derived from World Development Indicator (WDI). The most challenging part of data collection turns to be the identification of WTO Customs Valuation Agreement implementation year for each country. The Agreement allows developing member countries to delay the implementation for a transition period of five years from their entry to WTO. Besides, developing countries are opted to request a further extension from Committee on Customs Valuation for additional extension. Many OIC countries got this additional extension.¹⁶ Hence, implementation year is identified by digging into the WTO Trade Policy Reviews for each WTO member OIC country accessed through WTO website.¹⁷

5. Results

The correlation between imports and customs revenue is straight forward. More trade is associated with more customs revenue. However, relationship between tariffs and customs revenue does not so as tariffs

¹⁴ See Greene (2007) for the standard explanation.

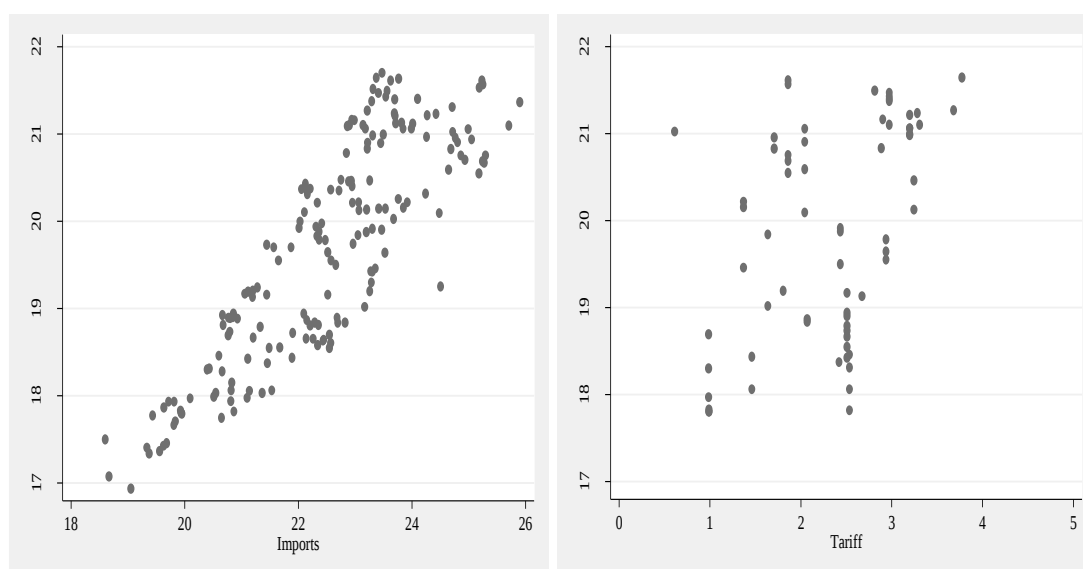
¹⁵ Please refer to WITS for the formula of weighted applied tariff rate. <http://wits.worldbank.org>

¹⁶ Indeed, as Rege (2000) identified the lack of ownership as the main reason for delays in implementation.

¹⁷ World Trade Organization (WTO) 2009, "Trade Policy Reviews" viewed 15 July 2009, http://www.wto.org/english/tratop_e/tp_r_e/tp_rep_e.htm#chronologically.

would have both direct effect and indirect effect through imports on customs revenue. Increasing tariffs would enhance customs revenue if decrease in imports as a result of higher tariffs does not surpass the said direct effect. The relationships can be observed from Figure 2, scatter plot for the sample of this study.

Figure 2: Correlation of Imports and Tariffs with Customs Revenue¹⁸



Source: Calculated by the author

From Figure 2, one may discern the diminishing return on tariffs and some pattern of Laffer Curve.¹⁹ The effect of tariffs increase on customs revenue diminishes as the tariffs level soars. This can be seen more obviously from the result of regression analysis illustrated in Table 1. As the results of fixed and random effect calculation suggests, both direct

¹⁸ Both X and Y axes are in logarithmic form.

¹⁹ The Laffer curve suggests that tax increases do not necessarily associate with increase in tax revenue. Defining and applying the optimal tax rate is important as any increasing beyond the optimal rate would decrease tax revenue. Popularized by Arthur Laffer in 80s, the discussion of the idea goes back to the Muqaddimah of 14th century North African Ibn Khaldun. Keynes also accounts how increasing tax after a certain point would lower the revenue in his “General Theory of Employment, Interest, and Money”.

effect and indirect effect of tariffs are statistically significant and positive direct effect of tariffs on customs revenue is stronger than negative indirect effect of tariffs through decreased imports. Hence, overall effect of increased tariffs on customs revenue seems to be positive although this effect is curbed by decreased imports as result of higher tariffs.

Table 1: Regression result for the determinants of OIC countries' customs revenue

	OLS	Fixed Effect	Random Effect
Log of Imports	1.205* (0.179)	-0.090 (0.250)	0.427* (0.209)
Direct Effect of Tariffs	-3.685* (1.375)	12.673* (0.170)	3.735* (1.800)
Indirect Effect of Tariffs	0.188* (0.060)	-0.526* (0.170)	-0.150* (0.077)
Direct Effect of WTO CVA	3.162 (1.910)	5.822* (0.980)	5.565* (1.183)
Indirect Effect of WTO CVA	-0.142** (0.084)	-0.266* (0.043)	-0.250* (0.052)
Constant	-6.166 (4.105)	23.685* (5.922)	11.092* (4.881)
Number of Observations	64	64	64
R ²	0.87	0.70	0.75

Notes: Regressand: Log customs revenue of OIC countries.

Hausman test fails as model fitted on these data fails to meet the asymptotic assumptions of the Hausman Test.

Standard deviations are in the brackets.

Again going through Table 1, negative and significant indirect effect of WTO CVA may suggest that introduction of WTO CVA gives rise to under valued declaration of imports. This justifies the concerns of public authorities on loss in custom revenue with implementation of the agreement. Upon implementation of the agreement, under invoicing translates into lower imports level in statistics, hence, lower customs revenue. The reason is obvious, customs taxes are collected as multiplication of ad valorem tax and imports. On the other hand, direct effect of implementation of WTO CVA agreement turns to be positive with fixed and random effect calculation. This might be interpreted as revenue increase from increased transparency in customs and less incentive for tax evasion. Importers might prefer to declare transaction value and pay customs tax accordingly rather than going through a hustle of avoiding taxation. Accordingly, one may not argue that the implementation of the agreement decrease the customs revenue as the coefficient of direct positive effect of WTO CVA is bigger than that of indirect negative effect with this calculation.

On the other hand, the relationship between imports and customs revenue from Figure 2 gives rise to a question of validity of those relationship explained with the model for all countries. As one may observe, variance increases as the imports increase suggesting that the effect of explanatory variables might be in different degrees for small and big countries. Then it is worth to run the model for small and big countries separately. For this purpose, sample average is taken and an observation defined to be for big country if the GDP is greater than US\$ 40 billion, small otherwise. Table 2 summarizes the result of the regression analysis for OLS, fixed effect and random effect calculations for small and big countries.

Table 2: Regression result for the determinants of OIC countries' customs revenue by economic size of country²⁰

	OLS		Fixed Effect		Random Effect	
	Small	Big	Small	Big	Small	Big
	Country	Country	Country	Country	Country	Country
Log of Imports	1.343*	-0.636	-0.247	-0.906	1.129*	-0.232
	(0.232)	(0.426)	(1.062)	(0.233)	(0.410)	(0.230)
Direct Effect of	-5.455*	11.437*	13.153	13.941*	-3.217	12.787*
Tariffs	(1.660)	(4.509)	(9.650)	(3.040)	(3.123)	(3.849)
Indirect Effect	0.270*	-0.457*	-0.570	-0.576*	0.162	-0.524*
of Tariffs	(0.076)	(0.188)	(0.428)	(0.124)	(0.142)	(0.158)
Direct Effect of	6.644*	9.445*	9.071*	9.226*	5.562*	8.808*
WTO CVA	(2.830)	(4.294)	(2.942)	(1.999)	(2.461)	(2.660)
Indirect Effect	-0.303*	-0.396*	-0.419*	-0.404*	-0.252*	-0.385*
of WTO CVA	(0.130)	(0.177)	(0.136)	(0.082)	(0.114)	(0.109)
Constant	-9.245**	37.041*	26.471	23.331*	-4.804	27.061*
	(5.090)	(10.093)	(23.692)	(5.622)	(9.019)	(7.231)
Number of	34	30	34	30	34	34
Observations						
R ²	0.851	0.559	0.63	0.90	0.53	0.87

