

MEASUREMENT OF IMPORT SMUGGLING IN PAKISTAN

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The study measures an overall import smuggling in Pakistan, using Monetary Approach covering the period from fiscal years 1973 to 2010. The results show a rising trend in import smuggling as a percentage of imports in the early period of analysis but it declines afterwards. The main factor responsible for such a trend is trade restrictions; the tariffs and other import restrictions were imposed in 1970s through mid- 1980s and were relaxed later. The study paves the way for further research in this avenue by employing new approach for measurement of import smuggling in Pakistan.

I. Introduction

Owing to its importance at various fronts, international trade is one of the key policy concerns, especially for developing countries. However, as with all other policies, the effective formulation of trade policies requires correct information about the relevant factors and possible consequences concerning changes in various instruments at the hands of policy makers. In case such pre-requisites are not met, the policy changes may fail to achieve the desired goals or may result in unintended consequences.

Smuggling or illegal trade, being unidentified and unrecorded in official accounts, is one of the examples of the situations that can cause informational gap for designers of trade policies, putting certain side-effects of the use of policy tools into oblivion. Defined formally, smuggling is the 'conveyance of things by stealth, particularly the clandestine movement of goods to evade custom duties or import or export restrictions.'¹ In general, smuggling involves the employment of illegal means not only to circumvent the trade taxes but it can also make available certain goods that are lawfully banned in a country. Evasion of tariff can partly proceed under the cover of authorized means, such as, through trade under-invoicing, mis-declaration of goods or under/over weighing the products; while the trade of contraband involves the use of unauthorized means through clandestine entry points from where the goods go unchecked in/out of the country. In addition to its socially

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¹ Encyclopedia Britannica.

harmful role in being immoral, it involves violation of law, and smuggling which harms the economy, as well. By evading trade restrictions, it does not let a government exploit the revenue opportunities as per potential, which in turn may lead to compromising on public expenditures meant for social welfare. Moreover, as far as trade restrictions are imposed to protect local industries, smuggling does not let the achievement of this objective possible. It is even more harmful when done in response to a complete ban on a product because the government prohibits trading such goods on certain moral, religious or economic grounds. Thus, smuggling harms the socio-economic framework of a country on various accounts.

Smuggling has been classified as an illegal Directly Unproductive Profit-Seeking (DUP) activity of category-1, in Bhagwati (1982), i.e., an activity which arises in initially distorted situation and leaves the final situation distorted too. It is theoretically seen that as an exploitation of a profit opportunity; smuggling emerges when a price wedge is drawn between domestic and foreign prices owing generally to trade regimes, exchange rate regimes or market intervention by government, such that there is an incentive to buy from the cheaper market and sell in the expensive, till the price differential decreases to equal the costs of such transaction. The major factors that are held responsible for promoting smuggling can be categorized into two types; those that stress the benefits of illegal trade and those that highlight the problems with formal trade (Table 1). The former includes trade restrictions, such as, tariffs, quotas, license requirements, embargo, etc., distortionary domestic policies e.g., market interventions that artificially drive prices too low or too high, lax administration, poor law and order situation, mild penalties, and corruption; while the latter refers to phenomenon, such as red-tapism, complex procedural requirements, poor infrastructural arrangements, and high transport costs on formal routes. The reasons, however, may vary from country to country depending on the geographical locations, trade regimes and preferences of people.

Illegal trade is one of the important components of underground or informal economy, the latter being defined to consist all activities that are not recorded in formal national accounts [Schneider and Enste (2002)], in addition to smuggling, tax evasion, gambling, drug trafficking, moonlighting, etc. According to one of the latest studies on underground economy in Pakistan, it has been found that on an average, between 2000 and 2008, the informal economy has remained about 23 per cent; as a percentage of Gross Domestic Product (GDP) per cent declining from 26 per cent in 2000 to 19.6 per cent in 2008 [Arbk, et al. (2010)]. Despite declining in recent years, it is still an alarming figure because all such activities go untaxed and the correct macroeconomic performance of the economy cannot be gauged without these activities taken into account. However, the share of smuggling in the underground economy of Pakistan has not been calculated.²

² For an overview of empirical literature on smuggling, see Appendix-A, (Table A-1).

TABLE 1
Categorization of Factors Responsible for Smuggling

	TYPE 1	TYPE 2
Definition	Factors that make illegal trade attractive due to its intrinsic qualities and benefits that it offers.	Factors that relate to the evils associated with legal trade that make it inconvenient and thus drive people towards informal trade.
Examples	Trade restrictions, domestic policy distortions, lax administration, poor law enforcement, mild penalties, corruption, etc.	Administrative delays, red-tapism, complex procedural requirements, poor infrastructure, high transport costs, etc.

