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Accepted version. *Journal of Development Economics*, Volume 80, No. 2 (August 2006): pg. 428-443.

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The size and development of the shadow economy: An empirical investigation from states of India[◇]

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Abstract:

Using the state level data from India, this paper investigates the size of the hidden economy in Indian states over the period 1974/75 to 1995/96. Our analysis has shown that after liberalization of the Indian economy in 1991/92, the growth in the size of the hidden economy has decreased on an average. Our results show that the growth in the size of the hidden economy is approximately 4% less in scheduled election years than in all other years. We also demonstrate that the growth is significantly lower in those states where the coalition government is in power. An increased growth of newspapers and the literacy rates translate to cleaner governance, e.g. to fewer amounts of shadow economy activities in the economy.

1. Introduction

Economists and social scientists have shown considerable interest in recent years to measure the gap between the observable and the actual. This has led to the conceptualization of the 'hidden economy', although several synonyms such as black, shadow, underground, unobserved, unofficial, unrecorded, and parallel were used for the 'hidden economy'. In general, it tries to capture the activities beyond measurement by official activity.² The hidden economy consists of legal and illegal activities outside the reach of the government.³ Empirical estimates demonstrate that underground activities have been on the rise since the 1970s when the presence of government activity became stronger in the economies around the world. With increase in tax rates to finance larger public spending programs, the desire to escape taxes and regulatory restrictions also gained in prominence (Tanzi and Schuknecht, 1997). Popular print-media articles were also ready to accept the notion that the underground economy had increased significantly over the years. Given such media attention, the nexus of the black economy into the public glare has created a consciousness about the gravity of the phenomenon all over the world.

Given the importance of the phenomenon, the next question that naturally arises is regarding the definition of the hidden economy. Tanzi (1999) suggests that the shadow economy crops up because of presence of activities that are difficult to measure and tax, like household work and also criminal and illegal activities. Schneider (1986) sums this point by defining the underground economy as "all economic activities that contribute to the value added and should be included in national income in terms of national accounting conventions but are presently not registered by national measurement agencies". Bhattacharyya (1999) describes the hidden economy as reflected by the unrecorded national income "calculated as the difference between the potential national income for the given currency in circulation and the recorded national income". Bagachwa and Naho (1995) consider it as a combination of informal (small-scale production and distribution units), parallel (illegal production of legal activities) and black market activities (production and distribution of market and non-market goods forbidden by the government). Acharya (1985), in the Indian context, refers to the black economy as "the

aggregate of incomes which are taxable but are not reported to the tax authorities” and also “the extent to which estimates of national income and output are biased downwards because of deliberate, false reporting of incomes, output and transactions for reasons of tax evasion, flouting of other economic controls and related motives”. A commonly used working definition is: all currently unregistered economic activities, which contribute to the officially calculated (or observed) Gross National Product.⁴ Smith (1985, p. 18) defines it as “market-based production of goods and services whether legal or illegal that escapes detection in the official estimates of GDP”.

The above discussion suggests that the shadow or hidden economy deals with the portion of the income earned from legal and illegal activities that cannot be accounted for by the standard measurement procedures used in compilation of national income accounts. We, in this paper, adopt this as a relatively broad definition of the ‘underground economy’.

In this paper, we try to estimate the size of the hidden (shadow) economy for fourteen major states of India over the period 1974/75 to 1995/96 using a multiple indicator multiple cause (MIMIC) model. Given the estimates of the size of the shadow economy, we also offer an empirical investigation to determine the role of socioeconomic, political and institutional factors explaining the size of the hidden economy. Our approach thus demonstrates the importance of policy actions in increasing government responsiveness to curb the size of the hidden economy. We particularly emphasize on the role of election, nature of the governments, literacy, mass media, and the impact of liberalization in this context. Kaufman (1999) considers knowledge and information; leadership and collective action can be used as the prime weapons to tackle corruption. Staphenurst (2000) provides a brief link between an active media and the amelioration of corruption as also the shadow activities of the economy. Djankov et al. (2002) demonstrate that the government ownership of the media is generally associated with less press freedom, fewer political and economic rights, and, most importantly, inferior social outcomes in the areas of education and health. Ahrend (2002) provides strong empirical evidence that suggests that strengthening press freedom should be among the priorities fighting against corruption. Dyck and Zingales (2002) discuss the role of the media influencing corporate policy.

