

# Liberalization and Tax Amnesty in a Developing Economy\*

by

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## Abstract

We show that tax evaders can respond to a tax amnesty, even if enforcement activities do not change, if it is timed to coincide with liberalization and rising incomes. The success of the amnesty, in terms of its effect on tax revenue and welfare, depends on the distribution of the gains from liberalization. Our analysis provides a theoretical justification of the link between successful amnesties and economic liberalization and points to factors that a policy maker should consider for success of future amnesties.

Keywords: liberalization, tax amnesty, compliance, enforcement, informal sector

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## 1. Introduction

While tax amnesties have been used as a policy tool to increase revenue collection by many governments, they have generated mixed results: some have failed while others have succeeded.<sup>1</sup> Why would a rational individual accept an amnesty and pay past dues? Unless the amnesty is accompanied by an increase in the expected cost of non-compliance (due to greater fines or audits or a combination of both) a delinquent taxpayer should have no incentive to revert to paying taxes. But if the success of an amnesty has to be sustained by increased (and costly) enforcement activities, it somehow defeats the purpose – in so far as an amnesty is to be a cheaper (and more easily manageable) alternative to increasing tax revenues rather than higher levels of enforcement.<sup>2</sup>

Answers to the puzzle of successful tax amnesties have focused on behavioral aspects of the delinquent taxpayer.<sup>3</sup> This paper takes a different and empirically relevant approach. Following the observation that often successful amnesties have taken place in times of transition to prosperity, we provide a theoretical justification of this link. While the empirical connection has to be researched more carefully, we submit that, besides being based on evidence (albeit perhaps anecdotal), our analysis raises the possibility that economic liberalization is an important factor to consider when determining the timing of a tax amnesty. Specifically, we show that an amnesty declared at a time of liberalization and increasing opportunities will generate response, even if enforcement activities remain unchanged, and develop conditions under which the amnesty results in higher tax collection.

There is some evidence that countries with successful amnesties show signs of major observable changes in economic conditions right around their amnesty times. Uchitelle (1989) mentions Ireland (in 1988) and Colombia (in 1988) as cases of successful amnesties – in each case these took place in times of significant growth and trade liberalization. Ireland shows steady growth in terms of GDP during their amnesty time and also big surpluses in their trade balance in the two years before the amnesty.<sup>4</sup> Colombia records rapid growth with imports increasing by 30 percent between 1986 and 1989. Further, Goldberg and Pavcnik (2003 and 2004) point out that Colombia experienced drastic trade liberalization in the late 1980's and early 1990's.<sup>5</sup> The country experienced a drastic reduction in tariff rates between 1984 and 1994 – exactly the time

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<sup>1</sup> European (e.g. Belgium, Denmark, France, Germany, Ireland, Italy, the Netherlands, Norway, Sweden, Switzerland) as well as South American countries (Argentina, Colombia, Ecuador, and Peru among others), India, and the majority of US states have used tax amnesties of some form to increase tax revenue.

<sup>2</sup> Enforcement activities are not only costly, but often ineffective due to the incidence of corrupt enforcers.

<sup>3</sup> For example unanticipated regret (Malik and Schwab; 1991) or risk aversion (Andreoni; 1991).

<sup>4</sup> All Macroeconomic data in this paragraph comes from the International Monetary Fund (IMF), IFS.

<sup>5</sup> Colombia had not participated in the tariff-reducing GATT/WTO rounds prior to the reforms. Because of the exemption in article XVIII of GATT, they used tariffs as one of the primary policy tools.

period in which the amnesty occurred. A similar connection holds for the Indian tax amnesties of 1975 and 1997 that are generally considered to be successful (see Das-Gupta et. al (1995) regarding the 1975 amnesty). From 1975 to 1976 India improved its trade balance from -286 Million to +787 Million US-Dollars, showing a drastic change in economic conditions. 1997 is well known to be a period of liberalization<sup>6</sup>.