Notes: Regressand: Log customs revenue of OIC Countries

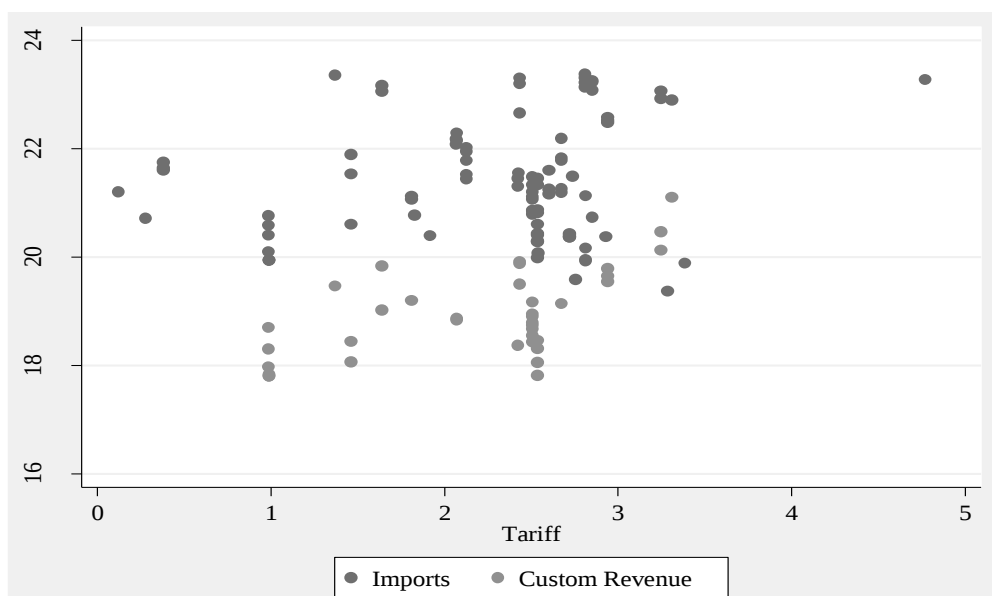
* Values are significant at 5% level; ** Values are significant at 10% level

Hausman test fails as model fitted on these data fails to meet the asymptotic assumptions of the Hausman Test.

²⁰ Unexpectedly, coefficient of imports is turned to be, albeit insignificant, negative for some estimations. This might come from omitted variable, i.e. VAT and other customs duties, bias inter alia decreased number of observations due to split of the data set for separate calculation for small and big countries.

The result of fixed effect and random effect calculations suggest that unlike big countries, both direct and indirect effects of tariffs on customs revenue are not significant for small countries. However, we were expecting that increase in tariffs would have positive direct effect on customs revenue. We were also expecting realization of negative indirect effect of tariffs on customs revenue as any increase in tariffs would decrease imports and favor domestic substitute products. Going through Figure 3, one may not observe a statistically significant correlation between imports and tariffs for small countries. On the other hand, one may discern a slight uplift in customs revenue suggesting positive direct effect, albeit statistically insignificant according to regression calculations, of tariffs on customs revenue.

Figure 3: Effect of Tariffs on Imports and Customs Revenue for Small Countries²¹

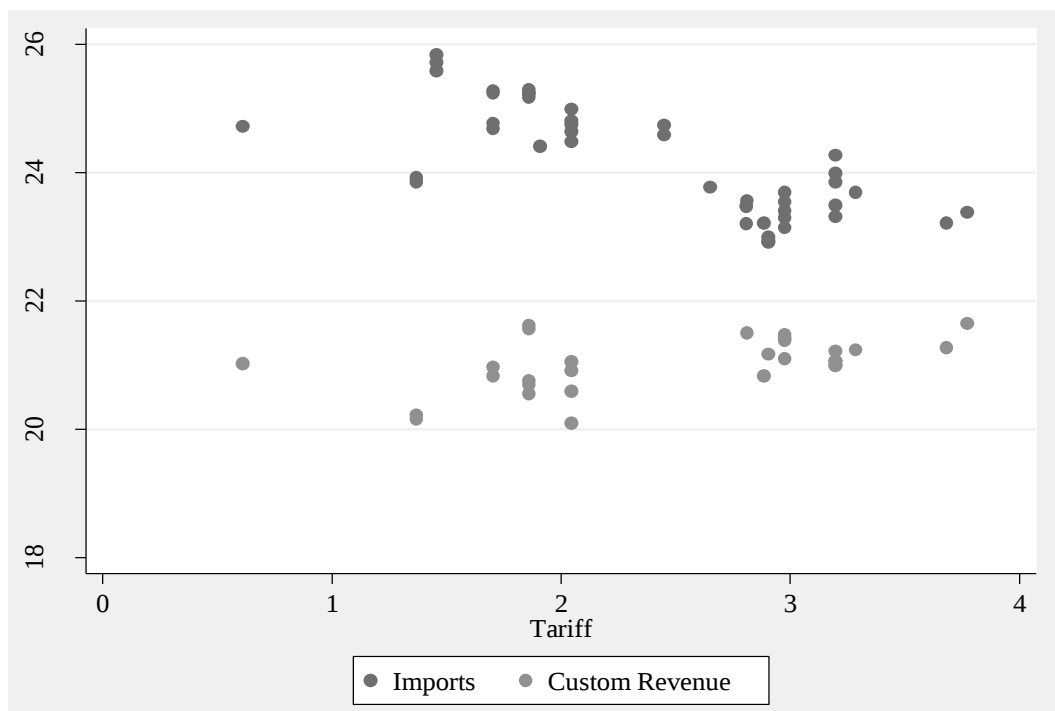


Source: Calculated by author.

²¹ Both X and Y axes are in logarithmic form.

As production capacity of small countries would very often be limited, traders may not have the option of domestic substitutes for their imports, hence, increasing tariffs rate would not discourage them from imports. However, insignificant increase in customs revenue suggests the lack of capacity or ability of customs authorities to leverage this situation in favor of government in the case of small countries. This suggestion might be further consolidated as both direct and indirect effects of implementation of WTO Customs Valuation Agreement are the same for both small and big countries.

Figure 4: Effect of Tariffs on Imports and Customs Revenue for Big Countries²²



Source: Calculated by author.

²² Both X and Y axes are in logarithmic form.

Going through Figure 4, one would see the effect of tariffs on customs revenue and imports as expected in the case of big countries. Tariffs has negative correlation with imports and positive correlation with customs revenue. That is, direct effect of tariffs on customs revenue surpassed its indirect effect through decreased imports as a result of increase in tariffs.

The results suggest that what matters for customs revenue, evidenced from significant effect of WTO CVA for both small and big countries, is the ability of customs authorities to collect tax rather than tariffs rate. This would especially hold for small countries. Gatti (1999) refers to the discretionary power of customs officials to compel importers for bribing which translates into government revenue loss, importer's surplus loss and efficiency loss in the context of small open economy.²³

6. Policy Recommendation and Conclusion

The results of this study show the importance of customs authorities' capacity to collect tax rather than higher tax rates for improving customs revenue especially for relatively smaller countries. Although the implementation of WTO Customs Valuation Agreement cannot be argued to decrease customs revenue as its direct effect evidently boost customs revenue, the results suggest certain level of undervaluation with the implementation of the agreement for both big and relatively small countries. Hence, capacity building in the customs of developing countries to ensure fair revenue for governments emerges as an important issue to make multilateral trade system attractive for them. In this regard, more attention is needed to develop a system to impede undervaluation, sustain certain level of revenue for the governments of

23 Gatti, R. (1999), *Corruption and Trade Tariffs, or a Case for Uniform Tariffs*, World Bank Policy Research Working Paper No.2216, Washington D.C.

developing countries and hence make multilateral trade system attractive for developing nations.

Indeed, many countries implement verification system in compliance with WTO Agreement on Preshipment Inspection by which authorized inspection companies inspect the goods in the country of exportation for verification of customs classification, quality, quantity, and price including exchange rate and financial terms. This might be a useful tool to prevent undervaluation and fraud in the classification of the goods. However, the process itself creates additional burden on importers, especially in developing countries, as inspection would not be free and increase imports cost. Besides, the integrity of inspection companies might also be of a question. Any misconduct of inspection companies would defeat the purpose.

Increasing the capacity of customs authorities in developing countries and developing a system for integration or at least efficient cooperation among customs across the globe might serve better to prevent undervaluation. This approach is also in compliance with Doha Ministerial Conference decision to direct Committee on Customs Valuation to identify and assess practical means for the exchange of information among customs authorities for export values. In this regard, capacity building activities to enhance ability of customs authorities to efficiently process transaction and collect duties by information and communications technology solutions is crucial. Establishment of single windows in national level, possibly to be integrated to other countries' single windows as planned by ASEAN countries, for one-time submission and collection of trade documents, hence, computerization of trade procedures in the form of online customs declaration, imports licensing transactions, electronic payments, or any other cross-border

transaction might more effectively address the undervaluation issue. This direction would also be in compliance with WCO Safe Framework.