India provides an interesting framework. India has been a democracy since 1947. Periodic elections to the national and state legislative assemblies have taken place since 1952. There is a relatively free and independent press with significant time-series and cross-sectional Variation. Using these data, we are able to examine a connection between the development of mass media, political and institutional factors and government actions to cater the needs of the citizens. In this connection, our paper can be viewed in line with the growing literature that uses data from India to examine the role of institutional and political factors to explain government responsiveness. Besley and Burgess (2000) demonstrate that party ideology affects public policy: the cumulative land reforms passed in a given state-year depend on the 4-year lagged state legislative assembly seat shares of different political groups. Besley and Burgess (2002) show that state governments are more responsive to falls in food production and crop damage in those states where newspaper circulation is higher and electoral accountability is greater. Banerjee and Iyer (2004) document that differences in historical institutions lead to very different policy choices, and hence to, differences in economic outcomes. Iyer (2004) demonstrates that areas under direct British rule have significantly lower levels of public goods in the present period. Hoff (2003) provides a survey relating institutional developments and its impact on economic growth. However, none of the above-mentioned papers has addressed the issue of the size of the unofficial economy in the Indian state context. Our paper is an attempt in this direction.

The Wanchoo Committee Report (Government of India, Ministry of Finance, 1971, p. 6) was the first to draw attention on the shadow economy in India. They referred to the phenomenon as a "cancerous growth in the country's economy which if not checked in time, will surely lead to its ruination". The Venkatappiah Committee Report (Government of India, 1974), which focused on the self-removal of excise taxes also felt "free to confess that we are not prepared for, and are, therefore, painfully surprised at, the range, diversity and, in certain segments of production, almost the universality of the evasion, which is practiced by those who produce the goods". Besides taxes, the extent of regulation present in the economy in the form of industrial licensing, import licensing, controls on prices and distribution channels of goods and services, credit controls and other measures

can encourage the proliferation of the hidden economy. The Dagli Committee Report (1979) highlighted this phenomenon.

The remaining parts of the paper are organized in the following manner. The next section presents a brief review of the literature for estimation of the size of the hidden economy. Section 3 discusses the estimation methodology. Section 4 is divided into three subsections: the first subsection lists out the basic data variables used in the analysis, the second one documents the nature of the hidden economy estimates obtained by the used methodology, and the last deals with the role of political and institutional factors explaining the size of the hidden economy. Section 5 concludes.

2. Methods of measuring the hidden economy

Our study is different from the earlier underground economy studies conducted in the Indian context by Gupta and Mehta (1981), Chopra (1982), Acharya (1985), Bhattacharyya (1999), and Bhattacharyya and Ghose (1998) in the following way:

- 1) While Acharya (1985), Bhattacharyya (1999), and Bhattacharyya and Ghose (1998) used traditional cash demand estimation methodology, which has been criticized in the literature for its focus on just one facet of the hidden economy, this work uses the MIMIC model. Gupta and Mehta (1981) have used a physical input approach whereas Chopra's method is in close line with the one suggested by Kaldor (1956).⁵
- 2) The uniqueness of the study hinges on the fact that it addresses the crucial question: Does an increase in the presence of civic institutions like media have a contractionary effect on the size of the hidden economy of a democracy like India?

In this paper, we attempt to estimate the hidden economy by multiple indicator multiple cause approach (MIMIC). Frey and Week-Hannemann (1984) were the first to employ this methodology for the estimation of the hidden economy of a cross-section of 17 OECD countries for the period of 1960-78. They borrowed from the statistical theory of unobserved variables developed by the likes of Zellner (1970), Goldberger (1972) and Joreskog and Goldberger (1975) which

considers multiple causes and multiple indicators of the phenomenon to be measured and used a factor-analytic approach to measure the hidden economy as an unobserved variable over time. The unknown coefficients are estimated separately through a set of structural equations with the indicator variables being used to capture the effect of the unobserved variables indirectly. Frey and Week-Hannemann (1984) provided a ranking of OECD countries based on the size of their underground economies. In the late 1970s, Scandinavian and Benelux countries were seen to have very large hidden economies followed by US in the middle rank and then by Switzerland and Japan, which exhibit very small sizes of underground activity for that period. Also growth rates wise, Denmark, Belgium, and Italy's hidden segment seem to have grown at an above average pace while Canada, UK and USA's hidden economy was found to be below the average rate. Another study by Aigner et al. (1988) uses a variant of the MIMIC approach – the DYMIMIC (the dynamic multiple-indicators multiple-causes approach) to assess the size of the US hidden economy for the period 1939-1982. The results of this study have found a peak in the US hidden economy size around 1943-44 and a trough in 1967-68.

In recent years, a lot of work has been done using the unobserved or latent variable approach, particularly in the context of New Zealand and Canada. Giles (1999a,b), Giles and Caragata (2001), and Giles and Tedds (2002) have used the time series data for the New Zealand and the Canadian economy, to arrive at hidden economy estimates, using the MIMIC approach. To the best of our knowledge, this is the first attempt to estimate the size of the hidden economy using MIMIC model in the Indian context.