The paper shows that a tax amnesty will be successful if timed correctly, but may also generate less revenue than the alternative case of no amnesty. Overall, our analysis indicates that the potential success of a tax amnesty may now be predicted in advance: liberalization, technological improvements or economic prosperity in general may be observed and predicted to a certain degree. This may make tax amnesties a more predictable policy tool for governments.

The following sections analyze the consequences of an unanticipated tax amnesty in a two period model where the detection of various types of tax evaders, represented by their probabilities of detection, remains unchanged. We first establish the benchmark case of tax evasion in the absence of any amnesty, and then demonstrate the relationship between economic prosperity and the success of a tax amnesty. The revenue and welfare implications of the amnesty are derived in later sections. We conclude with a brief discussion of our results.

## 2. Tax Compliance without Amnesty

Consider risk-neutral agents, each with an identical project that has a two period life and yields the net income  $Y$  in each period.<sup>7</sup> An agent is required to register her business with the appropriate Tax Authority (TA) and pay an income tax. We assume, for simplicity, that any tax evasion by a registered project is detected by the TA with probability 1. In other words, registration results in subsequent “visibility” that compels all registered projects to be legal; agents that choose to evade taxes also do not register. The legal or formal sector is the collection of all registered and tax-compliant businesses. The unregistered agents function in the underground or informal sector and are more difficult to trace. Let  $m$  denote the probability of detecting an agent’s present period violations in the informal sector.

Suppose an agent is apprehended for non-compliance in period 2. The investigation may uncover her past period violations (if any). We denote  $\mu$  (where  $0 < \mu < 1$ ) to be the probability of revelation of an agent’s past violation, given her detection in the informal sector in the present period. In a similar vein, we also assume that past violations of a currently legal (and registered)

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<sup>6</sup> see <http://indiabudget.nic.in/es97-98/chap22.pdf> for an overview of the Voluntary Disclosure of Income Scheme (VDIS ‘97).

<sup>7</sup> We avoid incorporating risk aversion, or other psychological/behavioral aspects, such as feelings of guilt, so as not to confuse our analysis with factors that earlier papers have demonstrated to have positive effects on the success of a tax amnesty.

agent may be detected with the same probability  $\mu$ .<sup>8</sup> Since past violations may be easier to detect once an agent is already under inspection (or registered and visible, in terms of her record), it is reasonable to assume that  $\mu > m$ . For ease of exposition, we assume the tax and the fine to be proportional to  $Y$ . If caught, an agent is forced to pay the fine  $fY$  in addition to her outstanding taxes,  $tY$ .

Suppose that an agent has not paid her taxes in period 1. We assume, reasonably, that detection in period 1 implies mandatory registration (and therefore compliance) in period 2.<sup>9</sup> If the agent escapes detection, her expected payoff in period 2 is  $Y - m(1 + \mu)(t + f)Y$  if she avoids paying taxes a second time.<sup>10</sup> If she decides to be compliant in period 2, and moves to the formal sector, her expected payoff is  $(1 - t)Y - \mu(t + f)Y$ .

We make the following assumptions for the rest of the paper:

$$(A.1) \quad m < \frac{t}{(1+\mu)(t+f)}$$

$$(A.2) \quad \mu \geq \frac{t}{t+f}$$

As the appendix demonstrates, (A.1) is both necessary and sufficient to ensure tax evasion as the benchmark case. That this is predominantly the characteristic feature of the informal (or illegal) sector, and that the purpose of the amnesty is to encourage businesses to register and emerge out of the underground economy, is an observable fact abundantly borne out by journalistic and anecdotal observations. As the next section will show, (A.2) is necessary to ensure the acceptability of a tax amnesty in period 2.

**Proposition 1:** *Given (A.1), agents choose to be in the informal sector (or the underground economy) in period 1 and, if undetected, remain informal and non-compliant in period 2. Agents are compliant in period 2 only if detected and compelled to register in period 1.*

Proof: See appendix.

