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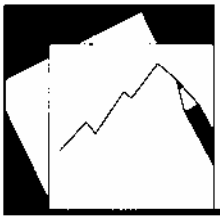

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On the Design and Effectiveness of Targeted Expenditure Programs

Ehtisham Ahmad and Leonardo Martinez

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Fiscal Affairs Department

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Prepared by Ehtisham Ahmad and Leonardo Martinez[1]

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Abstract

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This paper argues that both horizontal and intertemporal competition among recipient governments are needed in order to ensure incentives for effective utilization of targeted transfers. This has implications for budgeting frameworks and the types of information needed that might be amenable to formal contracting between the levels of government.

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Author(s) E-Mail Address: eahmad@imf.org; leonardo.martinez@rich.frb.org

[1] Mr. Ahmad is with the Fiscal Affairs Department (FAD) of the IMF, and Mr. Martinez is Economist with the Research Department of the Federal Reserve Bank of Richmond.

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I. INTRODUCTION

Two issues determine the effectiveness of subnational service delivery: which services to decentralize, for example, health care or education (Seabright, 1996), and what mechanisms provide subnational governments incentives to meet central government objectives efficiently in the provision of those services.[2] This paper focuses on the second issue, in particular, it examines the design of targeted expenditure programs financed by the central government but implemented by the local governments. The latter typically have incentives to divert central transfers to meet their own objectives. This special-purpose transfer problem is addressed routinely in most large or multilevel countries, for example to ensure minimum standards in education (number of years of schooling) with minimum diversion of funding, and without setting up unfunded mandates.[3]

Formally, this paper examines donor-recipient relationships, a special form of a wider class of principal-agent problems, in which programs are financed by the donor (central government) and executed by recipients (subnational governments).[4] The objectives of the donors and the recipients are likely to be different—recipients may value the output of the program less than the donors. Thus, recipients may prefer to allocate the funds to other uses, or may be unwilling to exert effort to implement the program.

Svensson (2003) suggests that the central government's ineffectiveness in providing incentives to improve the performance of targeted expenditure programs may be the consequence of a time-consistency problem. A typical response is for the central government to make future transfers conditional to policy reforms ("conditionality") or past performance. However, in practice funds distributed by the central government are often independent of the past success of the program. In many cases, there is an incentive for the central government to continue to give transfers for the program because of incomplete information and because funds that are not distributed would lapse.

A policy option examined in this paper is to increase the effectiveness of targeted expenditure programs by introducing competition among local governments in different districts and across time.[5] This formulation allows the central government to distribute all the available transfers and is shown to solve the time-consistency problem described before. The funds local

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[2] Ahmad, Tandberg, and Zhang (2002) present a formal discussion of the second issue.

[3] For example, Ahmad, Keping, Richardson, and Singh (2002) discuss the case of China.

[4] A similar problem exists when an international agency or donor country provides financing for special purposes to be implemented in a recipient country.

[5] Formally, the contribution of this paper is in the introduction of "intertemporal competition." Svensson (2003) introduces "Regional competition." It is shown that, even in the presence of regional competition, intertemporal competition is important. Moreover, when regional competition is not possible, intertemporal competition can help the central government to improve the performance of targeted expenditure programs.

governments will receive depend implicitly on the central government's confidence in their effectiveness.[6] Therefore, even without explicit contracts, a local government may be induced to consider the central government's interests when deciding on its own actions. This is because if a local government appears to be more effective in delivering services, this would increase its likelihood of receiving more transfers in the future.

A stylized three-period model is presented in Section II. At the beginning of each period, the central government decides the funds available (subject to budget constraints) for the targeted expenditure program in each district based on its confidence in the local governments' effectiveness. The central government lacks the ability to monitor directly the allocation of received transfers by the recipient government. Knowing this, a local government has discretion on how much of these funds to use for the targeted expenditure program, diverting the rest to other uses that may be more attractive to it (or to the officials in charge). The output of the targeted expenditure program is a function of both the local government's effectiveness and the funds it assigns to the program. Only a local government observes the funds used for the targeted expenditure program in its district. However, outputs[7] are more easily observable, e.g., by third parties, and this permits both levels of government to update their beliefs about the local governments' effectiveness in local service delivery.