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An Alternative Model of Infrastructure Financing Based on Capital Markets : Infrastructure REITS (InfraREITs) in Turkey

Turan Erol and Deniz D. Ozuturk

A sustainably higher GDP growth path is possible only through mobilizing adequate funds for investment in infrastructure. Capital markets can be used as an effective environment in mobilizing long-term investment funds to the infrastructure sector. Capital market funding motivates the participation of private sector in infrastructure projects and thus eases the constraints imposed by the public sector budget on infrastructure development and the burden on taxpayers. This equity-based model has no doubt gained prominence in the aftermaths of recent global financial crisis driven by excessive borrowing and leverage. This paper explores how Real Estate Investment Trusts (REITs) in Turkey can be used as an equity finance vehicle to launch and operate infrastructure projects.

We presented an overview on infrastructure assets and funds, their operational framework and risk factors related to infrastructure funds in the second section. In the third section we analyzed capital market financing of infrastructure projects in Turkey. In the next section we provided some information on REITs in Turkey . In the fifth and the last section we proposed that REITs can be an alternative tool for financing urban regeneration projects or regional projects such as Southern Anatolia Project .

I. Introduction

Development and modernization of infrastructure is the core to economic growth of any country and requires significant initial investment. Historically, infrastructure has been procured and funded by the public sector, with the taxpayer taking both the responsibility and risk of asset delivery, cost and operation. To obtain better value for

money for taxpayers, to share the burden of financing and in some cases to overcome constraints imposed by the public sector budgetary process, governments have recently turned to the private sector to assist in the procurement of infrastructure. Private sector involvement in the provision of infrastructure has steadily increased with privatization of existing businesses and the use of concessions to procure new assets.

In recent years, there has been a significant increase across the globe in the involvement of the private sector in the development and funding of public infrastructure. The governments have found that they do not have enough resources to fund their country's infrastructure to the necessary levels for the economic development. Besides technological advances, competitiveness in world markets has become dependent on the availability of high quality, efficient infrastructure. Public private partnerships (PPPs) are regarded as an effective way of allocating risks and responsibilities of developing infrastructure. Private sector is able to bring technical expertise and thus increased efficiency whereas governments can facilitate the projects by providing assets such as land and license, subsidies or guaranties to the private sector.

The success of private sector involvement in the infrastructure sector has led many governments to implement standardized procurement models such as PPP and Public Finance Initiative (PFI) as in the UK. Some countries use these models initially to procure transportation infrastructure, others (for example the UK, Portugal, France and Spain) have responded to the success of their initial projects by extending the scope into the provision of other public or social infrastructure assets.

New to the infrastructure sector are investment funds, sponsored by global investment banks, private equity firms, and institutional money managers, looking to place money from pension funds, insurance companies and high net worth clients into infrastructure investments. During the mid-1990s, Australian investment firms established the first of these funds, looking for new assets to invest in after tapping out on local real estate, stocks, and bonds. The rise of private infrastructure investing in Australia notably coincided with reduced government spending (from 7.2 percent of gdp in 1970 to about 3.6 percent in 2006). In 2007, more than \$30 billion of Australian infrastructure assets were held in publicly traded or listed entities. Various new global

infrastructure funds have raised about \$100 billion to invest in infrastructure assets with an initial focus on Europe, where public/private partnerships have been well established in many countries whose governments have sought alternative financing sources¹.

As one of the global PPP models, Turkey can adopt a strategic partnership or a project joint venture PPP in the form of REITs and raise money from institutional investors and general public to finance many infrastructure projects. In this paper we focus on how to benefit of existing REIT structure in financing infrastructure projects. We simply name those REITs as InfraREITs. They can function as an infrastructure fund if structured well legally and technically.

2. Infrastructure Assets and Funds

Infrastructure assets offer secure, long-term cash flows, inflation protection, and opportunities for reducing overall portfolio volatility and risk. Infrastructure assets and funds tend to be highly diversified investing in economic infrastructure like toll roads, parking lots, power plants, water treatment facilities and airports as well as social infrastructure, including hospitals, schools, and affordable housing as shown in Chart 1 .

2.1. Infrastructure Assets

Fundamentally, infrastructure assets are distinguished by displaying the following key characteristics:

- Provide essential community services
- Have strategic competitive advantage
- Have predictable long-term cashflow

Infrastructure assets display unique characteristics. Their long-term nature, combined with strong competitive position, leads to stable and predictable consumer demand and cash generation. These assets tend to have a high fixed capital base with comparatively low operating costs.

¹ Infrastructure 2007 : A Global Perspective: Urban Land Institute and Ernst Young

Along with the long-term operating licence and predictable demand, often in a regulated environment, this allows the manager to forecast cashflows with accuracy.

Chart 1

Transport	Regulated Utilities	Communications	Social
Toll roads	Electricity	Fixed Line Networks	Education
Bridges	Gas	Satellite Systems	Hospitals
Tunnels	Water	Broadcast Facilities	Health Care
Ports			Prisons
Airports	Project Types :		Court Houses
Rail	<i>Distribution</i>		Government Buildings
Ferries	<i>Storage</i>		
Tram	<i>Generation</i>		
Rapid Transit	<i>Treatment</i>		
Car Parks			

Source: ING REIM Research

Infrastructure assets have a low correlation to equity markets and other main asset classes. For this reason, it can provide valuable diversification in an investment portfolio. It also provides a good match for the long-dated liabilities of pension funds due its long-life and inflation protected returns. This stability in operating cashflows can reduce the overall volatility of returns for investors and investors are finding this combination of sustainable yields, lower volatility and inflation-linked returns increasingly appealing.

Another key distinction between infrastructure assets is whether they are primary or secondary stage projects. Primary Stage projects require a construction phase prior to operation and this will be reflected in a higher level of return. Primary stage assets themselves fall in to two categories. ‘Greenfield’ projects are entirely new infrastructure assets

while '*brownfield*' assets involve a second construction phase to an existing asset such as an extension, major refurbishment or upgrade. The risks involved in the latter are clearly lower than those of a green field project as a portion of the overall investment will be income producing from the start. Secondary Stage projects will see the investor acquire an up and running asset and the responsibility becomes one of operation, maintenance and managing long term life cycle costs. Mature projects with predictable cash flows will represent low risk investments.

2.2. Infrastructure Funds

A combination of strong investor demand for stable yield, inflation/recession protected asset and an increase in the deal flow of infrastructure assets has led to a rapid expansion of interest in infrastructure sector. This led to the establishment of a number of specialist infrastructure funds which are offered usually to institutional investors to provide increased opportunities to access infrastructure returns.

Before the establishment of such funds the methods for accessing the sector was limited and that was usually done through direct involvement in infrastructure projects achieved by securing a concession/asset, either independently or through a joint venture. This gave investors very little opportunity to diversify and left them at the mercy of individual project risks. The more viable alternative for most was to invest in listed infrastructure companies. However, the limited choice of pure infrastructure companies and the higher volatility of returns that result from their stock market listings also present investors with problems and may detract from the fundamental stability of the underlying assets.

Infrastructure funds remove any need for direct involvement in an infrastructure asset. Infrastructure funds contain sufficient numbers of assets to diversify away specific risk, leaving investors with a market return. As a result, investors with smaller amounts of equity at their disposal can achieve high levels of diversification and so take lower overall risks.

An infrastructure fund is a managed vehicle through which investors gain exposure to the underlying characteristics of infrastructure assets.

Infrastructure is emerging strongly as an asset class which can be particularly well suited to pension funds and other investors with a long-term outlook. Infrastructure assets tend to display comparatively stable, long-term real returns and provide a good match for long-dated liabilities. Funds usually created by a core investor or an independent management team through funds raised in the open market from institutional investors and they aim to maximize financial returns to shareholders. Independent teams make investment decisions based on pre-defined sector and financial objectives .

By investing in infrastructure through a specialized fund, investors not only gain access to infrastructure as an asset class, but they benefit from the expertise that the fund manager can bring to asset selection and management.