3. Estimation methodology

This section describes in brief the MIMIC variable approach. The MIMIC model actually is a variant of the LISREL (linear independent structural relationships) models of Joreskog and Sorbom (1993a,b) and others that can only yield a time-series index for the latent variables: an ordinal index. We need to convert ordinal index into a cardinal series of values of hidden economy sizes by scaling up the ordinal values to some cardinal value that has been obtained in the past through other methods of estimation like the electricity or the

currency demand approach. The MIMIC model equations can be stated as:

$$\mathbf{y} = \lambda\eta + \varepsilon \quad (1)$$

$$\eta = \gamma'\mathbf{x} + \zeta \quad (2)$$

where \mathbf{y} is a column vector of ' p ' indicators of the latent variable, η , and \mathbf{x} is a column vector of the ' q ' "causes" of η . In other words, Eq. (1) is the measurement model for η and Eq. (2) is the structural equation for the latent variable, η . ε is a ($p \times 1$) measurement error while ζ is the scalar structural error. It is assumed that ζ and all the elements of ε are mutually uncorrelated, with $\text{var}(\zeta) = \psi$, and $\text{cov}(\varepsilon) = \theta_\varepsilon$. Substituting (2) into (1), the MIMIC model can be expressed as a p -equation multivariate regression model:

$$\mathbf{y} = \Pi\mathbf{x} + z \quad (3)$$

where $\Pi = \lambda\gamma'$, $z = \lambda\zeta + \varepsilon$, and $\text{cov}(z) = \lambda\lambda'\psi + \theta_\varepsilon$.

The p -equation model in (3) seems to have a regression matrix of rank equal to one and an error covariance matrix that is similarly constrained. The first condition is typical in simultaneous equation models where the removal of a few exogenous variables from the structural equation might cause a part of the reduced form coefficient matrix to be short-ranked. The singularity property of the error covariance matrix develops because for the measurement model to be estimated it has to be normalized first. This implies that the estimation of (1) and (2) can be carried only after (1) is normalized by setting one element of λ to a pre-assigned value. We estimate the model using the Maximum Likelihood Estimation procedure.

We use the following combinations of the causes and indicators to arrive at different hidden economy estimates. For the indicators, we use the growth in real net state domestic product of the Indian states (*Grsdp*)⁶ and the total number of employees (sum of productive and non-productive workers) in registered manufacturing industries adjusted by the total number of factories in a state (*Temp*). For the causal variables, we have included the following: capital account developmental expenditure (*Capdev*), capital account non-developmental expenditure (*Cqndev*), states' own tax revenue (*Otr*),

states' own non-tax revenue (*Ontr*), states' current account developmental expenditure (*Curdev*), and states' current account non-developmental expenditure (*Curndev*). All the expenditures and tax variables are expressed as a proportion of states' net domestic product.

The total revenue of a state government consists of two components: total tax revenue, and total non-tax revenue. A state government's total tax revenue is, in turn, decomposed into two parts: its share in the tax revenue of the central government and revenue raised through state taxes. State taxes are mainly indirect in nature.⁷ A state government's non-tax revenue derives from two sources: grants from the central government, and own non-tax revenue. The interest receipts from loans issued by the state government, dividends and profits from public sector undertakings owned by the state government, and revenues from state lotteries are the major constituents of the non-tax revenue. In this paper, we use the own tax revenue and own non-tax revenue components of total revenue. The total expenditures incurred by state governments are on either the current account or the capital account. Current account expenditure is of three types: developmental spending, non-developmental spending and grants to local governments. Developmental current account spending mainly meets the need to maintain the existing assets mainly in terms of economic services (inclusive of expenditure on agriculture, industry, power and irrigation, transport and communications) and social services (inclusive of education, health and family welfare, planned expenditure on social security), where as non-developmental part consists of interest payments on past debts, expenditure on fiscal and administrative services, pension and retirement benefits, non-planned expenditure on social security and welfare and food subsidy. Capital account expenditure consists of two parts: development and non-developmental where the former mainly concentrates on creation of physical assets. Non-developmental part of the capital expenditure is mainly used for repayments for loans to central governments and discharge of internal debt.

As stated earlier, the MIMIC model can only yield a time-series index for the latent variables (the underground economy). However, it can only give an index for a time-series. Therefore, we need to convert this ordinal index into a cardinal series of values of hidden economy

sizes by scaling up the ordinal values to some cardinal value obtained in the past through other methods of estimation like the electricity or the currency demand approach and using values from it to calibrate the ordinal series obtained by the MIMIC approach. Here we have adopted this option. We have used Bhattacharyya's (1999) hidden economy estimate for India, of 22.5% for 1989-90, to scale up our ordinal hidden economy series to arrive at the complete cardinal underground economy sizes for different states for India.