A benchmark variation illustrates the model with no competition among subnational governments for central transfers. The central government has a separate budget for each district and for each period; that is, the central government cannot use funds assigned to one district in another district or funds assigned to one period in another period. It is easy to show that funds distributed by the central government are independent of the success of the program, even if the central government would like to make future funding conditional on past performance (or reforms). Consequently, officials in the local governments may choose to divert all the funds they can from the program and the program has little chance of success (this is frequently the case according to the empirical aid literature).[8]

In an extension to the model, the central government has a given budget for the program that can be used for any district. In this framework, local governments in different districts compete for the targeted expenditure program funds, introducing "regional competition" to the analysis.[9] However, it is shown that competition among local governments is not enough to reduce the

[6] Implicit incentives are studied in the literature on career concerns following Holmström (1999).

[7] We abstract from the debate on whether outputs should be measured or outcomes—this is an important issue in the discussion of the effectiveness of performance budgeting.

[8] On average, there is no relationship between aid (meaning grants or concessional loans) and growth or aid and alleviation of poverty (see Boone, 1996; Burnside and Dollar, 2000; Collier and Dollar, 1999). On the other hand, Burnside and Dollar (2000) show that aid has a positive impact on growth in countries with sound macroeconomic policies, while Svensson (1999) finds that aid has a positive impact on growth in countries with an institutionalized and well-functioning check on governmental power.

[9] See also Svensson (2003).

incentives that local government officials have to divert resources from the designated program.[10]

We then examine an "intertemporal competition" model in which, during period three, the central government is allowed to redirect all the funds available after period two. It is shown that the funds local governments divert from the program are decreased, as the central government has an opportunity to redirect transfers to local governments with a higher level of competence.

Section III concludes and suggests possible policy extensions.

II. THE MODEL

In order to highlight the incentives generated by intertemporal competition, we use a stylized three-period model, which illustrates a game played by the central government and the local governments in two districts, A and B. Two districts are used for showing the incentives generated by regional competition between local governments. It will be shown that, even in the presence of regional competition, intertemporal competition is important. Moreover, if regional competition is not possible, intertemporal competition can help the central government to improve the performance of targeted expenditure programs.

Within a district, intertemporal competition is important because existing local government officials presently in charge of the program may not remain in office over time. Political leaders face elections, and government officials may be reassigned to different responsibilities. Officials generally prefer the funds to be assigned and/or the program to produce results while they are in charge. For example, officials are likely to build their reputations (and politicians may increase their future reelection probabilities) with the success of the programs. For expositional simplicity, it is assumed here that in each district the local government officials in charge of the program during period one will remain in charge of the program during period two, but and will not be in office during period three.[11]

At the beginning of each period, the central government decides on the funds that will be available for the targeted expenditure program in district j in period t, m_{jt}, subject to a budget constraint (this budget constraint depends on the specific assumptions adopted below).

[10] As shown by Svensson (2003), this is not always the case. In particular, this would not be the case in the framework described here if local governments care about the output of the program (even if there is a conflict of interest with the central government because a local government would prefer not to use all the funds for the program).

[11] It may be more realistic to consider that in each period the incumbent local government official has a positive probability of remaining in charge of the program. Moreover, it would be interesting to consider the case in which this probability is endogenous. However, models of career concerns with endogenous retention probabilities are typically dynamic and this complicates the analysis. In order to highlight the incentives generated by intertemporal competition, the simplest version of the model is presented.

After the central government decides on m_{jt}, a local government may decide either to use all the transfers obtained for the targeted expenditures for the designated program or to divert some of these funds, r_{jt}, for something else. Only the local government j observes r_{jt}. For expositional simplicity, local governments are restricted to use either all funds or a fraction (1-F) of the funds in the program, that is, $r_{jt} \in \{0, F\ m_{jt}\}$.

After the local governments decide on the funds that will be actually used for the program, the output of the targeted expenditure program in each district, g_{jt}, is determined as a function of the local government's effectiveness, h_{jt}, and the funds available for the program, $(m_{jt} - r_{jt})$. In particular, $g_{jt} = (m_{jt} - r_{jt})\ h_{jt}$.

At the outset of the budget cycle we assume that the central and local governments are ignorant of a local government's effectiveness. This construct allows us to consider situations where a local government may be ignorant of its effectiveness when faced with new tasks. This assumption also deepens the understanding of situations in which a local government's success depends not only on an individual official's effectiveness, but on the effectiveness of a group of people working together. A local government's resulting effectiveness is a random variable with a uniform distribution with positive support between zero and one.