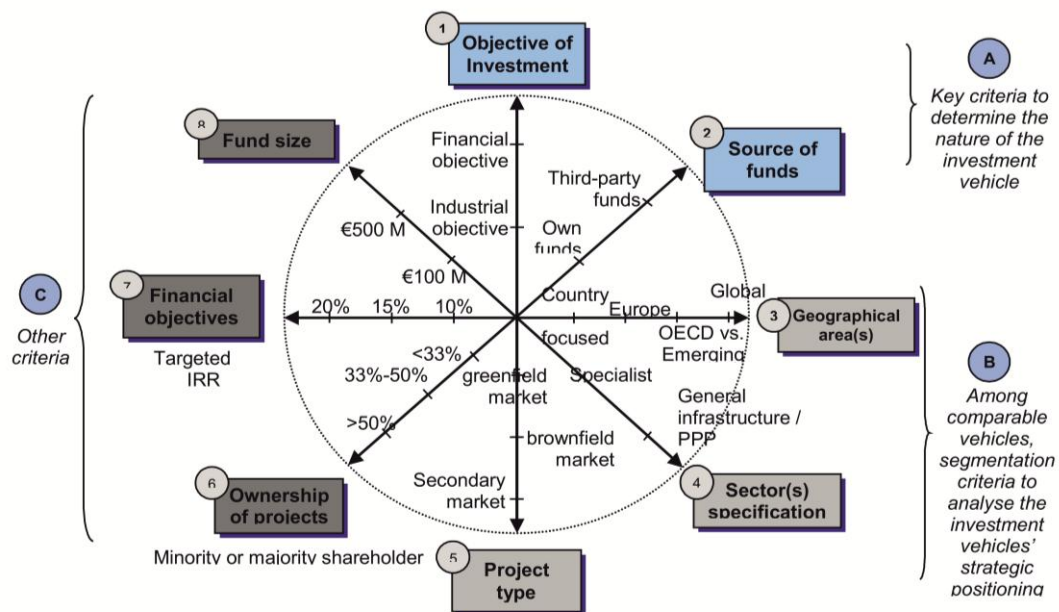
As mentioned above, cash flows from infrastructure tend to be relatively stable and predictable, and therefore lower risk. They may not suit high risk / high return investors. While unlisted funds often move toward a listing, investors looking for immediate liquidity may find listed funds or direct investment in infrastructure equities more attractive.

Infrastructure funds invest in private infrastructure companies, but the funds themselves can be listed or unlisted. The funds tend to either specialise in one class of infrastructure may – for example invest only in airports or only in toll-roads – or they invest across various infrastructure sectors which meet specified investment criteria . In addition, they can have a global or regional focus. In a research by Adventon Business Partners, eight potential segmentation criteria was used to segment the infrastructure investment vehicles market as shown in Chart 2 .

2.3.Operational Framework of Infrastructure Funds

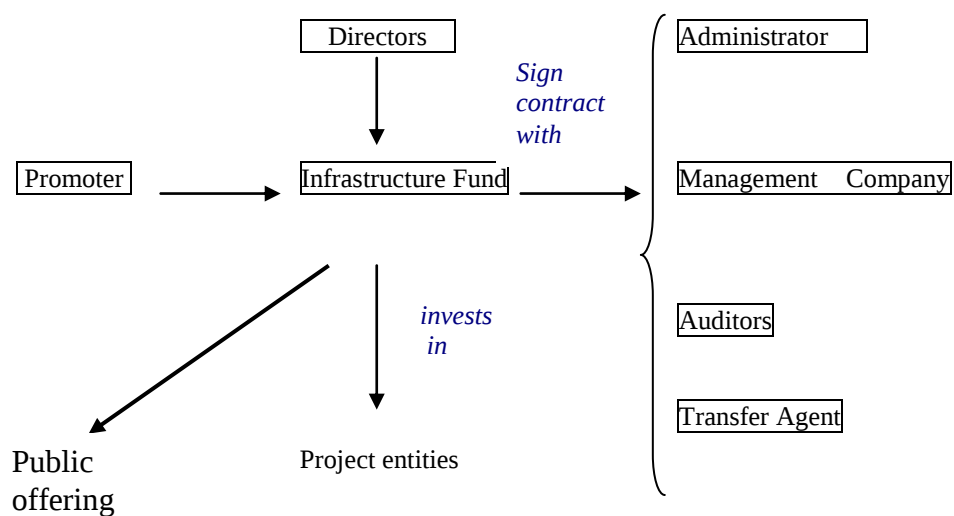
Infrastructure funds are usually established as a limited liability, off-shore incorporated, closed-ended investment company. The companies are advised by an investment management company, usually a subsidiary of the same infrastructure group.

Chart 2



The main actors in an infrastructure fund can be described as in chart 3 below:

Chart 3



where;

Promoter, is a person or an entity that initiates the creation of fund, *Management company*, oversees whether the investments are carried out in compliance with the prospectus and the investment policy, *Administrator* provides general administration facilities, secretarial services calculate net asset value of the fund, prepare annual accounts and financial reports, *Transfer agent or registrar*; executes subscription or redemption of orders, hold and maintain shareholder's register, *Directors* are responsible for the overall management of the company, *Auditors* certify fund's annual or periodical reports as required by government authorities, *Custodian/depository bank* safeguards the assets of the fund.

This chart summarizes the institutional framework of funds in general. Depending on the country where the fund is domiciled or shares are offered, there may be other or different types of institutions in charge of the funds required by regulations.

2.4. Risk Factors in Infrastructure Funds

There may be some specific risks associated with the funds due to the nature of infrastructure assets. Some are listed² below:

a) Construction risk: Some assets in the funds may be in the construction phases and may not be yet cash generative. As stated above primary stage projects require a construction phase prior to operation and this will be reflected as a higher risk in a higher level of return.

b) Termination of project agreements: Both the project entities and the public sector have the right to terminate a project agreement in certain defined circumstances. In some cases there may be no compensation. In other cases (including termination for force majeure), the amount of

² These are the main risks associated with the funds. The risk factors here are compiled from the prospectuses of major infrastructure funds (such as; Babcock&Brown Infrastructure, Macquaire Infrastructure Group, 3i infrastructure limited). There may be other risks depending on the nature of the fund like, investment policy, geographical focus or related regulations where the fund is domiciled.

compensation payable may cover neither the full amount of senior debt secured on that project entity nor the nominal value of the investment capital invested in the project entity.

c) Financial modeling: Infrastructure projects rely on large and detailed financial models. There may be a risk that errors may occur in the assumptions or methodology used in a financial model. In such circumstances the returns generated by the investment may be less than expected.

d) Targeted returns of project entities: Investments are usually based on estimates or projections of investment cash flows. There can be no assurance that the actual investment cash flows will equal or exceed those expected and that the stated targeted return to shareholders will be achieved.

e) Life cycle costs: During the period of a concession, components of the project facility or building will need, to be replaced or undergo a major refurbishment. The timing of such replacements is usually retained by the project entities to assist in such forecasting of lifecycle timings and costs. However, shorter than anticipated asset lifespans or costs or inflation higher than forecast may result in life cycle costs being more than anticipated. Any cost implication, not otherwise passed down to subcontractors, will generally be borne by the affected project entities.

f) Change in tax law and practice: Financing structures of project entities are usually based on assumptions regarding prevailing taxation law and practice. Any change in a project entity's tax status or in tax legislation (including in relation to taxation rates) could adversely affect the investment return of the investment.

g) Subcontractor service failures: If a subcontractor to a project entity fails to perform the services which it has agreed to provide, the project entity may fail to meet the service standards it has agreed with its public sector client and there may be a reduction in the payments that the project entity is entitled to receive, and/or claims by the public sector client for damages. If there is a subcontractor service failure and the relevant subcontractor or its guarantors or insurers fail to meet their

obligations in respect of the liabilities that have been passed on to them, then, to the extent the liability cannot be set off against service fees, the project entity will not be compensated for any reductions in payments and/or claims made by the public sector which it suffers as a result of the subcontractor's service failure. Ultimately such service failure could lead to termination of a project agreement.

h) Demand risk: Investments may be reliant on revenues receivable from users and may be exposed to full demand risk, as in toll roads and this may result in a reduction in expected revenues for that project entity³.

i) Liquidity of investments: Investments may comprise of unquoted project entities which are not publicly traded or freely marketable and a sale may require the consent of other interested parties. Such investments may therefore be difficult to value and realize. These realizations may involve significant time and cost.

2.5. Valuation of Infrastructure Investments

Some infrastructure assets commonly have fixed life concessions after which the asset reverts to government control. Not all infrastructure assets have finite lives. However, a portfolio which contains a significant number of such assets will experience a decrease of value over time. Investors should therefore look at the total internal rate of returns (IRRs) produced by their investments rather than the negative capital growth element experienced during the 'wind-down' phase of assets with finite lives. Because infrastructure produces the majority of its returns in the form of income, the asset class does present investors with reinvestment risk. As such it is a more suitable asset for investors with a reasonably high requirement for income such as a mature pension fund. Investors with less of a preference for income would therefore be better served by infrastructure assets with indefinite lives or which have a higher scope for increases in capital values through active management. They may also prefer a fund which more actively trades its infrastructure assets, rather than looks to hold assets until concessions expire. Either way, investors in infrastructure funds are likely to require periodic portfolio valuations on an ongoing basis. The valuation of

³ In some countries there are some subsidies like shadow toll payment to cover this risk

infrastructure assets is in some respects a more straightforward process than valuing a listed company or a real estate investment. With a mature secondary infrastructure asset the revenues and costs that will be produced will be known with a fair degree of certainty and the valuation process is a case of applying an appropriate discount rate to those cash flows either to the end of the concession or in perpetuity - depending on the nature of the asset – in order to arrive at a present value. The appropriate discount rate should primarily reflect the risks involved in the project but should also reflect any opportunities for further growth in cash flows. This appropriate rate will be determined by the market through comparable evidence from other new infrastructure concessions or recently traded assets. However, some subjective judgements will be required and so independent third party valuations are generally commissioned from specialist consultants⁴.