Given the above estimates, in the next stage, we have tried to explain whether the civic institutions like media, political institutions or characteristics of the state governments affect the growth in the size of the hidden economy estimates (g_{it}). The regression equation for this model takes the standard panel data form:

$$g_{it} = \alpha_i + \lambda_t + \rho \log(H_{it-1}) + \mu t_i + \beta e_{it} + \delta f_{it} + \eta s_{it} + \varnothing w_{it} + \varphi p_{it} + \psi lit_{it} + \mu primary_{it} + \theta rur_{it} + u_{it} \quad (5)$$

where α_i is a state fixed effect and λ_t is a time-dummy controlling for aggregate shock. The term, H_{it-1} is the lagged size of the hidden economy. We have allowed for the state-specific trend (t_i) in our estimation. The variable f_{it} variable represents the government characteristics in terms of coalition measuring the proportion of year ' t ' where a coalition government is in power with more than one pivotal party. We call this variable as *Coalition government*. The variable e_{it} represents an election year dummy taking the value of one if a scheduled election is held in the second half of financial year t or in the first half of the next financial year in state i . We have also included two other variables (s_{it} and w_{it}) in the above equation. The first one captures the extent of political affiliation between the governments at the center and the state. Specifically, this is a dummy variable that takes the value of 1(0) if the government in state s is politically affiliated with the central government for more (less) than 6 months during financial year t . The second one tries to capture the difference between a left-wing state government (that is, a government headed by a communist party) and all other government types. The variable w_{it} measures the proportion of financial year t during which the government of state i was a left-wing government. We have also introduced two other variables in Eq. (5): namely the proportion of rural population (*Rur*), and contribution of primary sector (*primary*)

(agriculture and allied services) in total net state domestic product. The variable denoted by p_{it} refers to the growth in per capita total newspaper circulation while lit refers to the growth in literacy rates.

In Eq. (5), the error term u_{it} is modeled as an AR(1) process where we allow state-specific degree of autocorrelation. Estimation of Eq. (5) via generalized least squares also permits us for a heteroskedastic error structure with each state having its own variance.⁸

4. Empirical results

4.1. Data

The data set for our study consists of annual observations from 1974-75 to 1995-96 covering the 14 major states of India. The fourteen major Indian states are: Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. The variables that we consider partition into two major categories: (1) data on the indicator variables (*Grsdp* and *Temp*) and (2) data on cause variables. The real net state domestic product is obtained from various issues of the *National Accounts Statistics* (Government of India, Ministry of Planning, Department of Statistics), published by the Central Statistical Organization of the Government of India. The employment data for the registered manufacturing industries were compiled from various issues of the *Annual Survey of Indian Industries*, Ministry of Statistics and Program Implementation, Government of India. The data on cause variables such as tax and expenditure variables of state governments were collected from various volumes of the *Reserve Bank of India Bulletin*, published by the Central bank of India.

State demographic characteristic like the contribution of the primary sector is constructed using the *National Accounts Statistics*. The literacy rates are collected from *Census of India* and the *National Sample Survey* rounds (both published by the Government of India). For some years, state literacy rate data were not available from either the Census of India or the National Sample Survey rounds. For these years, we have interpolated the data using a simple growth rate

formula. We obtain the per capita newspaper circulation figures from *Press in India* (published by the Ministry of Information and Broadcasting). We have also experiment with total vernacular language newspaper circulation, total English newspaper circulation, total second language newspaper circulation and total other language newspaper circulation. All these come from *Press in India*. Our data on political variables comes from multiple sources. First, the dates of all state legislative assembly elections were taken from the book *India Decides* (Butler et al., 1996) and from the official website of Election Commission of India.⁹ Thereafter, for each state-year combination, the “nature” of the state government (coalition, political. affiliation and ideology was determined. We have collected this information from the publication *Encyclopedia of India and Her States* (Grover and Arora, 1998).

4.2. Results

This section is divided in two parts: Section 4.2.1 reports the results for the MIMIC model where as the results from the estimation of Eq. (5) is reported in Section 4.2.2.