In Pakistan, smuggling of various forms has merited concerns at social, political and judicial levels, quite often. Despite the legislation in the form of Prevention of Smuggling Act, 1977, the geographical location of the country and weak guard at borders along with lax administrative control make it difficult for the government to prevent the illegal transaction across borders. Unsatisfactory performance of the Pakistan Customs Service, one of the major wings of Federal Board of Revenue, responsible to protect borders against contraband movements, is highlighted off and on at various fronts.³ In this way the financial costs and risk of punishment associated with smuggling remain low. In addition, despite the attention that it attracts the estimates regarding volume of illegal trade occurring across borders in Pakistan have been largely, is just an educated guess.

The objective of the present study is to bridge the gap in existing literature for Pakistan, in order to provide quantitative estimates of import smuggling in Pakistan for fiscal years 1973 to 2010.

The rest of the study is organized as follows. Section II discusses the methodology employed in the study, i.e., monetary approach for estimation of import smuggling. Moreover, it also discusses the theoretical framework of the study, whereby, variables linked to import smuggling are considered and theoretical relations are established. Estimation and results are presented in Section III which is followed by discussion in Section IV. Section V concludes the study and offers some policy implications and finally Section VI enlist policy and research recommendations.

³ Recently in a suo-motu case at Karachi, the Court declared the Federal Board of Revenue reports regarding tax evasion and smuggling an 'eyewash' (<http://www.dawn.com/news/1059052>).

II. Methodology and Theoretical Framework

The present study employs monetary approach for measurement of illegal imports in the economy. This section highlights the basics of monetary approach along with the justification of variables used in this approach. In the end the method of converting ordinal index of smuggling obtained from monetary approach into a cardinal index has been discussed.

1. *The basics of Monetary Approach*

Tanzi (1983) introduced monetary approach for measuring the size of underground economy in the United States, wherein it is argued that illegal transactions are primarily carried out using cash, and thus, the changes in illegal transactions can be detected by looking at the changes in currency demand in the economy, after controlling other factors responsible for such changes.⁴

Following Tanzi (1983), the present study employs monetary approach for measuring the volume of illegal imports in the economy because the same argument goes for smuggling; smuggling transactions are mainly carried out in cash because the anonymity of smugglers is preserved when payments are made in cash rather than checks or other bank instruments [Pohit and Taneja (2003)]. Thus, as long as import smuggling is driven by the need to evade tariffs, the increase in currency ratio relative to money supply in the economy in response to tariffs applicable on imports, is indicative of the increase in import smuggling. Moreover, in addition to tariffs, the sales tax on imports is also considered as a factor in motivating the traders to engage in evasion as it is not possible to evade sales tax on legally imported items. As tariff is the main trade policy instrument in case of Pakistan [WTO (2007)], other instruments have been ignored in the present study and tariffs and sales tax on imports approximate all trade policy instruments. The resident foreign currency accounts have also been included in the currency in the present study. The ratio of currency to money supply is then calculated on the presumption that foreign currency accounts are also a useful means for illegal transactions due to their confidentiality, transferability and availability of a variety of modes to feed money in them [Aslam (1998)].

The procedure makes use of Fisher equation i.e., $MV=PY$ where M is the quantity of money which on multiplication with its income velocity equates nominal income in the economy. The volume of illegal imports is thus calculated by multiplying the currency used in the illegal activities with its velocity. The basic concept thus remains similar to that of Tanzi (1983) with three major assumptions.⁵

⁴ Many studies have used this principle ever since. See, for example, Ahmad and Ahmad (1995), Shabsigh (1995), Iqbal, et al. (1998), Aslam (1998), Yasmin and Rauf (2004), Kemal (2007), Arby, et al. (2010) in case of Pakistan. However, it is argued that the issue of stationarity of variables is generally ignored while applying this methodology [Arby, et al., (2010)] whereas owing to the properties of time series data, the issue needs to be treated with due concern.

⁵ The assumptions are debatable in that means of transactions other than cash can be employed for smuggling and velocity of money may not be the same between legal and illegal transactions. However, these assumptions can be considered an approximation to reality.

- a) Smuggling transactions are carried out mainly in cash.
- b) Evasion of taxes on imports is the primary incentive for people to engage in illegal import of goods. Thus the higher the import tax rate, the larger the volume of import smuggling.
- c) Velocity of money is same, both in its legal and illegal uses.