3. Capital Market Financing of Infrastructure Projects in Turkey

Infrastructure projects may be financed in different forms. In corporate finance, the primary source of repayment for investor and creditors is the sponsoring company, backed by its entire balance sheet, not the project alone. Project financing on the other hand is different from traditional forms of finance because the financier principally looks to the assets and revenue of the project in order to secure and service the loan. In project finance a new project company is built to own and operate a separate infrastructure project. The new project company is capitalized with equity contributions from each of the sponsors. In contrast to an ordinary borrowing situation, in a project financing the financier usually has little or no recourse to the non-project assets of the borrower or the sponsors of the project. The project is not reflected in the sponsors' balance sheets. In Annex 1, there is a brief comparison of bank loans, bonds and corporate finance in project finance.

One of the efficient ways to finance infrastructure investments might be the use of infrastructure funds via capital markets in Turkey. Although Turkey is an emerging market, the legal and technical structures of capital markets are well designed to launch and operate infrastructure funds.

⁴ ING REIM Research

Our study bases on two main issues. First we propose that the infrastructure funds can use the legal form of REITs, which we will name as InfraREITS, in Turkey as it seems to be the most suitable legal form of an institutional investment to be structured as as infrastructure fund. Secondly we suggest that the InfraREITs be a public-private partnership. A public initiative will enable the private sector enter into concession agreements with more confidence, as government side may facilitate some legal processes regarding the investment.

4. Current legal structure of REITs in Turkey

According to Capital Markets Law (CML) regulations in Turkey, REIT is a joint stock company and defined as a capital market institution. In general REITs can invest in real estates, capital market instruments based on real estates, real estate projects, rights and capital market instruments based on real estates, establish ordinary partnerships to undertake certain projects.

REITs can also;

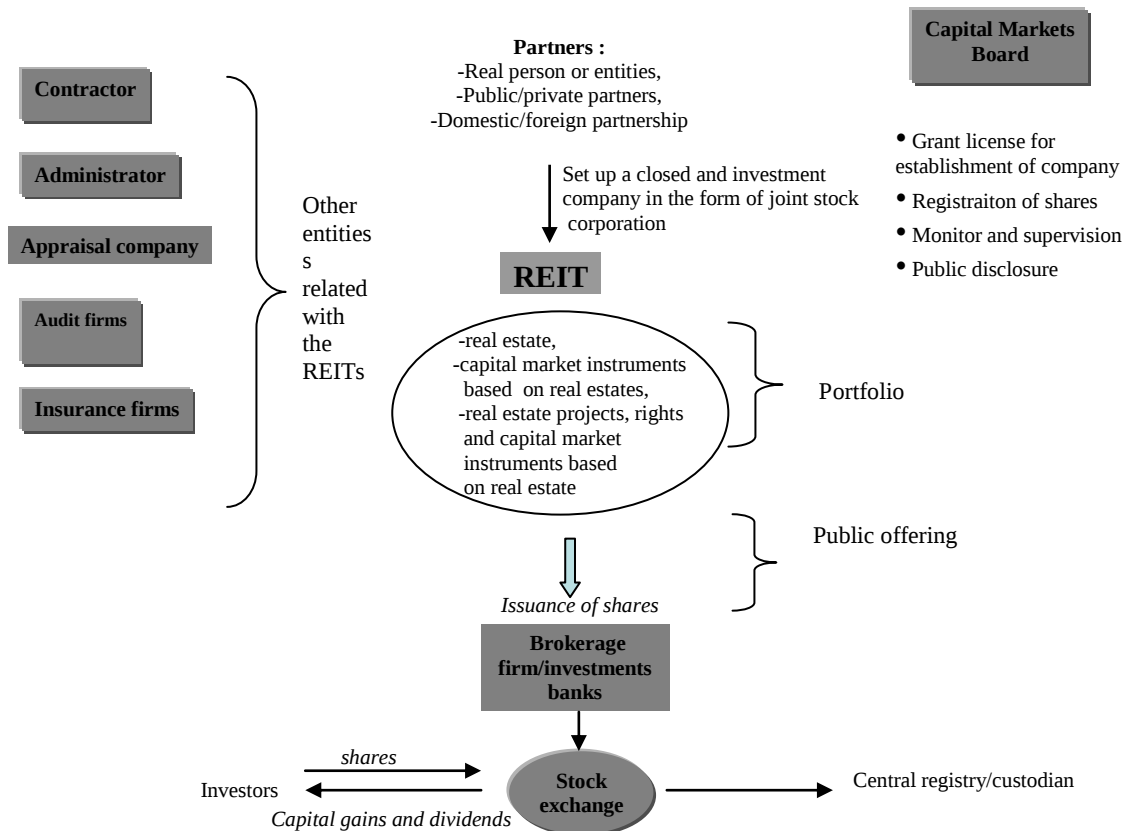
- a) invest in Build-Operate-Transfer (BOT) projects/companies up to %50 of their portfolio value.
- b) be established for a limited time to undertake a certain project.
- c) realize BOT projects by establishing the right for construction for others or itself.

They can invest in projects of real estate, for which all required permits have been obtained pursuant to the relevant legislation, whose project is ready and approved and all of whose legally required documents to start construction have been determined by independent real estate appraisal companies to be fully and correctly existent.

After fulfilling the required conditions set up in the regulations, REITs grant a license from Capital Markets Board (CMB), their shares are registered with CMB and offer their shares to public. The shares should then be quoted on stock exchanges. The legal and operational framework of REITs is provided in the chart below:

Chart 5

Legal and Operational Structure of REITs in Turkey



Portfolio administration gains of REITs in Turkey are exempt from corporate tax regardless of whether they distribute dividends or not. If REITs are registered with the Board and fulfill all the legal conditions, they benefit from this exemption. At investor level, the sale of shares is subject to a 0% of withholding tax for domestic and foreign investors.

The company deducts %15 of an income tax from the distributed profits. This is the final tax for foreign investors. For domestic investors, after deduction 1/2 of the dividends are tax exempt and if the amount exceeds the income amount which is determined in Income Law, the income will then be declared. Tax exempt REITs can be used in 3 ways in infrastructure finance.

a) Designing REITs as an infrastructure Fund (private sector initiative):

As REITs in Turkey are allowed to invest in BOT projects/companies up to %50 of their portfolio value, they can act as an infrastructure fund. The project companies are not required to be listed.

b) Designing REITs as a project based special purpose vehicle - SPV (Private sector initiative)

REITs are also allowed by regulation to be set up as an SPV to realize a specific BOT project. Thus, they can raise money from investors to finance the infrastructure projects

c) As an institutional PPP /strategic partnership- joint venture (public & private sector initiative)

Another use of REITs may be that the REIT would be formed as a public-private partnership between the government (which may or may not contribute cash) and strategic sponsors, such as developers, contractors and equipment providers, local investors and small shareholders. The REIT may raise money from investors and the generated cash will be used to fund the infrastructure projects in the portfolio. The REIT can also have the opportunity to issue bonds or convertible bonds or borrow from financial institutions up to three times⁵ of its net asset value.

5. Alternative Implementations of Infrastructure Funds

In this section we proposed alternative models to explore how InfraREITs can be used as a tool for financing public and/or private investment initiatives.

5.1. Funding urban regeneration projects through infraREITs

One of the potential use of benefits in infrastructure could be the urban regeneration projects. Municipalities can alone or through a joint venture with private contractors, set up a REIT and finance urban

⁵Borrowing limit according to the current regime for REITs.

regeneration projects. We propose this to be done through either setting up a REIT by municipalities or a joint venture with a contractor.

5.1.1. Setting up a REIT by municipalities: In this model, the ownership of the houses/flats belongs to the municipality in the initial stage. Municipalities will alone or through a private company purely established by the municipality, will set up a REIT. 100% of the shares of the REIT will belong to the municipalities or the municipal companies. These subsidiary companies can also be established in the form of private REITs for tax purposes. The contractors will not have any shares in the company, but the municipality signs a contract with the contractors that win the tender, in turn for progress payments. The REIT will then offer its shares to private investors and/or general public. The income generated from the public offering will be used to finance a) the construction cost of houses/flats and other residentials, b) infrastructure of the regenerated area, c) progress payments of contractors.