4.2.1. The MIMIC model's estimates of the hidden economy of Indian states

In this sub-section, we present the hidden economy estimates of the Indian states. We have estimated the MIMIC model separately for individual states.¹⁰ For an illustrative purpose, however in Table 1 we present the results for four states, namely, Andhra Pradesh, Kerala, Maharashtra and West Bengal. Our results clearly indicate the following: although the causal variables enter in general with expected signs, however, many of them lack individual significance. Table 2 reports the diagnostic statistics for the estimated model. Small values of root mean square residual (RMR) where as large values of the adjusted goodness of fit index (AGFI), and the parsimony goodness of fit index (PGFI), reflect a good model fit. In almost all the models, the diagnostic statistics give a satisfactory result in terms of model fit. In Table 3, we present the results for the size of the underground economy of Indian states for four samples: 1974/75-1980/81, 1981/82-1985/86, 1986/87-1991/92 and 1992/93-1995/96. Table 3 depicts some interesting pictures: for the entire period, state of

Haryana has the lowest size of underground economy followed closely by the southern state of Tamil Nadu while that of Bihar is the highest. The southern states namely, Andhra Pradesh, Karnataka, Kerala and Tamil Nadu represent lower underground economy in comparison with other states of India. Three of five BIMARU¹¹ states have an average size of under-ground economy that is larger than that of all-14 average. States like Haryana, Orissa, Punjab, Rajasthan, Uttar Pradesh and West Bengal show a considerable size of the hidden economy in the post-liberalization era (1992/93-1995/96) compared to the entire period.

In Fig. 1, we also provide a diagrammatic exposition of the average size of the hidden economy for fourteen major states along with that of all-India.¹² In this figure, the column all-14 represents a simple average for the fourteen major states. For the sample period, the hidden economy for all-India stands at 20.35% of GDP. The size of the hidden economy has increased from 15.39% (1974/75) to 23-21% (1995/96). States as Bihar, Gujarat, Madhya Pradesh, Maharashtra, Punjab, and Rajasthan had experienced a higher size on an average compared to all-India figure.

A comparison of the estimated size of the hidden economy for the all-India along with some other Asian countries (reported in Appendix A)¹³ reveals that Thailand has by far, for the year 1994/95, the biggest shadow economy with 48.3% of the official GDP, followed by the Philippines with 38.4% and Sri Lanka with 35.3%. In the middle field is Taiwan with 17.4%, India with 20.3% and South Korea with 22.4%. At the lower end is China with 10.2%, Japan with 10.6% and Singapore with 11.2% of the "official" GDP.

In order to get a better understanding, we also calculate the growth rate of the underground economy for the pre-liberalization (1975/76-1991/92) and post-liberalization (1992/93-1995/ 96) for Indian states and report the results in Table 4. In the post-liberalization era, the growth in the size of the underground is lower in most states except Haryana, Kerala, Rajasthan and West Bengal. The state of Rajasthan had the highest average growth rate in the post-liberalization period whereas Andhra Pradesh had the lowest one. In the pre-liberalization era, Kerala experienced the lowest average growth rate whereas that of Orissa was the highest.

4.2.2. Explaining the size of the hidden economy of Indian states

In order to explain the size of the hidden economy, we ran the regression as given in Eq. (5). The result is reported in Table 5. Column 1 of Table 5 presents the regression results where we just used the political variables, namely the scheduled election, the coalition government, the match dummy, ideology of the government and the liberalization dummy. The lagged value of the hidden economy is negative and significant implying the evidence of convergence. Our results show that the growth in the size of the hidden economy is approximately 5% less in scheduled election years than in all other years. The coefficient associated with the Coalition Government is negative and statistically significant. The estimates reveal that the growth in the size of the hidden economy is around 3% less if the coalition is in power compared to a single-party government. The trend term is significant implying that the hidden economy is growing for the Indian states significantly. We also obtain the fact that the state where the left-wing government (*Ideology*) is in power the growth in the size of the hidden economy is less. The liberalization of the Indian economy that took place in 1991/92 also exerts a negative significant impact.

In order to examine the robustness of the results reported in Column 1, in column 2, we introduced the following variable as a determinant of the growth in the Indian economy: the contribution of the primary sector (agriculture and allied services) in net state domestic product and proportion of rural population as control variables. Our results in terms of the political variable (the election dummy, coalition government, match dummy and ideology of the government) remain the same except the fact that both the match dummy and ideology becomes significant. Our result infers that state that has the same political party in power as in the Center is less active in terms of curbing the growth in the size of the hidden economy. We also note that an increase in the contribution of the primary sector significantly reduces the growth in the size of the hidden economy.

Next, we try to focus on the role of print-media. In column 3 Table 5 we have introduced both the growth in literacy rates and that in per capita total newspaper circulation. The reported results

document that both the variables yield the expected negative sign, although the effect is significant only in case of growth in per capita total newspaper circulation. This shows that state governments are more responsive to reduce the size of the hidden economy in those states where newspaper circulation is higher. In column (4) of Table 5, we have used growth in per capita newspaper circulation published in vernacular language instead of per capita total newspaper circulation. The coefficient associated with the variable is negative, although not significant. Our results almost remain the same with respect to other variables.