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<sup>8</sup> Thus the joint probability of detection of prior period tax evasion is  $m\mu$  for an informal sector agent. For a formal sector agent, this probability is simply  $\mu$ , since her probability of detection of present offences is 1 (in a sense, the registered agent is always under observation). Assuming a different probability of detection of prior offences for the registered agent does not change the nature of results, and only complicates the algebra.

<sup>9</sup> Relaxing this assumption to one where an agent penalized for period 1 violation, can become incognito in period 2, and thus able to violate again, makes no difference to our analysis other than complicating the algebra presented in the appendix. Also see footnote 14 in this context.

<sup>10</sup> With probability  $m$  she is penalized for her present violations;  $m\mu$  is the joint probability of detection of her past violations.

### 3. Tax Amnesty in Times of Prosperity

Suppose that an agent's income increases to  $Y + \theta$  at the beginning of period 2 due to the positive effects of liberalization, and that, simultaneously, the regulator declares an amnesty. Agents who take the amnesty only need to pay outstanding taxes, and register their business in period 2. We further suppose that benefits from liberalization are available only in the formal or legal sector of the economy. Such an assumption is quite reasonable. The import and purchase of new and productive technology, or access to improved infrastructure may only be possible through legal and visible channels; foreign direct investments may not want to operate in the informal sector because of contract enforceability problems. The increment  $\theta$ , as well as the amnesty, is assumed to be completely unanticipated (or unexpected) in period 1.<sup>11</sup>

It is easy to see that, in the absence of non-linearities, partial compliance is never optimal in our model: the agent will either pay no taxes at all or pay them in full. With complete lack of anticipation of either the increase in income, or the amnesty, the agent's period 1 decision is the same as before, i.e. she decides not to pay taxes. Her optimal decision in period 2 depends on the relative magnitudes of three alternative payoffs:

Accepting the amnesty earns

$$(1 - t)(Y + \theta) - tY \quad (1)$$

If the agent remains in the informal sector in period 2, her expected income is

$$Y - m(1 + \mu)(t + f)Y \quad (2)$$

The agent, however, may decide to move to the formal sector without accepting the amnesty. In this case, she earns  $Y + \theta$  in period 2 but does not declare and pay back her period 1 taxes. Then, given  $\mu$ , the probability of discovery of her past tax evasion, she earns

$$(1 - t)(Y + \theta) - \mu(t + f)Y \quad (3)$$

Comparing (1) to (3) we see that (A.2) implies that accepting the amnesty is superior to moving to the legal sector without making use of the amnesty offer. A comparison of (1) and (2) then reveals that it is strictly optimal to accept the amnesty if  $\theta > \theta_I$ , where

$$\theta_I = Y \frac{2t - m(1 + \mu)(t + f)}{1 - t}. \quad (5)^{12}$$

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<sup>11</sup> Our results are robust to assuming that, in period 1, an agent expects a period 2 increment of  $\theta$  with probability  $p$ . The additional algebra that verifies this is available upon request from the authors.

<sup>12</sup>  $\theta_I > 0$  as  $2t > m(1 + \mu)(t + f)$  given (A.1).

Thus, the availability of new and enhanced opportunities in the formal sector must be significant enough to make a tax amnesty viable. (Note that, for this outcome to hold, the probability of detection of past violations, at least in the formal sector, should be “sufficiently high”. However, the detection probabilities need not be high enough to ensure compliance in the absence of amnesty, as is the case in our model).