5.1.2. Joint venture: In this model, the municipality will provide capital in kind and the contractors will provide capital in cash, and they set up a REIT, where both the private contractors and the municipality will have equal shares. The municipality will go into a tender process, and the contractors that win the tender will sign a revenue sharing contract with the municipality, based on flat-for-land construction. The contract will then be registered to title deed and the contractors will get a kind of a property right backed by real estate. Afterwards the REIT will offer its shares to investors and the income generated from the offering will be used to a) pay the progress payments for commitment of construction works, b) pay the landlords of squattered houses, if there any, and lastly c) to fund the infrastructure of the regenerated area.

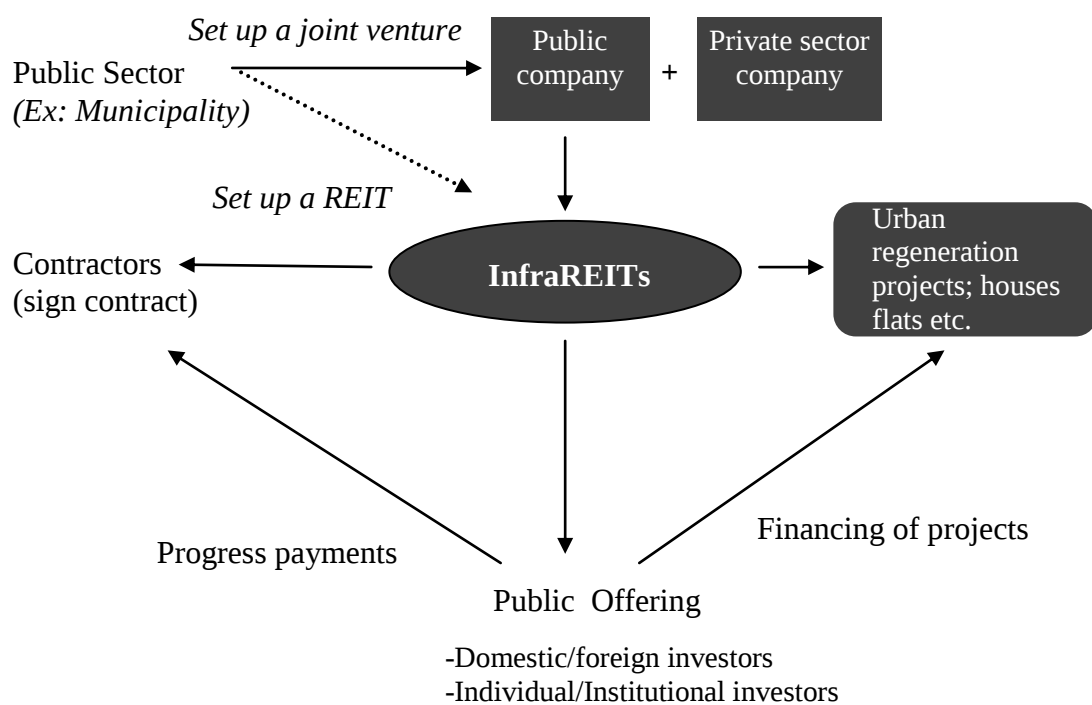
Below is a chart showing the operational framework of the proposed model explained above :

It is important that the urban regeneration project portfolio that is going to be financed by the REIT is chosen among the ones which are feasible and have obtained permits pursuant to the relevant legislations, whose projects are ready and approved by relevant legal authorities, legally required documents to start construction have been determined by

independent real estate appraiser companies to be fully and correctly existent.

Chart 5

Financing of Urban Regeneration Projects through InfraREITs



As we are going to discuss in the following section another potential use of InfraREITs may be Southern Anatolia Project (SAP).

5.2. Regional InfraREIT for Southeastern Anatolia project in Turkey

5.2.1. Overview

The South-Eastern Anatolia Project (SAP) seeks to uplift the income levels and living standards of people living in the region by mobilizing and utilizing resources existing in this region, to remove inter-regional development disparities and to contribute nationwide goals of economic development and social stability. As such it is a very important and

comprehensive project with international implications. There are 9 administrative provinces in the project region: Adıyaman, Batman, Diyarbakır, Gaziantep, Kilis, Mardin, Siirt, Şanlıurfa and Şırnak. The SAP region has a share of about 10% in both the total population and geographical area of Turkey. Yet, 20% of total irrigable land in Turkey is in this region and the region represents 28% of Turkey's total hydraulic potential mainly with the rivers Euphrates and Tigris. While the share of the region in Gross Domestic Product (GDP) was around 4% in 1985, it rose to 5.5% in 2001 accompanied by rate of per capita income rise from 47% to 55%.

Under the Master Plan, funds needed for envisaged public investments in the region reach 37 billion YTL in 2006 prices. As of the end of 2007, total spending amounted to 21 billion YTL, thus giving the rate of cash realization as 56,4%. Looking at the trend of SAP investment allocation in the period 1990-2006, we observe that on average 6.8% of public funds is annually allocated to SAP investments. The share of SAP investments in country's total investments started rising after 2000: 4.9% in 2001, 5.9 % in 2002, 5.8 % in 2003, 6.8 in 2004 and 2005, and 5.6 in 2006.

SAP investments consist of the sum total of projects and activities in economic and social sectors launched and carried out by about 40 governmental organizations and agencies. Funds allocated for these investments launched by various agencies from different sectors are transferred to the investment budgets of respective agencies and used by them. The financing needs of public investments that must be made in order to achieve the targets and physical outputs envisaged by the SAP Master Plan is 24.000.000 dollars in 2007 prices. In this context, spending made until the end of 2006 reached 15.000.000 dollars giving the cash realization rate of nearly 60 % .

The SAP already enjoys international mention in foreign press and international platforms, referred to as a model of regional development project with its pronounced "human development" dimension and sustainability. As such, the SAP has enjoyed financial support and contributions from various countries including the US, Canada, Israel, France and some other European countries, international finance

institutions including the World Bank, some external funding and credit agencies.

SAP is officially managed by Ministry of Turkey SAP Regional Development Administration which is a public institution.

5.2.2. Financing SAP through REITs: SAP region has a great potential for infrastructure investments. A public-private joint venture can set up a regional REIT that will act as a regional development infrastructure fund to realize many infrastructure projects similar to urban regeneration projects. The portfolio of the REIT can consist of a single project or pools of projects diversified by sectors. A global sale of REIT securities (equity/debt) is expected to attract both domestic and foreign institutional investors. It would be more attractive for the investors if these REITs have some incentives such as tax benefits for investors (as for instance; capital gains and dividends not being subject to tax declaration or withholding tax...etc).

The operational framework for an SAP InfraREIT will be the same as we explained in the previous section. The thing is that SAP already enjoys international mention in foreign press and international platforms, referred to as a model of regional development project with its pronounced "human development" dimension and sustainability. SAP has enjoyed financial support and contributions from various countries including the US, Canada, Israel, France and some other European countries, international finance institutions including the World Bank, some external funding and credit agencies thus having not only national but also an international attention. This may enhance the investor demand that will be set up for an InfraREIT for SAP combined with generous government incentives in addition.

5.3. What are the advantages of financing through an InfraREIT Model ?

In an Infra REIT model the existence of public side such as the municipality in our example, will facilitate the bureaucratic procedures and also provide capital in kind such as land, while the private sector will supply technical support and construction works of the project.

Tax advantage is another incentive for InfraREITs. Portfolio administration gains of REITs in Turkey are exempt from corporate tax. At investor level, the sale of shares is subject to a 0% of withholding tax for domestic and foreign investors. This may provide an incentive both at the supply side and the demand side .

Another point is that InfraREIT based project finance model has no credit cost or credit risk. The source of finance is directly provided from capital markets through public offering. The income generated from the public offering will be used to finance the construction cost of houses/flats and other residentials, infrastructure of the regenerated area, progress payments of contractors.

The proposed system is flexible in context of investment objectives . REITs may be established for a limited time to undertake certain projects or for an unlimited time to invest in more projects in different investment areas. REITs can be used for both greenfield and brownfield projects.

6. Conclusion

The international capital markets are the largest and deepest pool of financing in the world, and in conjunction with local capital markets, which represent an essentially untapped source of funds for infrastructure projects, they can make a huge contribution to economic development, if effective transaction structures are developed.

Capital markets can be used as an effective environment in promoting the flow of investment to the infrastructure sector by permitting capital market institutions such as REITs to launch and operate infrastructure projects and function as an infrastructure fund. They can potentially become an important source of capital for various infrastructure projects that are important for a country's economic development. REITs can attract the financial capital from a wide range of investors including retail investors, pension funds, insurance companies as well as overseas institutional investors. From an investor perspective, REITs can also provide an alternative investment opportunity to retail investors and ensure broader public participation in the infrastructure creation in a country.