We have used the scheduled election years only. However, if the regressions are re-estimated without differentiating between scheduled and mid-term elections, our reported results in Table 5 remains the same with the election variable enters with a negative and significant coefficient. Second, the effects of government fragmentation are robust and do not depend on how the election year dummy is coded. Third, the coefficient associated with the match dummy variable remains unaltered.¹⁴ However, the ideology variable loses its significance.

Given these results, we ran another regression where we include the mid-term election as a separate variable along with the scheduled election to differentiate the impact of these two different types of elections. Here we obtain that both the scheduled and the mid-term election enters with negative significant coefficient.¹⁵ A test for the difference in estimated coefficients associated with these two variables reveals significant difference in the estimated coefficients at the 10 percent level. The results in terms of the other variable remain qualitatively the same.¹⁶

In sum, we can infer that the growth in the size of the hidden economy is significantly lower in election years than all other years. A state where the coalition government is in power also experiences lower increase in the growth compared to single-party governments. Our results also provide some weak evidence that an increased growth in literacy rates and newspaper circulation results in a lower growth rate in the size of the hidden economy. We also document that increased competition in terms of liberalization of the Indian economy

in 1991 also helps to reduce the growth in the size of the underground economy.

5. Conclusion

This paper tries to estimate the size of the hidden economy using state level data from India over the period 1974/75 to 1995/96. We have used a MIMIC model. The estimates from the MIMIC model demonstrate the varying size of the hidden economy in Indian states. On an average, the size has grown from 13.1% to 26.3%.

We have also shown that an increased growth of per capita newspaper circulation helps to curb the growth in the size of the shadow economy activities in the economy. This focuses on the importance of free and independent regional presses as key factors for proper functioning of the democracy. Our result also demonstrates that the state governments are active during the election to provide a cleaner picture of the economy. Elections act as an incentive for politicians to perform. The growth in the size of the hidden economy is lower if the coalition government is in power. Our result also provides evidence in favor of liberalization of the Indian economy in order to reduce the growth in the size of the hidden economy.

Notes

◇ We would like to thank an anonymous referee for suggesting changes that greatly improved the quality of the paper. Thanks are also due to Prof. Mark Rosenzweig, The Editor of the journal.

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² See the *Economic Journal*, vol. 109, no. 456, June 1999 the feature "Controversy: on the hidden economy".

³ The literature about the "shadow", "underground", "informal", "second", "cash" or "parallel", economy is increasing. Various topics, on how to measure it, its causes, and its effect on the official economy are analyzed. See for example, survey type publications by Frey and

Pommerehne (1984); Johnson et al. (1997, 1998); Lippert and Walker (1997); Loayza (1996); Pozo (1996); Schneider (1994a,b, 1997, 1998, 2005) and Thomas (1992); and for an overall survey of the global evidence of its size in terms of value added Schneider and Enste (2000, 2002).

⁴ This definition is used for example, by Feige (1989, 1994), Frey and Pommerehne (1984), and Lubell (1991) and Schneider (1994a, 2005).

⁵ Kaldor (1956) tried to estimate the size of the hidden economy in India, by estimating the income that avoided the income tax.

⁶ We have also tried using the growth in per capita real net state domestic product instead of growth in real net state domestic product. Our results in terms of the size of the hidden economy remain almost the same. The results are available on request.

⁷ On an average, this amounts to around 87-88% of total state tax revenue.

⁸ Besley and Burgess (2000) have also followed this kind of estimation strategy.

⁹ <http://www.eci.gov.in>.

¹⁰ Although we do not provide the estimates for each one of them, the results, however, are available for the authors on request.

¹¹ The BIMARU states are Bihar, Madhya Pradesh, Orissa, Rajasthan, and Uttar Pradesh.

¹² For the estimation of the hidden economy at the all-India level, please see Chattopadhyay et al. (2003).

¹³ The calculation of the shadow economy for China is very difficult and the values may be questioned because only a part of China has so far been developed into a market economy. A great part of China still belongs to a planned economy and due to this mix of systems, the calculated figures may not be very reliable.

¹⁴ The coefficient is 0.041 with a p -value of 0.000.

¹⁵ The coefficient associated with the scheduled election is -0.048 and that of mid-term election is -0.028. The test for the difference in the estimated coefficients associated with these two variables yields a test

statistic of 2.79 distributed as χ^2 with one degree of freedom. This is significant at the 10% level.

¹⁶ The detailed results are available on request.