**Proposition 2:** *Given (A.2), an unanticipated tax amnesty, declared at a time of liberalization and rising productivity, is successful only if liberalization has a positive and significant impact on the income of taxpayers.*<sup>13</sup>

Proof: Follows from the above analysis. //

#### 4. Amnesty and the Tax Authority's Revenue

In the absence of an amnesty, but with the gains from liberalization, the payoff represented by (1) is no longer available to the agent. Comparing (2) and (3), it is easy to show that an agent finds it optimal to move to the formal sector, post liberalization, if  $\theta \geq \theta_2$  where<sup>14</sup>

$$\theta_2 = Y \frac{t+\mu(t+f)-m(1+\mu)(t+f)}{1-t} \quad (6)$$

We henceforth assume that there exist agents who are ‘high-type’ in the sense that they experience a productivity increase of magnitude  $\theta_H$  where  $\theta_H \geq \theta_2$ . The TA's expected revenue from any high-type agent is  $t(Y + \theta) + \mu(t + f)Y$  if no amnesty is offered. Since  $\mu(t + f) \geq t$  by (A.2), comparing the TA's revenue from no amnesty vs. amnesty for the high-type agent shows that

$$t(Y + \theta) + \mu(t + f)Y \geq 2tY + t\theta \quad (7)$$

and declaration of amnesty does not lead to higher revenues.

For the purpose of our analysis, we also assume the existence of two other types of agents. There is a low type, who, with liberalization, experiences a productivity increase of  $\theta_L$ , with  $\theta_1 < \theta_L < \theta_2$ . The remaining type (denoted type 0) is unaffected by liberalization, and

<sup>13</sup> Thus, the absence of liberalization, equivalent to assuming  $\theta = 0$ , implies that a tax amnesty is ineffective.

<sup>14</sup> Note that (A.2) implies that  $\theta_2 > \theta_L$ .

experiences no productivity gain.<sup>15</sup> Let  $n_L$  and  $n_H$  represent the numbers of low- and high-type agents in society, while  $n_0$  represents the number of type 0 agents.

If no amnesty is offered, the low type will find it optimal to remain in the informal sector in period 2, and forego the gains from liberalization. For such an agent, a tax amnesty increases the revenue collected by the TA since:<sup>16</sup>

$$m(1+\mu)(t+f)Y < 2tY + t\theta. \quad (8)$$

The L.H.S. of (8) represents the revenue from fines collected in the absence of the tax amnesty, while the R.H.S. is the revenue generated with an amnesty. The type 0 remains in the informal sector with or without an amnesty.

It is easy to see that the success of a tax amnesty – in terms of revenue for the TA – depends on the proportion of low to high type agents in the population. The TA increases its revenue with an amnesty if and only if

$$\frac{n_L}{n_H} > \frac{\mu(t+f) - t}{t[2 + \frac{\theta_L}{Y}] - m(1+\mu)(t+f)} \quad (9)$$

**Proposition 3:** *From the TA's point of view, an amnesty results in higher revenue only if the proportion of low-type agents (those who benefit moderately from liberalization) is high enough relative to the high-type agents (those who gain substantially from liberalization).*

Proof: See appendix. //

## 5. Tax Amnesty and Welfare

Finally, we examine how an amnesty affects overall welfare. Suppose that the purpose of taxation is investment in public goods, and that a unit of tax revenue results in public goods of net worth  $\gamma (\geq 0)$  to society. In the extreme case when tax revenues do not yield any net benefit, and are only used for redistributive reasons,  $\gamma = 0$ . Then, in period 2, the overall welfare from an amnesty becomes

$$\gamma\{(1-m)[n_L(2tY + t\theta_L) + n_H(2tY + t\theta_H) + n_0m(1+\mu)(t+f)Y] + m[n_L t(Y + \theta_L)$$

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<sup>15</sup> Thus, we assume that  $\theta = 0$  for type 0. Alternatively, we can assume that the type 0 experiences a productivity gain of  $\theta_0$  with liberalization, where  $0 < \theta_0 < \theta_1 < \theta_L < \theta_2 < \theta_H$ , but this leaves our results intact and only complicates the algebra.