The currency demand ratio is estimated both in the presence and in the absence of taxes on imports. The difference between the two obtained ratios when multiplied by M2 gives the increase in currency demand in response to imposition of tariffs and sales taxes on imports.

$$(\widehat{CF}_t - \widehat{CF}_{wt}) * M2 = \text{Currency used for import smuggling} \quad (1)$$

where,

\widehat{CF}_t : Estimated currency plus foreign currency accounts ratio to money supply in the presence of tariffs and sales tax on imports.

\widehat{CF}_{wt} : Estimated currency plus foreign currency accounts ratio to money supply in the absence of tariffs and sales tax on imports, i.e., CF excluding tariff and sales tax on imports.

The velocity of circulation is calculated by dividing nominal GDP by legal money, the latter estimated by subtracting illegal money from M2, that is,

$$\widehat{V} = \frac{\text{Nominal GDP}}{M2 - \text{Currency used for import smuggling}} \quad (2)$$

Multiplying the obtained velocity with the money used to carry out import smuggling yields the estimated series of import smuggling.

$$\text{Volume of Import Smuggling} = \widehat{V} * \text{Currency used for import smuggling} \quad (3)$$

Dividing the smuggling volume found in Equation (3) by the value of imports gives the ratio of import smuggling to imports. The index obtained, however, is ordinal because of the process of calibration involved, and thus, it tells about the changes in import smuggling over time but cannot be interpreted in value, as such, i.e., it has qualitative interpretation but not quantitative. The procedure used to convert it into cardinal index is explained, in Section II(3).

2. Justification for Variables used in the Monetary Approach

The currency demand is hypothesized to be dependent on tax rate: domestic as well as import tax rates where both tariff and sales tax on imports have been included in import taxes. Moreover, growth rate of real GDP, interest rate and a dummy variable for financial reforms are also considered as control variables in currency demand equation in the present study.

As mentioned earlier, the variable of prime concern in the monetary approach of measuring import smuggling is the import tax rate. Currency, demand is expected to rise with an increase in import tax rate because of the assumed positive relationship between import tax rate and import smuggling that increases the use of cash in response to a rise in import taxes. Illegal imports go unnoticed by the official authorities and thus regulations that apply on official imports cannot be practiced on unofficial ones. Tariffs being one of the major trade policy instruments, is therefore, a key driver in motivating traders to engage in smuggling activity, as both, through under-invoicing of imports, as well as, their non-reporting, trade taxes can be avoided. In theoretical literature, smuggling is considered to arise whenever government introduces distortions in terms of tariffs and other trade restrictions [Bhagwati and Hansen (1973), Sheikh (1974), Falvey (1978), and others). Moreover, to the extent that trade restrictions introduce price disparity between the domestic and world markets, they motivate agents to exploit the profit opportunity arising, due to this disparity through buying from the cheap world market to sell in the expensive domestic market by means of import smuggling [Sheikh (1977)]. Thus, the assumed positive relationship between import tax rate and import smuggling is theoretically justifiable, and thus, owing to this relationship and the ease of carrying out illegal transactions in cash, the currency to money ratio in the economy is expected to rise in response to an increase in import tax rate.

Tariffs and the sales taxes on imports are not the only variables that affect the currency ratio. It is important to include other variables in the model for proper specification of the system. The control variables along with reason for their use are listed below.⁶

- Currency ratio depends on the tax to GDP ratio in the economy as higher the ratio, the larger is the incentive for tax evasion which in turn is reflected in the rise in currency ratio because illegal activities are carried out mainly in cash [Tanzi (1983)].
- Rise in interest rate reflects increase in opportunity cost of holding money which decreases the demand for currency as it incentivizes the agents to keep their money in instruments other than cash in order to earn return.

⁶ The variable banking services defined as bank deposits divided by number of bank accounts was also included initially in the analysis but was dropped later, due to its insignificance.

- Increase in growth rate of real GDP can also decrease currency ratio in the economy as development in the economy can replace cash by other financial instruments to carry out transactions [Yasmin and Rauf (2004), Aslam (1998)].
- In order to capture the effect of regime switch due to financial reforms introduced since 1991, a dummy has been used in the analysis.

3. *Conversion to Quantitative Index of Import Smuggling*

Though the ordinal index obtained by monetary approach explained above is important in showing trends in import smuggling as a fraction of imports over time, a benchmark period is necessary to look at the volume of import smuggling. In order to arrive at a meaningful benchmark the trade discrepancy approach is used. It employs the differences in reported import and export figures of partner countries to arrive at an estimate of trade mis-invoicing. The data of exports reported in UNCOMTRADE database that has been used for this purpose is reported on f.o.b. (free on board) basis. Thus, in accordance with the standard IMF practice, 10 per cent of export value is added in the export figures of trade partners to capture transportation and other costs involved. The import misinvoicing is therefore calculated as follows:

$$\text{Import Mis-invoicing}_t = \sum_{i=1}^n [\{X_t^i + (0.1 * X_t^i)\} - M_t^i] \quad (4)$$

where,

X_t^i is the exports to Pakistan in period t as reported by its i th trade partners, and M_t^i is the imports of Pakistan in period t from its i th trade partner as reported by Pakistan.