The governments do not observe h_{jt} directly, but they do observe g_{jt}. Observing g_{jt} allows them to infer h_{jt} by using the production function and their knowledge about the funds a local government makes available for the program, $(m_{jt} - r_{jt})$. In district j, the local government knows its actions, r_{jt}, and is always able to infer h_{jt} correctly. The central government infers h_{jt} using the incumbent's equilibrium action, r^*_{jt}. Thus, the effectiveness inferred by the central government is given by $h_{jtc} = g_{jt} / (m_{jt} - r^*_{jt})$. This inference would be correct on the equilibrium path, but may be inaccurate, however, if deviations from the equilibrium behavior are analyzed.[12]

The central government's utility in each period depends on the output of the program in each district, g_{At} and g_{Bt}, and it is denoted by $u(g_{At},g_{Bt})$. In particular, $u(g_{At},g_{Bt}) = g_{At}+g_{Bt}$. For expositional simplicity, it is assumed that the discount factor equals one.

A conflict of interest between the central government and the local governments exists because local governments would prefer to use funds for something different from the program, that is, they derive more utility from r_{jt} than from g_{jt}. For simplicity, it is assumed here that a local government derives utility only from r_{jt} and its utility is equal to the funds it diverts from the program.

[12] If a local government diverts from the budget less than what might be the case in equilibrium, the effectiveness inferred by the central government may be higher than one. For evaluating these situations, we assume that if the effectiveness inferred by the central government is higher than one, the central government believes the local government's effectiveness is one (the main results are independent of this assumption).

A pure strategy equilibrium for the framework described here consists of strategies m^*_{j1}, $m^*_{j2}(h_{A1c},h_{B1c})$, m^*_{j3}, r^*_{j1}, r^*_{j2}, and r^*_{j3}, for j = A and j = B, such that each government maximizes its expected utility subject to its budget constraint taking equilibrium actions for itself and other governments as given.

Case 1: A Benchmark without Competition among Local Governments

Let us assume that each period, for each district, the central government has a budget T for the targeted expenditure program, that is, $m_{jt} \leq T$ for all j and for all t. The central government cannot use funds assigned to one district in another district or funds assigned to one period in another period. Undistributed funds lapse.

In this framework, in equilibrium, the central government always gives all available funds to the local governments, and the local governments always divert the maximum possible amount of funds from the program, that is, $m^*_{jt} = T$, $r^*_{jt} = FT$, and $g^*_{jt} = T\ (1\text{-}F)\ h_{jt}$ for all j and for all t. If local governments can extract enough funds from the program (F is high enough), the model predicts that very little will be obtained from the program, as indicated in the empirical literature. This is summarized in the following proposition:

Proposition 1: *Without competition among local governments, $m^*_{jt} = T$, $r^*_{jt} = FT$, and $g^*_{jt} = T\ (1\text{-}F)\ h_{jt}$, and the expected output of the program is $E[g^*_{jt}] = T\ (1\text{-}F)/2$.*

Under this one-period budgeting framework, the central government is unable to effectively make future transfers conditional on current performance (or policy reform). Ex post, the central government threat of reducing future transfers is not credible and would be ineffective.

The framework described here replicates two more facts found in the empirical literature (on foreign aid): success of local programs is more likely to be linked to the extent to which the objectives are part of local priorities, rather than reflecting the donors' conditionality; and special purpose programs seldom seem to influence recipients' decisions.[13]

Case 2: Regional (Horizontal) Competition

Following the model of regional competition, proposed by Svensson (2003), we assume that the central government's budget in each period equals 2T; and that it can decide the way this budget is distributed between the two districts, that is, the funds originally assigned to each of the two districts are combined and the new budget constraint becomes $m_{At} + m_{Bt} \leq 2T$.

[13] Foreign aid has not been systematically channeled to countries where programs are more likely to be successful. Collier and Dollar (1999) estimate that if aid is redirected toward poor countries with good policies, more than twice the number of people could be lifted out of poverty for the same aggregate level of foreign aid. Conditionality (making aid conditional on reforms) appears not to be working. Collier (1997) and Dollar and Svensson (1998) conclude that aid does not seem to influence policy.

This is a three-period model and the local government officials are different in periods two and three. Therefore, local government officials during periods two and three are in the last period of their relationship with the central government and have no incentives to support the central government's interests. Consequently, the incentives to divert reduce to the r_{jt} identified in period one.

Of course, the central government would benefit from a longer relationship with the local governments and would not want to face "last-period problems." In analyzing a framework with more periods, one would find that the r_{jt} can decrease in every period in which the local officials have a positive probability of staying in charge of the program.