<sup>16</sup> (A.1) implies that  $t > m(1+\mu)(t+f)$ .

$$+n_H t(Y + \theta_H) + n_0 tY\} + n_L(Y + \theta_L) + n_H(Y + \theta_H) + n_0 Y \quad (10)$$

Recall that all agents are non-compliant in period 1, and that a proportion  $(1 - m)$  of them proceeds to period 2 without being detected. With liberalization and amnesty, the same proportion of low and high types voluntarily pays their past and present dues to the TA.  $1 - m$  proportion of the type 0 are undetected in period 1, and remain non-compliant in period 2, paying the delinquent taxes and fines only if detected. Thus,  $(1 - m)[n_L(2tY + t\theta_L) + n_H(2tY + t\theta_H) + n_0 m(1 + \mu)(t + f)Y]$  represents the expected revenue collected from those not penalized in period 1. Similarly,  $m[n_L t(Y + \theta_L) + n_H t(Y + \theta_H) + n_0 tY]$  represents the period 2 tax revenue from those apprehended (and subsequently registered in the formal sector) in period 1.

In the case of no amnesty, the low type obtains the gains from liberalization only if it moves to the formal sector. Only a proportion  $m$  of them who have been detected and registered in period 1 will do so. All of the high types relocate to the formal sector in period 2, even at the risk of being detected for past violations. The tax revenue from type 0 is the same as before. Accordingly, the period 2 social welfare, in the absence of an amnesty, is

$$\gamma\{(1 - m)[n_L m(1 + \mu)(t + f)Y + n_H(t(Y + \theta_H) + \mu(t + f)Y) + n_0 m(1 + \mu)(t + f)Y] + m[n_L t(Y + \theta_L) + n_H t(Y + \theta_H) + n_0 tY]\} + n_L(Y + m\theta_L) + n_H(Y + \theta_H) + n_0 Y \quad (11)$$

The period 1 social welfare remains the same with or without an amnesty in the next period, as long as the amnesty is unanticipated. Comparing (10) to (11) reveals that if

$$\frac{n_L}{n_H} > \frac{\gamma[\mu(t + f) - t]}{\gamma[t(2 + \frac{\theta_L}{Y}) - m(1 + \mu)(t + f)] + \frac{\theta_L}{Y}} \quad (12)$$

a tax amnesty increases social welfare. Given (A.1) and (A.2), the R.H.S. of both (9) and (12) are positive, but the former is strictly higher than the latter {Just because it seems more intuitive to me to name 9 before 12}. Thus, condition (12) may be satisfied even when (9) does not hold: a tax amnesty can sometimes be justified on the grounds that it is welfare enhancing, even if it lowers the revenue collected by the TA. An increase in  $\gamma$  increases the R.H.S. of (12), implying that the critical value of relative share of the low type to high type has to be higher for the welfare effect of an amnesty to be positive. Note that the L.H.S. of (12) increases asymptotically towards the L.H.S. of (9), and remains lower than the latter for any finite value of  $\gamma$ .

Note that, if  $\gamma = 0$ , a tax amnesty increases social welfare as long as  $n_L > 0$ , i.e. the population (or mass) of low type agents is strictly positive, however small.

**Proposition 4:** *If tax revenues finance productive expenditures in public goods, a successful tax amnesty can be welfare enhancing even if it does not increase the revenue collected by the TA.*



*Corollary to Proposition 4: If tax revenues are merely used for redistributive purposes, a tax amnesty declared in the time of liberalization and prosperity always increases social welfare as long as some agents in the population take advantage of the amnesty to declare their unpaid taxes and thus move to the formal sector, but would not otherwise become legal despite the new opportunities in the formal economy.*

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The proofs of both the proposition and its corollary follow from the analysis of this section.