The positive value of the formula in Equation (4) means import under-invoicing while the negative value means import over-invoicing in any period t . The obtained misinvoicing is then divided by total imports of Pakistan in the respective period to obtain a series for import misinvoicing as a fraction of imports. Three years moving average of the series is calculated to capture the effect of delays in reporting the respective trade figures owing to storage and transportation issues involved. Benchmark period is then selected looking at trends in the series. In the present study, 1979-80 is considered the benchmark period where import smuggling is found to be 18.57 per cent.⁷

⁷ See Appendix-C, (Table C-1).

The next step is to use the obtained figure for benchmark period to convert the qualitative index of smuggling obtained from the above methods into the quantitative index. Denoting the smuggling ratio in the benchmark period by S/M and found the estimation by ρ/M , the series is generated using the formula:

$$(S/M)_t = \frac{(S/M)_0}{(\rho/M)_0} (\rho/M)_t \quad (5)$$

This preserves the percentage variation in smuggling ratio but the scaling is done on the basis of ratio obtained from trade discrepancy data. The scaling done in this way also circumvents a major criticism raised on both the trade discrepancy approach and regular conversion into cardinal index. The value used for benchmark is not chosen arbitrarily but has been calculated properly, using the available data which, though is not completely reflective of the true value, is much less arbitrary.

III. Estimation and Results

The stationarity properties of all variables involved have to be studied using unit root test because if the variables are found non-stationary, the use of Ordinary Least Square (OLS) may yield spurious estimates of the parameters. If all variables are found to be non-stationary and integrated of same order, the next step is to explore the possibility of existence of a stationary linear combination of these variables, as such, a stationary linear combination implies long-run relationship among the variables. Using Augmented Dickey-Fuller (ADF) test for unit root on each variable, it is found that all the time series variables are non-stationary and integrated of order 1, i.e., $I(1)$.⁸ This warrants the proceeding to Johansen Cointegration test to explore the possibility of a long-run relationship among the variables.⁹ In order words, to select appropriate lag length for cointegration test, the procedure require estimation of simple VAR (Vector Autoregressive) model and the use of lag-length criteria to find appropriate number of lags, denoted by p . It is found that only one lag should be introduced in Johansen test.¹⁰ Thus, in Johansen cointegration test, following equation is estimated.

$$\Delta Y_t = A_0 + A_1 D1 + \Pi Y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-i} + \varepsilon_t \quad (6)$$

⁸ Results of unit root test are reported in Appendix-D (Table D-1).

⁹ Engle-Granger methodology has not been employed as it suffers from various defects such as allowing only one cointegrating relationship where there can be many, arbitrary choice of dependent variable, two-step estimation that can cause the errors introduced in one step to be transmitted to the next step etc., [Enders (1995)].

¹⁰ LR test, Final Prediction Error, Schwarz Information and Hannan-Quinn information criteria.

where,

$$Y_t = \begin{bmatrix} CF_t \\ MTAX_t \\ DTAX_t \\ INT_t \\ G_t \end{bmatrix}$$

- CF : Ratio of currency and foreign currency to money supply (M2 including foreign currency).
- MTAX : Import tax rate i.e., ratio of tariff and sales tax on imports to total imports.
- DTAX : Domestic tax rate i.e., ratio of domestic taxes to nominal GDP.
- INT : Interest rate represented by weighted average rate of return on deposits.
- G : Growth rate of real GDP.
- D1 : Dummy variable to capture the effect of financial liberalization; set equal to one for 1991 onwards and zero otherwise.
- A_0 : 5x1 vector of intercepts with elements a_i , $i=1$ to 5.
- A_1 : 5x1 vector of coefficients of exogenous variable D1.
- Π : 5x5 matrix of long-run coefficients π_{ij} , $i, j=1$ to 5.
- Γ_i : 5x5 matrices of coefficients on lagged variables where $i=1$ to p ; p being the appropriate number of lags chosen through lag length criteria.