The outcome of the program is also expected to improve in period two because the central government assigns the entire period-two budget to the more effective of the local governments. Moreover, if local officials have a positive probability of staying in charge of the program in every period, the expected effectiveness of the local government that will receive funds from the central government (and, therefore, the expected output of the program) increases in every period but the first period.

Let us assume that, if the expected effectiveness of the local governments in districts A and B is the same, the central government assigns the same transfers to each district, that is, each district receives T. This is the case in periods one and three, when local government officials of unknown effectiveness are in charge of the respective local programs. Therefore, $m^*_{j1} = m^*_{j3} =$ T for all j. It is also known that, as previously explained, $r^*_{j2} = Fm_{j2}$ and $r^*_{j3} = FT$ for all j.

In this framework, the incentives from regional competition appear because at the beginning of period two the central government decides which district will receive all the available funds (2T), by comparing its beliefs about the effectiveness of the local governments. Thus, $m^*_{A2} =$ 2T if the central government believes the local government in A is more effective; $m^*_{A2} =$ T if the central government believes local governments in the two districts have the same effectiveness; and $m^*_{A2} = 0$ if the central government believes the local government in B is more effective. In general, $m^*_{B2} = 2T - m^*_{A2}$.

A local government may want to decrease the funds it diverts from the program in period one in order to appear more effective, and thus receive more from the central government in the future.

This discussion is summarized in the following proposition:

Proposition 2: *For any district j: $m^*_{j1} = m^*_{j3} = T$. $r^*_{j2} = Fm_{j2}$ and $r^*_{j3} = FT$. $m^*_{A2} = 2T$ if the central government believes the local government in A is more effective, $m^*_{A2} = T$ if the central government believes local governments in the two districts have the same effectiveness, and $m^*_{A2} = 0$ if the central government believes the local government in B is more effective. $m^*_{B2} = 2T - m^*_{A2}$.*

On the other hand, the incentives generated by regional competition are not sufficient to induce local governments to fully utilize all the available transfers in the program.

Proposition 3: *$r^*_{A1} = 0$ and $r^*_{B1} = 0$ cannot be part of the equilibrium with regional competition.*

Proof: *Let us suppose $r^*_{A1} = 0$. The expected utility of the local government at A if it diverts zero in period one equals the equilibrium probability of its being more efficient than the other local government (1/2) multiplied by its period-two utility in this case (2FT). Thus, its expected utility equals FT.*

Moreover, if the local government A decides to divert FT in the first period, with a positive probability ($P[h_{A1}(1-F) > h_{B1}]$) the central government thinks that it is more effective than the local government B, then the local government A would receive 2FT in period two.

Therefore, the expected utility of the local government A is higher if $r_{A1} = FT$ than if $r_{A1} = 0$, and r^*_{A1} is different from zero in equilibrium. The same holds for $r^*_{B1} = 0$.

The reasoning behind this result is simple. Diverting zero in period one in order to have a 50 percent probability of receiving in period two twice as much as in period one is not good for a local government. This is the case because even if the local government decides to divert all the available transfers from the program in period one, it may still be possible for this local government to receive funds in period two.

Moreover, the next proposition shows that $r^*_{j1} = FT$ and regional competition does not reduce r^*_{j1}.

Proposition 4: *In the unique pure strategy equilibrium with regional competition $r^*_{j1} = FT$.*

Proof: *Let us suppose $r^*_{j1} = FT$. If $r_{j1} = FT$, the expected utility for local government j equals 2FT (FT in period one plus a 50 percent probability of having 2FT in period two). This local government cannot improve by choosing $r_{j1} = 0$ (the probability of getting 2FT in period two is less than one). Asymmetric equilibria where one of the local governments chooses $r_{j1} = 0$ do not exist by Proposition 3.*

Case 3: Intertemporal Competition

In this section, in period two, the central government has a 4T budget and can decide to give any fraction of this budget either to district A or B in either period two or three, that is, the funds that were originally assigned to periods two and three can now be distributed between these two periods in any way.

This introduces intertemporal competition between the local governments in period one (and two) and the local governments in period three. **The incentives generated by intertemporal competition complement the incentives from regional competition.** In particular, it is now possible to have $r_{j1} = 0$ in equilibrium (something that was not possible only with regional competition). Moreover, in many situations where the central government is not indifferent among helping different local governments the mechanism proposed here is crucial for the

success of these programs (for example, the central government may choose to provide transfers to only one particular local government).