## 6. Conclusions

This paper contributes to the literature on tax amnesties in three ways. First, it demonstrates that, even if there are no changes in enforcement intensities, and thus the probability of detection of delinquent taxpayers, an improvement in economic opportunities in the legal (or formal) sector (often as a result of economic liberalization) may result in a tax amnesty inducing voluntary payment of due taxes. Second, it derives a relationship between such an amnesty's impact on tax revenues and the distribution of productivity gains (in the period of liberalization) across the population. Third, it shows that a successful amnesty can be welfare enhancing, even if it has a negative impact on revenue generation.

On a final note, we want to stress that our model does not incorporate behavioral reasons for successful tax amnesties like some previous papers in the literature - such as feelings of unanticipated regret (Malik and Schwab; 1991) or risk aversion (Andreoni; 1991). We demonstrate that the success of a tax amnesty is related to a change in economic conditions, and the distribution of gains from this change. In this sense, our findings provide important implications for the timing of tax amnesties as a policy tool.

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## Appendix

*Proof of proposition 1:* Comparing the payoffs  $Y - m(1 + \mu)(t + f)Y$  and  $(1 - t)Y - \mu(t + f)Y$ , it is easy to see that, if the agent has been undetected in period 1, she will not comply in period 2 if

$$m < 1 - \frac{f}{(1+\mu)(t+f)} \quad (1.A)$$

Next, suppose that the agent is compliant in period 1. In period 2, compliance yields a payoff of  $(1 - t)Y$ , while violation gives  $Y - m(t + f)Y$ . If

$$m < \frac{t}{t+f} \quad (2.A)$$

the agent will be a violator in period 2. Note that the R.H.S. of (1.A) is strictly greater than that of (2.A). Thus, if (2.A) is satisfied, an agent will always be a tax evader in period 2, irrespective of her decisions in period 1.

Suppose that (2) holds. Then, the agent chooses to be non-compliant in period 1 if

$$Y + m[-(t + f)Y + (1 - t)Y] + (1 - m)[Y - m(1 + \mu)(t + f)Y] > (1 - t)Y + Y - m(t + f)Y \quad (3.A)^{17}$$

The L.H.S. of the above inequality represents the expected payoff from non-compliance in period 1. If she is non-compliant, then, with probability  $m$  she will be audited, and is subsequently compliant in period 2. With probability  $(1 - m)$  on the other hand, she avoids detection in period 1, and finds it optimal to remain non-compliant in period 2. It is easy to see that, if

$$m < \frac{t}{(1+\mu)(t+f)} \quad (4.A)$$

both (3.A) and (2.A) are satisfied, and the agent will be a tax evader in period 1, and, if not detected, remains so in period 2. //

*Proof of proposition 3:* A tax amnesty increases the revenue collected from each type L, and lowers the revenue from each type H agent. The revenue from type 0 agents remains unaffected by the amnesty. From an inspection of the period 2 tax revues derived in section 5, for the amnesty and no amnesty cases, it is easy to see that, for an overall increase in revenue to the TA from the amnesty, the following condition must hold:

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<sup>17</sup> If we do not assume that a violator apprehended in period 1 has to be registered and compliant in period 2, given (2.A), the only change in the above proof is that (3.A) changes to

$$Y + m[-(t + f)Y + Y - m(t + f)Y] + (1 - m)[Y - m(1 + \mu)(t + f)Y] > (1 - t)Y + Y - m(t + f)Y$$

It is easy to check that (4.A) is sufficient for satisfaction of the above inequality.

$$n_L[2tY + t\theta_L] + n_H[2tY + t\theta_H] > n_L m(1 + \mu)(t + f)Y + n_H[\mu(t + f)Y + (Y + \theta_H)t] \quad (5.A)$$

which implies that the relative populations of the two types need to satisfy

$$\frac{n_L}{n_H} > \frac{\mu(t+f)-t}{t[2+\frac{\theta_L}{Y}]-m(1+\mu)(t+f)} \quad (6.A)$$

As the above conditions imply, the proportion of low types need to be “appropriately high” for the amnesty to result in higher revenues for the TA. //