The essence of Johansen test is to find the rank of Π as this rank equals the number of co-integrating vectors in the system.¹¹ If rank of Π is zero, all its elements are zero which implies that all variables are random walk processes and their linear combination cannot be stationary. On the other hand; if Π has full rank i.e., 5, it implies stationarity of the vector process and thus no cointegration. Therefore, in order for cointegration to exist, the rank of matrix Π should be greater than zero and less than 5. The rank of matrix Π can be found by testing the significance of characteristic roots of Π . Let the 5 characteristic roots of Π , denoted by λ_i , where $i = 1, \dots, 5$, be ordered such that $\lambda_1 > \lambda_2 > \lambda_3 > \lambda_4 > \lambda_5$; then the following two test statistics are calculated.

¹¹The discussion on Johansen Cointegration test has been extracted from Enders (1995).

$$\text{Trace test: } \lambda_{\text{trace}}(r) = -T \sum_{i=r+1}^n \ln(1 - \hat{\lambda}_i)$$

$$\text{Maximum Eigen value test: } \lambda_{\text{max}}(r, r+1) = -T \ln(1 - \hat{\lambda}_{r+1})$$

where $\hat{\lambda}_i$ is the estimated characteristic root of estimated Π matrix, T is the number of observations and r is the hypothesized rank of Π . Trace test is conducted under the null hypothesis. The number of cointegrating vectors are less than or equal to r against the general alternative while maximum Eigen value test is conducted under the null hypothesis of r cointegrating vectors against the alternative of $r+1$ cointegrating vectors. Johansen and Juselius [Procedure of Cointegration Analysis (1990)], have provided the critical values for both the statistics.

Johansen test result confirms the existence of cointegration among the variables.¹² Moreover the sum of products of cointegrating coefficients and error correction coefficients is less than zero which ensures stationarity of the linear relationship. Once the presence of cointegration is established, the vector error correction model (VECM) is estimated and finally only the long-run relationship is used in the analysis. The presence of a single cointegrating vector was confirmed which is given by:

$$\hat{CF}_t = \hat{\beta}_0 + \hat{\beta}_2 \text{MTAX}_t + \hat{\beta}_3 \text{DTAX}_t + \hat{\beta}_4 \text{INT}_t + \hat{\beta}_5 G_t \quad (7)$$

where $\hat{\beta}_0 = -(\hat{a}_0 / \hat{\pi}_{11})$ and $\hat{\beta}_i = -(\hat{\pi}_{1i} / \hat{\pi}_{11})$ for $i = 2, 3, 4, 5$.

Specifically, the long run coefficients obtained through VECM in terms of Equation 7 is as reported below with t-values in braces,¹³

$$\hat{CF}_t = -0.199 + 1.140 \text{MTAX}_t + 5.494 \text{DTAX}_t - 0.013 \text{INT}_t - 0.928 G_t \quad (8)$$

[11.86] [9.66] [-4.41] [-4.38]

Thus, according to the hypothesized relationships, the taxes; domestic as well as trade have a positive relationship with currency to money ratio whereas interest rate, representing the opportunity cost of holding money has a negative relationship with the currency ratio. Growth rate of real GDP, influences currency ratio negatively, i.e., increase in growth rate of real GDP decreases the currency ratio in the economy which supports the argument that with increase in the pace of economic growth, agents switch from cash towards other financial instruments as a means to carry out transactions.

¹²Trace test indicates 2 while maximum Eigen value test indicates 1 cointegrating equation at 5 per cent level.

¹³See, estimation output in Appendix E.

The obtained coefficients are then used to calibrate currency ratio by using Equation (8). In order to capture the rise in currency ratio in response to trade restrictions, the Equation is then estimated, with \widehat{CF}_{wt} depicting currency ratio without trade restrictions.

$$\widehat{CF}_{wt} = -0.199 + 1.140 * 0 + 5.494 DTAX_t - 0.013 INT_t - 0.928 G_t \quad (9)$$

Subtraction of Equation (9) from (8) gives rise in currency demand in response to trade restrictions. By employing Equations (1), (2) and (3), an ordinal index of import smuggling is obtained. Following the steps as explained in Section II(3), the ordinal index is converted into a cardinal index. The division of volume of smuggling in each year by the value of imports in that year gives the index of import smuggling as a fraction of imports for the period of analysis. The results are reported in Table 2, where the reference period used for conversion of ordinal index into the cardinal one, i.e., 1979-80 is shown in bold.