In this paper we proposed that infrastructure funds can use the legal form of REITs, which we named as InfraREITS in Turkey and we think REITs are the most suitable legal form of an institutional investment to be structured as an infrastructure fund. We also suggested that the InfraREITs are to be structured as a public-private partnership where public initiative will enable the private sector enter into concession agreements with more confidence, as government side may facilitate some legal processes regarding the investment.

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Annex 1 : Bank Loans versus Bonds versus Corporate Finance

Bank Loans	Bonds	Corporate Finance
Can be provided to any credit-worthy market	Only available in certain markets	Available in capital markets, primary source of repayment is the sponsoring company backed by its entire balance sheet
Banks will not offer long term maturity	Generally offer longer term of repayment	There is no maturity on shares, but revenue shares may be related with the duration of the project.
Funds from the loan drawn only when needed	Funds from the bond is drawn all at once and the redeposited until required to pay for project capital costs	Funds are drawn from capital markets at once
Banks tend to maintain longer-term policies towards lending	More affected by short term sentiment	Long term investment
If a project gets into difficulty negotiations with banks should remain private	Negotiations with bond holders may be publicized.	A publicly held company should disclose it immediately if the project gets into difficulty
Low penalties for prepayment	High penalties for prepayment	No prepayment
Banks tightly control the addition of any new debt and are unlikely to agree the basis for this in advance	It is generally easier to add a limited amount of new debt to bond financing as bond investors will agree the terms for this in advance	Capital increase in different periods may provide an additional fund
The sponsors' corporate banking lines will not offer long term maturities	Bonds rely on a different investor base, thus avoiding the need to tie up bank credit lines.	No need to tie up bank credit lines.
Banks exercise control over all changes to project contracts and impose tight controls on the project company	Bond investors only control matters that significantly affect their cash flow cover or security	Investors only control matters indirectly which are given as a shareholder right in regulations such as commercial laws, capital market regulations

Is there a bank lending channel in Tunisia?

Adnen Chokri¹

This paper aims to investigate the relevance of bank lending channel of monetary policy in Tunisia by using disaggregated bank level data set. To avoid this ambiguity, a panel of annual balance sheet data on 10 Tunisian banks used to test whether lending responses to a change in monetary policy differs, depending on the balance sheet strength of a bank. The empirical evidence has stated that monetary policy shocks is significantly and negatively influenced the banks' loan supply, and therefore has supported the existence of bank lending channel in Tunisia. In addition, several bank characteristics variables namely capitalization, size and liquidity in the transmission of monetary policy is studied. Size revealed to be an important bank characteristic that affects the way Tunisian banks react to monetary policy changes.

1. Introduction

For an effective monetary policy to be formulated, it is necessary to understand how monetary policy actions are transmitted into the economy and the role that the financial sector plays in this process. Studies about the transmission of monetary policy in Tunisia are scarce. This paper attempts to start to fill this gap, by estimating for the second time the effectiveness of the bank lending channel in Tunisia.

The basic theoretical explanation of monetary policy transmission, the so called interest rate channel (IRC), suggests that monetary policy shocks propagate through the economy in the following way: an expansionary monetary policy leads to a fall in the real interest rate thus lowering the cost of capital; this reduced cost of capital causes an

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increase in investment spending, which increases aggregate demand, and, ultimately, output (and vice-versa, for monetary contractions). The functioning of this channel rests on the assumption that there are two assets in the economy: money and interest bearing bonds.

More recently, a substantial research on alternative monetary transmission mechanisms has been undertaken, aiming at explaining how changes in the short-term nominal interest rates can induce changes in the level of investment, which should be affected only by the real long-term interest rate. Mishkin (1997) lists nine such mechanisms, which can be broadly divided into two categories: those operating through asset prices and those operating through credit markets. The bank lending channel is the one of the channels that operate through the credit markets.

The concept of the bank lending channel rests on the assumption that there are three assets available for businesses and households in an economy - money, bonds and bank deposits: adding deposits creates a role for banks in the transmission of monetary policy. The bank lending channel operates as follows: a contraction in the money supply by the central bank decreases bank deposits and forces the commercial banks to cut on lending. The decrease in loans makes loan-dependent business and consumers reduce aggregate demand. As a result, output is affected. Hence, the economic significance of the bank lending channel depends on: a) the existence of bank dependent borrowers and b) the quantitative impact of a central bank's monetary policy on the supply of bank loans. Since the first condition usually holds for most economies, empirical studies have concentrated on testing whether a central bank can affect the supply of bank loans. They typically study individual bank data, testing the assumption that banks with different size, liquidity or level of capitalization should respond differently to policy shocks (see Kashyap and Stein 2000). Lending responses, if they emanate from loan supply changes, should be larger for banks with – for example - “weaker” balance sheets, which are more likely to have difficulties substituting lost deposits with external forms of finance.

We use a panel of annual balance sheet data on 10 Tunisian banks from 1990 to 2008 and test whether lending responses to a change in monetary policy differs, depending on the balance sheet strength of a

bank. Our results indeed suggest that banks (especially private ones) with lower than average assets are more affected by monetary policy actions than average banks, which is consistent with bank lending channel hypothesis.

We first present a brief overview of theoretical work on the bank lending. Then we present the model to be used here. Afterwards, the presentation of results of our estimations and conclusions are discussed.

2. A brief overview of the recent literature on the lending channel

According to the bank lending channel theory, monetary policy affects the supply of bank loans through an imperfect market for bank debt. A restrictive monetary policy leads to a drop in bank deposits. Only banks that have a larger share of liquid assets or that are bigger are able to shield their lending relationships from the monetary policy shock (see Mishkin 1996). Smaller banks have to draw on their liquid assets, whereas larger banks have better access to external finance due to their size. Hence, they do not have to reduce their lending as strongly as smaller or less liquid banks (see Bernanke and Gertler 1995). The same may be true for banks with a bigger capital-to-assets ratio, as market participants may perceive highly capitalized banks as being less risky. Consequently, it should be more expensive for less capitalized banks to access external finance. Further, if debtors do not have perfect substitutes for loans, banks' restrictive lending behaviour results in added costs to them. As a consequence, the bank lending channel would be an additional real economic effect to the conventional channels, which would not exist under a perfect market for debt.

Kashyap and Stein (1993) list three conditions (based on Bernanke and Blinder 1988) for a distinct bank lending channel to exist:

1. Firms should not be able to completely compensate a reduced supply of commercial bank loans from other sources;
2. The central bank must be able to affect the supply of credit;
3. There must be imperfections in the adjustment of the aggregate price level.

The third condition is an overall requirement for the effectiveness of monetary policy, and is usually met. So, to test the existence of the lending channel, one has to verify that conditions 1 and 2 are satisfied for a given economy.

With respect to the first condition, Kashyap and Stein (1993) conclude that if a contractionary monetary policy reduces the supply of loans, loan-dependent firms will be affected adversely. The second condition requires an empirical examination in each particular economy. There are institutional arrangements that weaken the power of the bank lending channel. Three of the most important ones are the existence of capital adequacy requirements, the existence of reserve requirements and the participation of non-banking financial institutions in the supply of loans. Capital adequacy and reserve requirements restrict the supply of loans that a bank can make, thereby leaving less room for loan responses to monetary policy actions. The central bank also cannot control loans issued by non-banking financial institutions, which implies a lower overall capacity to affect the loans' supply to the economy. Kashyap and Stein conclude that an average bank should respond by cutting back on loans, as only well-capitalised banks can raise external finance and thus their lending would be less affected by policy changes.

3. The model

As in the majority of studies using bank-level data, our empirical specification is based on Kashyap and Stein (1995), designed to test whether banks react differently to monetary policy shocks. In particular, we want to test the effect of bank capitalization and assets on the response of loans to changes in monetary policy. The theory predicts that better capitalized banks should be less sensitive to changes in policy, while the impact of asset size is ambiguous. The explanatory variable of primary interest is i_t , an exogenous indicator variable describing monetary policy shocks. We will use the Tunisian money market rate as the policy indicator.

The effect of monetary policy on bank loans depends, as explained above, on the balance sheet strength of a bank. We include a second set of explanatory variables that is the interaction between the change in i_t and a measure of balance sheet strength of a bank. As indicated above,

the theory suggests capital and asset size as measures of bank strength. Empirical papers typically use asset size (A_{it}), liquidity (LIQ_{it}), or capitalization (CAP_{it}). We include all three of them into our specification.