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Appendix

Table 1: MIMIC model results

Variables	State of			
	Andhra Pradesh	Kerala	Maharashtra	West Bengal
<i>Indicators</i>				
Grsdp Annual growth of real net state domestic product of Indian states	0.04 (0.25)	-0.47 (-2.10)*	-0.13 (-0.51)	-0.20 (-0.62)
Temp Total number of employees in registered manufacturing industries adjusted by total number of factories in a state	1.00	1.00	1.00	1.00
<i>Causes</i>				
Capdev Capital account developed mental expenditures in percent of states' net domestic product	0.44 (3.82)***	0.03 (0.32)	0.03 (0.23)	0.10 (0.68)
Capndev Capital account non developed mental expenditures in percent of states' net domestic product	-0.25 (-2.07)*	-0.05 (-0.46)	0.02 (0.06)	-0.18 (-0.62)
Otr States own tax revenue in percent of states' net domestic product	-0.13 (-0.60)	-0.88 (-3.52)***	-0.60 (-1.80)*	-0.42 (-1.12)
Ontr States own non tax revenue in percent of states' net domestic product	-0.15 (-1.24)	0.35 (3.44)***	0.22 (0.75)	0.10 (0.34)
Curdev States current account development expenditure in percent of states' net domestic product	-0.20 (-0.79)	-0.20 (-1.21)	-0.16 (-0.35)	0.78 (2.68)**
Curndev States current account non development expenditure in percent of states' net domestic product	-0.43 (-3.56)***	0.31 (1.19)	-0.17 (-0.86)	-0.69 (-1.79)*

t-Statistics are reported in parenthesis.

* Denotes significance at 10% level.

** Denotes significance at 5% level.

*** Denotes significance at 1% level.

Table 2: Diagnostic statistics of the estimated MIMIC model

State	Root mean square residual (RMR)	Adjusted goodness of fit index (AGFI)	Parsimony goodness of fit index (PGFI)
Andhra Pradesh	0.046	0.66	0.13
Bihar	0.110	0.53	0.13
Gujarat	0.051	0.87	0.14
Haryana	0.087	0.37	0.13
Karnataka	0.050	0.80	0.14
Kerala	0.074	0.23	0.12
Madhya Pradesh	0.150	0.26	0.12
Maharashtra	0.100	0.61	0.13
Orissa	0.046	0.63	0.13
Punjab	0.020	0.91	0.14
Rajasthan	0.040	0.92	0.14
Tamil Nadu	0.070	0.27	0.12
Uttar Pradesh	0.092	0.26	0.12
West Bengal	0.066	0.37	0.12

Table 3: Size of the hidden economy for states of India as a percent of measured net state domestic product.

State	Time period									
	1974/75–1980/81		1981/82–1986/87		1987/88–1991/92		1992/93–1995/96		1974/75–1995/96	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Andhra Pradesh	14.437	2.357	20.235	3.198	22.177	0.711	18.724	2.399	18.557	3.811
Bihar	22.642	2.847	26.623	4.586	25.954	2.520	27.422	1.731	25.350	3.573
Gujarat	16.278	2.574	20.957	2.589	25.160	4.481	21.011	1.493	20.433	4.341
Haryana	9.308	2.664	15.937	2.397	21.114	1.014	28.400	4.836	17.148	7.503
Karnataka	16.419	3.537	22.150	3.363	22.965	1.809	19.739	1.063	20.073	3.840
Kerala	15.638	1.958	19.917	2.563	21.788	0.812	22.531	1.236	19.456	3.319
Madhya Pradesh	22.071	6.700	25.687	1.744	24.708	2.997	23.038	2.630	23.832	4.309
Maharashtra	17.047	1.168	22.284	1.566	23.181	0.838	23.392	1.881	21.023	3.084
Orissa	9.971	2.825	15.107	4.865	24.019	2.474	29.715	1.490	18.154	8.247
Punjab	15.286	1.806	20.419	1.760	24.808	1.694	27.598	0.714	21.088	5.001
Rajasthan	17.003	3.823	19.862	3.425	24.586	2.800	31.584	6.052	22.157	6.510
Tamil Nadu	15.839	1.526	21.430	1.086	23.119	2.489	22.268	1.604	20.187	3.479
Uttar Pradesh	11.285	1.047	14.395	1.884	21.625	1.941	27.016	1.531	17.343	6.254
West Bengal	16.907	2.428	16.012	3.951	22.103	2.517	29.812	3.232	20.190	5.931
Average (all 14)	15.724	4.628	20.041	4.552	23.379	2.545	25.161	4.642	20.357	5.555
India	17.060	1.128	20.377	0.926	22.475	0.428	23.399	0.310	20.348	2.659