TABLE 2

Import Smuggling as a Fraction of Imports

Years	Monetary Approach	Years	Monetary Approach
1972-73	0.197	1991-92	0.212
1973-74	0.149	1992-93	0.200
1974-75	0.121	1993-94	0.265
1975-76	0.188	1994-95	0.251
1976-77	0.250	1995-96	0.208
1977-78	0.286	1996-97	0.173
1978-79	0.217	1997-98	0.185
1979-80	0.186	1998-99	0.190
1980-81	0.193	1999-00	0.226
1981-82	0.208	2000-01	0.206
1982-83	0.230	2001-02	0.204
1983-84	0.248	2002-03	0.204
1984-85	0.202	2003-04	0.177
1985-86	0.295	2004-05	0.125
1986-87	0.442	2005-06	0.085
1987-88	0.339	2006-07	0.078
1988-89	0.280	2007-08	0.054
1989-90	0.312	2008-09	0.056
1990-91	0.287	2009-10	0.073

The results are indicative of fluctuations in the trend of smuggling; rising in the earlier periods of analysis and falling afterwards. For FY73 to FY80, smuggling remained at an average annual of 20 per cent of imports. In the decades of 1980's, it remained even higher at an average annual rate of 28 per cent of imports, hitting its all-time peak at around 44 per cent of imports in FY86. However, it started to decline in 1990's, making the average annual percentage for the decade, around 22 per cent. Afterwards, the results show a persistently declining trend till FY09 when import smuggling is found to be around 6 per cent; bringing the average annual percentage of smuggling for the decade, down to 13 per cent.

IV. Discussion

The monetary approach followed in the present study cannot be trusted undoubtedly as these are ad hoc measures to look at an unobservable phenomenon but for that matter, unobservable variables can have only approximated estimates. The result shows the trend of import smuggling that it rose in the beginning, reaching its peak around mid 80's which fell afterwards. Table 3 lists the descriptive statistics for the smuggling estimates.

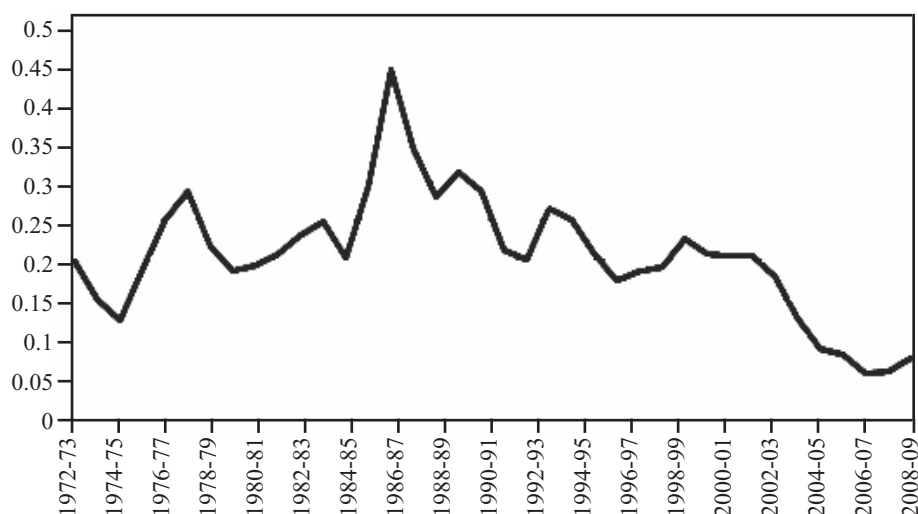
A graphical representation of the estimates of import smuggling obtained by monetary approach is shown in Figure 1.

The monetary approach is in fact a measure of import tax evasion which we name as smuggling. Thus, it shows the response of smuggling solely to the trade taxes. The large volume of import smuggling in the decade of 1980s is no surprise as Pakistan was practicing massive trade restrictions in the decade. As nationalization in the decade of 1970s had caused reversion of the improvement in trade balance that had been observed in the 1960s, Pakistan resorted to import restrictions

TABLE 3

Descriptive Statistics for Monetary Approach

Descriptive Statistics	Monetary Approach
Mean	0.205
Median	0.204
Maximum	0.442
Minimum	0.053
Coefficient of Variation	0.389
Correlation Coefficient	0.247



Import Smuggling as a Fraction of Imports

FIGURE 1

to boost its exports and decrease imports. The maximum tariff rate on imports, being only one of the various trade restrictions, stood at an alarming 225 per cent in FY87 [Khan and Qayyum (2007)]. However, the government introduced trade reforms in the late 1980s, for example, the list of banned products was decreased from 300 to 75 items between 1988 and 1994 [Nabi (1997)]. Later, in 1995, Pakistan became a member of the World Trade Organization demanded further reforms and trade liberalization, and since then Pakistan pursued a relatively open and transparent trade policy. The direct interventions in trade in the form of quantitative restrictions was largely abolished by the government and exchange controls and adopted simple customs tariff as the main trade policy instrument. Moreover, the government reduced tariff rates and simple average ad valorem tariff rate were also brought down to under 15 per cent in FY06 from over 50 per cent in FY95 [World Bank (2006)]. The South Asian Free Trade Agreement (SAFTA) was signed by Pakistan in 2004 which calls for even lower tariff rates for member countries imports in order to promote intra-region trade in South Asia. Thus, all these steps that facilitate the legal trade activity contribute to decreasing import smuggling by reducing the costs associated with legal trade.¹⁴