We also have to include lags of both dependent and explanatory variables to allow for dynamic effects. The model specification is as follows in equation below:

$$\begin{aligned}\Delta \log L_{it} = & \alpha_1 \Delta \log L_{i(t-1)} + \sum_{j=0}^2 \beta_j \Delta PM_{t-j} + \gamma Z_{i(t-1)} \\ & + \sum_{j=0}^2 \delta_j [\Delta PM_{t-j} Z_{i(t-1)}] + \sum_{j=0}^2 \varphi_j \Pi_{t-j} \\ & + \sum_{j=0}^2 \eta_j \Delta \log Y_{t-j} + \mu_i + \varepsilon_{it}\end{aligned}$$

where $\Delta \log L_{it}$ is the growth rate of loans of bank i in year t . The data on loans and all other balance sheet items is taken directly from the balance sheet of banks.

ΔPM_{t-j} change in the annualised Tunisian money market rate.

$Z_{i(t-1)}$ vector of the three variables capturing the balance sheet strength of a bank Asset size (S_{it}), Liquidity (LIQ_{it}) and Capitalization (CAP_{it}). Asset size is total assets (in TND), while liquidity and capitalization are calculated as ratios of bank liquid assets and equity capital to total assets, respectively.

$$\begin{aligned}S_{it} &= \log A_{it} - \frac{1}{N} \sum_i A_{it} \\ LIQ_{it} &= \frac{liq_{it}}{A_{it}} - \frac{1}{T} \sum_t \left(\frac{1}{N_t} \sum_i \frac{liq_{it}}{A_{it}} \right) \\ CAP_{it} &= \frac{C_{it}}{A_{it}} - \frac{1}{T} \sum_t \left(\frac{1}{N_t} \sum_i \frac{C_{it}}{A_{it}} \right)\end{aligned}$$

$\Delta \log Y_{t-j}$ is the growth rate of real GDP and Π_{t-j} is the annual inflation rate. The coefficients on the ΔPM_{t-j} terms capture the response of an average bank to a monetary shock, while the coefficients on $z_{i(t-1)}$ cross terms describe how the response differs for differently capitalized banks. For an operational lending channel to exist it is sufficient that all coefficients on ΔPM_{t-j} are negative (and significant) and the coefficients on the $z_{i(t-1)}$ and ΔPM_{t-j} cross products are positive (and significant).

4. Data and estimation results

In this work we use annual data covering 1990-2008. We have bank balance sheet data for 10 Tunisian banks, provided by BankScope², real GDP, the inflation and money market rate provided by the International Financial Statistics (IMF).

Our aim is to test for the existence of the bank lending channel in Tunisia. In terms of our specification, this implies that all coefficients ΔPM_{t-j} on should be negative (and significant) and the coefficients on $z_{i(t-1)}$ and ΔPM_{t-j} cross products should be positive (and significant).

With respect to the monetary policy impact, we find that, in all model specifications (**Table 1**), the long-run multipliers of monetary policy have the expected negative sign and are significantly different from zero for the average bank in the sample. Better still, this finding is robust with regard to the inclusion of each of the bank characteristics considered. In sum, the results of Tunisia tend to confirm that the bank lending channel may exist.

The most important feature of the empirical estimates in the case of Tunisia is that only the linear effects of bank size is significant and has a correct sign; the other two banks characteristics, namely capitalization and liquidity do not play any role at least in their direct (linear)

² BankScope is a publicly available database provided by Bureau Van Dijk, that covers balance sheet data on banks in all Eastern European countries, although not the full population in each. It has been used in the majority of the published papers for the euro area that are based on micro data on bank so far.

relationship to loans behaviour. As for the distributional effects of monetary policy due to bank characteristics, only that due to size is statistically significant. The first order interactions terms of liquidity and capitalization do not seem to play an important role in shaping the reaction of Tunisian banks to monetary policy changes; this finding seems to vary across the specifications. Though the cross products of size with monetary policy indicator alternate in sign (the coefficient on $\Delta PM_t size_{t-1}$ is negative and that on $\Delta PM_{t-1} size_{t-1}$ is positive), the total effects is nonetheless positive as predicted by the theory. The negative sign signifies that the bigger the bank, the more its lending was affected by the monetary policy conditions. In contrast, the positive sign implies that the bigger the bank, the less its lending reacted to the monetary policy conditions. What is rather important for policymaker is rather the total effect which is positive as expected indicating, by the same way, that big banks react, on average, less to changes in policy. In sum, the distributional effects (the significant non linear relationship between size and loans growth) as well as linear effects of size speak about the existence of a bank lending channel in Tunisia.

Finally, the effects of the macroeconomic variables (real GDP growth and inflation) is somewhat mitigated. The long-run elasticity of loans to real GDP growth is always positive and statistically significant as expected in all the specifications. However, the response of loans to inflation is non significant, albeit positive. This finding could be explained by the fact Tunisia did witness a high inflation period.

Table1: The Determinants of Banks' Loan Supply Function: System GMM estimation

Variables	1	2	3	4	5	6	7	8
$\Delta \text{Log L} (-1)$	0.189** (0.0768)	0.176** (0.087)	0.168** (0.081)	0.21** (0.092)	0.181*** (0.0645)	0.190** (0.085)	0.164** (0.0767)	0.167** (0.086)
ΔMP	-0.0052 (0.0046)	-0.0119* (0.00654)	-0.0076 (0.00587)	-0.014** (0.0068)	-0.0072 (0.0061)	-0.011* (0.0067)	-0.0085 (0.0055)	-0.013 (0.00689)
$\Delta \text{MP}(-1)$	0.0035 (0.0046)	0.0044 (0.0052)	0.00463 (0.0057)	0.00532 (0.0063)	0.0028 (0.0058)	0.00376 (0.0052)	0.0028 (0.0055)	0.00343 (0.0059)
$\text{Size}(-1)$	-0.095 (0.069)	-0.16** (0.0565)					-0.074 (0.066)	-0.078 (0.071)
$\Delta \text{MP} * \text{Size}(-1)$	-0.027** (0.015)	-0.025* (0.014)					-0.029* (0.018)	-0.027* (0.0164)
$\Delta \text{MP}(-1) * \text{Size}(-1)$	0.035** (0.0171)	0.037** (0.0165)					0.036** (0.0153)	0.032** (0.0135)
$\text{Liq}(-1)$			0.000723 (0.0023)	0.000564 (0.00165)			0.000034 (0.000754)	0.000062 (0.000743)
$\Delta \text{MP} * \text{Liq}(-1)$			0.00083 (0.00018)	0.00031 (0.000187)			0.000097 (0.00017)	0.000093 (0.00020)
$\Delta \text{MP}(-1) * \text{Liq}(-1)$			-0.00028 (0.00034)	-0.000234 (0.00037)			-0.000087 (0.00027)	-0.000085 (0.00028)
$\text{Cap}(-1)$					0.0031 (0.0088)	0.0035 (0.0078)	0.0037 (0.0067)	0.00324 (0.0087)
$\Delta \text{MP} * \text{Cap}(-1)$					0.0013 (0.0015)	0.0012 (0.00146)	-0.00087 (0.0016)	-0.0007 (0.00157)
$\Delta \text{MP}(-1) * \text{Cap}(-1)$					-0.00167 (0.00185)	-0.00175 (0.00173)	0.000077 (0.00147)	-0.00022 (0.00136)
Y		-0.18 (0.212)		-0.153 (0.242)		-0.069 (0.25)		-0.0423 (0.27)
$Y(-1)$		0.24** (0.12)		0.22* (0.17)		0.25** (0.115)		0.212** (0.0976)
Π		-0.039 (0.417)		-0.0216 (0.412)		-0.135 (0.445)		-0.182 (0.395)
$\Pi(-1)$		0.719 (0.69)		0.775 (0.607)		0.543 (0.587)		0.497 (0.685)
Constant	0.0556*** (0.0178)	0.0567*** (0.031)	0.0498*** (0.018)	0.0567*** (0.0342)	0.0612*** (0.031)	0.0578*** (0.0356)	0.071*** (0.019)	0.0651*** (0.027)
Sargan test	103.17**	129.88**	95.03**	128.74**	94.26**	129.87**	153.03**	149.83**
Nb. of banks	10	10	10	10	10	10	10	10
Nb. of observations	170	170	170	170	170	170	170	170

Notes: ***, **, and * indicate significance levels at 1, 5, and 10 percent, respectively.

5. Conclusion

The existence of the bank lending channel has important implications for the conduct of monetary policy by a central bank. The literature predicts that if the bank lending channel is present, banks would cut back on lending in response to monetary contraction and undercapitalized banks would be more affected than larger, better capitalized banks. This happens because for the former it is more difficult to compensate the reduction in deposits with funds from other external sources. Tests for the existence of the bank lending channel usually classify banks according to some measure of balance sheet strength, like capitalization or asset size, and then estimating the lending responses to a monetary shock. This paper uses capitalization, bank assets and liquidity as “separating” variables.

This work, using annual data covering 1990-2008 and applying GMM estimator, finds signs that the bank lending channel is operational in Tunisia. Size revealed to be an important bank characteristic that affects the way Tunisian banks react to monetary policy changes.

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