Table 4: Growth in size of the hidden economy for states of India

State	Pre-liberalization (1975/76–1991/92)		Post-liberalization (1992/93–1995/96)	
	Mean	S.D.	Mean	S.D.
Andhra Pradesh	0.049	0.099	−0.067	0.059
Bihar	0.046	0.199	−0.014	0.070
Gujarat	0.047	0.202	−0.068	0.139
Haryana	0.079	0.313	0.122	0.123
Karnataka	0.056	0.156	−0.040	0.075
Kerala	0.025	0.094	0.036	0.027
Madhya Pradesh	0.047	0.185	0.007	0.186
Maharashtra	0.026	0.054	0.018	0.101
Orissa	0.163	0.508	0.019	0.059
Punjab	0.045	0.097	0.013	0.014
Rajasthan	0.049	0.202	0.117	0.105
Tamil Nadu	0.041	0.078	−0.051	0.077
Uttar Pradesh	0.058	0.076	0.056	0.067
West Bengal	0.056	0.259	0.090	0.085
All 14	0.056	0.211	0.017	0.103
India	0.024	0.010	0.016	0.027

Table 5: Regression results: growth in the size of the hidden economy

	(1)	(2)	(3)	(4)
Lagged value of hidden economy	−0.480 (−10.11)***	−0.504 (−11.40)***	−0.498 (−10.97)***	−0.505 (−11.33)***
Scheduled election dummy	−0.052 (−4.72)***	−0.049 (−5.87)***	−0.047 (−5.59)***	−0.046 (−5.45)***
Trend	0.016 (6.13)***	0.009 (3.36)***	0.009 (3.47)***	0.009 (3.47)***
Coalition government	−0.028 (−2.61)***	−0.031 (−3.60)***	−0.029 (−3.23)***	−0.030 (−3.25)***
Match dummy	0.004 (0.43)	0.016 (2.13)**	0.016 (2.15)**	0.017 (2.21)**
Ideology	−0.024 (−0.92)	−0.054 (−2.34)**	−0.060 (−2.46)**	−0.052 (−2.28)**
Liberalization dummy	−0.038 (−2.94)***	−0.023 (−1.99)**	−0.025 (−2.29)**	−0.044 (−4.57)***
Contribution of the primary sector	−	−1.072 (−7.13)***	−1.036 (−6.94)***	−1.052 (−6.85)***
Proportion of rural population	−	0.443 (0.93)	0.584 (1.26)	0.504 (1.08)
Growth in per capita total newspaper circulation	−	−	−0.035 (−1.92)*	−
Growth in per capita vernacular newspaper circulation	−	−	−	−0.011 (−1.42)
Growth in literacy rates	−	−	−0.812 (−0.84)	−0.910 (−0.85)
Constant	1.328 (10.58)***	1.561 (4.16)***	1.443 (3.96)***	1.526 (4.12)***
State dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Observations	294	294	294	294

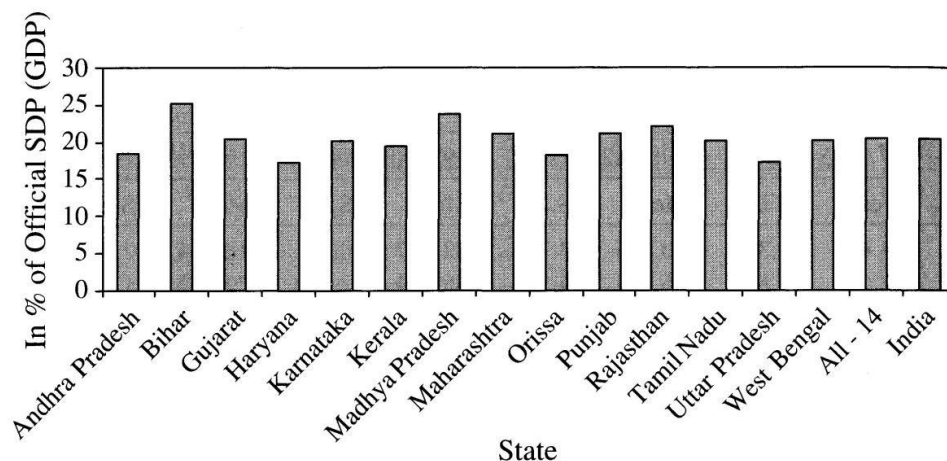
Numbers in parentheses are the calculated Z-statistics.

*Denotes significance at the 10% level.

**Denotes significance at the 5% level.

***Denotes significance at the 1% level.

Figure 1: Average size (1974/75-1995/96) of the hidden economy of 14 Indian states



Appendix A: Size of the hidden economy for some Asian countries (percent of official GDP in 1994/95)

Country	Rank	Size of the shadow economy in percent of GDP
Bangladesh	6	30.2
China (only free economic zones)	15	10.2
Hong Kong	12	15.3
India	9	20.3
Indonesia	11	15.4
Japan	14	10.6
Korea (South)	8	22.4
Malaysia	7	28.3
Nepal	4	33.4
Pakistan	5	31.4
Philippines	2	38.4
Singapore	13	11.2
Sri Lanka	3	35.3
Taiwan	10	17.4
Thailand	1	48.3
Unweighted average of the 15 countries		24.5