The monetary approach has given us the quantitative index of import smuggling as a fraction of imports in Pakistan. The approach, though not perfect in itself, does

¹⁴Note that in our formulation we have included tariff as a sole indicator (proxy) for trade liberalization measures mentioned above.

give a fairly good picture of the extent of this phenomenon in that on average, 20 per cent imports are smuggled annually which is roughly Rs.67bn, but the percentage declined in the recent years. This is largely due to more open and flexible trade policies pursued by the government, because results points towards a significantly positive effect of trade restrictions on import smuggling.

V. Conclusion and Policy Implications

The present study tailors monetary approach that is used for measurement of underground economy to employ it for the measurement of import smuggling to arrive at estimates of the latent variable of smuggling.

Monetary approach focuses on trade tax evasion, and thus, holds trade taxes to be the major and significant cause of import smuggling. The results show a fluctuating trend in smuggling but generally it shows rise in earlier years, reaching its peak by mid-1980s and falling afterwards to attain its minimum value in FY08. This is largely attributed to the trend shown by trade restrictions. These restrictions started to rise in 1970's owing to the need of the state to improve its worsening trade balance and the protectionist policies which remained in practice till 1980s whereas in the late 1980s, the government started a relatively liberal policy that was further reinforced by Pakistan joining World Trade Organization in 1995 and continue to be liberalized till now.

VI. Recommendations

1. Policy Recommendations

As tariffs and other restrictions on imports are found to be the major factors responsible for illegal imports, liberal trade practices are supposed to decrease the cost associated with formal trade, making it attractive. However, as the results are indicative of an already declining trend in import smuggling, government may give more weight to the revenue impact of further liberalization of trade policy which is crucial for problem of budget deficit in the economy.

In addition it must be noted that presenting as a percentage of GDP, import smuggling between FY73 and FY10 is at an average annual of around 3.5 per cent according to estimates of the present study. For the decade of 2000's it stands at an average annual of 2.2 per cent. As smuggling is a part of underground economy which stood around 23 per cent from 2000-2008 [Arby et al. (2010)], it can be said that the contribution of import smuggling to underground economy is relatively moderate, showing declining trends in recent years. Therefore, other components of underground economy, especially tax evasion needs to be addressed by the government as a top priority.

2. Research Recommendations

The present study is one of the very few attempts to address problems of smuggling in Pakistan. It opens an avenue of research in this field by presenting the estimates of overall import smuggling in the country with the help of monetary approach employed for the first time in case of Pakistan. Further research may be undertaken to improve the approach used in the present study or discovering new approaches for the measurement of this phenomenon. Moreover, broadening the dimensions to explore trends of export smuggling too will also be a good contribution to the research.

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APPENDIX-A**TABLE A-1**

An Overview of Empirical Literature on Smuggling

Study	Region of Analysis	Period of Analysis	Approach Used
Morgenstern (1963)	U.S.A., U.K., Germany, France, Canada	1900, 1907, 1928, 1935	Trade discrepancy approach.
Bhagwati (1964)	Turkey	1960-61	Trade discrepancy approach.
Naya and Morgen (1969)	South-East Asian Countries	—	Trade discrepancy approach.
Simkin (1974)	Indonesia	1958-1967	Trade discrepancy approach & commodity comparison approach.
Cooper (1974)	Indonesia	Not mentioned	Market price responsiveness to tariffs.
Sheikh (1974)	Pakistan	1965-1968	Trade discrepancy approach & Regression analysis of determinants.
Aleno (1984)	Philippines	1965-1978	Trade discrepancy approach and calibration using OLS estimates.
May (1985)	Ghana	1976-1982	Monetary approach.
McDonald (1985)	Selected Developing Countries	1962-1979	Trade discrepancy approach analyzed.
Yeats (1990)	Sub-Shaharan Countries	1982-1983	Trade discrepancy approach.
Mahmood and Mahmood (1993)	Pakistan	1981 and 1988	Trade discrepancy approach.

(Continued)

TABLE A-1
(Continued)

Wang (1994)	Nigeria	1986-1993	Trends in price differentials across borders.
Cortes, et. al. (1995)	Paraguay	1990	Trade discrepancy approach and comparison of tourists' expenditure data.
Mahmood (1997)	Pakistan	1981 and 1988	Trade discrepancy approach & Regression analysis of determinants.
Mahmood and Azhar (2001)	Pakistan	1984-1994	Trade discrepancy approach.
Pohit and Taneja (2003)	India and Bangladesh	2003	Direct survey approach (Qualitative).
Fisman and Wei (2004)	China	1998	Trade discrepancy approach.
Khan, et al. (2005)	Pakistan	2005	Direct survey approach.
Biswas and Marjit (2005)	India	1960-1998	Trade discrepancy approach.
Fisman and Wei (2007)	U.S.A., Canada, Germany, U.K., Switzerland	1996-2005	Trade discrepancy approach.
Beja (2008)	China	2000-2005	Trade discrepancy approach.
Berger and Nitsch (2008)	U.S.A., Germany, China, U.K., Japan	2002-2006	Trade discrepancy approach.
Farzanegan (2008)	Iran	1970-2002	Structural model (MIMIC) approach and Trade discrepancy approach.

APPENDIX-B**TABLE B-1**

Variables and Data Sources

Variables	Data Sources
Ratio of Currency and Foreign Currency Accounts (FCA) to Money $CF_t = \frac{\text{Currency in Circulation}_t + \text{Foreign Currency Accounts}_t}{M2_t}$	State Bank of Pakistan
Import Tax Rate $MTAX_t = \frac{\text{Gross import duty}_t + \text{Sales tax on imports}_t}{\text{Nominal imports}_t}$	Federal Board of Revenue Year-book
Domestic Tax to GDP Ratio $DTAX_t = \frac{\text{Total taxes}_t - \text{Import duty}_t - \text{Sales tax on imports}_t}{\text{Nominal GDP}_t}$	Federal Board of Revenue Year-book
Growth Rate of Real GDP $G_t = \frac{RGDP_t - RGDP_{t-1}}{RGDP_{t-1}}$	State Bank of Pakistan
Interest Rate $\frac{[\text{Weighted Average Rate of Return on Deposits}]}{\text{GDP (Real)}}$	State Bank of Pakistan

APPENDIX-C**TABLE C-1**

Import Under-Invoicing as a Fraction of Imports

Fiscal Years	Import Under-Invoicing as a Fraction of Imports
1975	0.193
1976	0.185
1977	0.201
1978	0.194
1979	0.185
1980	0.186
1981	0.163
1982	0.145
1983	0.149
1984	0.170
1985	0.193
1986	0.194
1987	0.194
1988	0.193
1989	0.193
1990	0.205
1991	0.224
1992	0.205
1993	0.159
1994	0.113
1995	0.105
1996	0.092
1997	0.081
1998	0.069
1999	0.042
2000	0.025
2001	0.051
2002	0.108
2003	0.159
2004	0.207
2005	0.236
2006	0.239
2007	0.209
2008	0.167
2009	0.149

APPENDIX-D**[Unit Root Test Results]**

Augmented Dickey-Fuller test has been used where the regressions are done without any trend or intercept except for GDP where intercept is included on finding it significant.

TABLE D-1

Unit Root Test Results

Variables	t-Statistic Level	t-Statistic First Difference	Conclusion
CF	-0.180	-6.341**	I(1)
MTAX	-0.721	-2.655**	I(1)
DTAX	-0.483	-5.747**	I(1)
G	-1.468	-8.679**	I(1)
INT	-0.432	-6.103**	I(1)

**indicate significance at 5 per cent and 1 per cent level respectively.

APPENDIX-E**[Regression Results]**

Monetary Approach-Eviews Output [Vector Error Correction Estimates].

TABLE E-1

Results of the Monetary Approach

Cointegrating Equation

CF(-1)	MTAX(-1)	DTAX(-1)	INT(-1)	G(-1)	C
1.000000	-1.13979	-5.49432	0.012856	0.928345	0.199543
	(0.09608)	(0.56858)	(0.00291)	(0.21188)	
	[-11.8631]	[-9.66326]	[4.41337]	[4.38150]	

Error Correction Coefficients

D(CF)	D(MTAX)	D(DTAX)	D(INT)	D(G)
-0.59414	0.495442	0.007002	4.088305	-0.28674
(0.15110)	(0.14882)	(0.03332)	(6.31905)	(0.13381)
[-3.93199]	[3.32906]	[0.21017]	[0.64698]	[-2.14281]

Standard errors are given in parenthesis while t-values are reported in braces.

Log Likelihood: 378.49 (significant at 1% level).