In order to ensure continuing receipt of funds from the central government in period two, a local government needs to convince the central government that it is more effective than the other local government, and more effective than an average local government (otherwise the central government may wait to give the funds to a third local government next period).

The next proposition shows that, with intertemporal competition, there are situations in which $r^*_{j1} = 0$, that is, the mechanism proposed helps reduce the funds that are diverted from the program, even in the presence of regional competition.

Proposition 5: *Let us assume that $F>(1-1/3^{.5})$. Then, there is a pure-strategy equilibrium in which $r^*_{A1} = r^*_{B1} = 0$.*

Proof: *Let us suppose that $r^*_{j1} = 0$. If $r_{j1} = 0$, the expected utility of incumbent in jurisdiction j equals the probability that j will receive funds in the next period (3/8) multiplied by its period-two utility in this case (4FT). Thus, its expected utility equals 3FT/2.*

If $r_{j1} = FT$, local government j receives 4FT in period two with probability $P[h_{A1} (1-F)>h_{B1}$ and $h_{A1} (1-F)>1/2] = 3(1-F)^2/8$. Thus, its expected utility equals $FT [1 + 3(1-F)^2/2]$. Therefore, this is not a profitable deviation if $F>(1-1/3^{.5})$.

On the other hand, the equilibrium described in the proposition above is not a unique pure strategy equilibrium. The next proposition shows that there is another pure strategy equilibrium such that $r^*_{A1}= r^*_{B1} = FT$.

Proposition 6: *There is a pure-strategy equilibrium in which $r^*_{j1} = FT$.*

Proof: *Let us suppose that $r^*_{j1} = FT$. If $r_{j1} = FT$, the expected utility of incumbent j equals the probability that it will receive the funds next period (3/8) multiplied by its period-two utility in this case (4FT), plus the funds it takes in the first period (FT). Thus, its expected utility equals 4.5 FT. Therefore, $r_{j1} = 0$ can never be a profitable deviation and this is an equilibrium (the expected utility would be less than 4FT with $r_{j1} = 0$).*

In a model with more periods, there would be a larger set of parameter values such that the equilibrium with $r^*_{j1} = 0$ can be sustained and a smaller set of parameter values such that the equilibrium with $r^*_{j1} = FT$ can be sustained. This is the case because a local government's benefits from being believed to be more effective are higher if it can participate in the program longer, and/or the central government can combine funds from more periods. Moreover, an equilibrium with $r^*_{j1} < FT$ is likely to be the outcome in a model where local governments can choose r_{j1} from a continuum.

III. POLICY EXTENSIONS: THE BUDGETING FRAMEWORK

This paper focuses on commonly-faced difficulties in the design of targeted expenditure programs with central government financing and local government implementation, but where the local officials may not completely share the objectives of the center. As suggested by the model in Section II, the ineffectiveness of such programs may be the consequence of a time-consistency problem.

The central government would generally like to make transfers conditional on policy reforms or past performance, but the structure of the budget process or design of information flows may not make this feasible. This is typically the case with single-period budget frameworks common to many developing countries, where undistributed funds are not available for future transfers.

While horizontal competition helps, it is not sufficient to eliminate incentives to divert central funds. One of the implications of the model above is that a **multi-year budget framework,** including multi-year appropriations, would greatly facilitate the achievement of central government objectives, since this permits the introduction of intertemporal competition across lower level jurisdictions.

Intertemporal budgeting and transfer frameworks are needed to improve the performance of targeted programs because local governments (policymakers facing elections or bureaucrats who may be assigned to other positions) build reputations around the success of the programs while they are in charge. For the mechanism proposed here to work the central government does not need to be able to transfer funds across distant periods. It is sufficient that local officials prefer to receive the funds in an earlier period.

The model proposed here may appear to condone central government manipulation of the funding of targeted expenditure programs in order to obtain political advantages. This problem is avoided easily with a contract establishing the local government performance for the funds received. For example, in the simple framework developed here, this contract might establish that a local government would receive funds in the second period if and only if in the first period the program in this district would produce better results than in the competing district and the local government performs better than an average local government.

Thus, a second implication of the model is that it would be helpful to be able to draw up **actionable contracts** between the center and the local governments. Given that the allocation of inputs is not easily observable, as far as possible the contracts should be able to specify identifiable outputs (even if the outcomes may not be simple to specify or monitor in many developing countries). Thus, if the transfer is designed to provide education to children until age 12, information systems could be established to monitor absenteeism, or children excluded from school—more sophisticated monitoring of outcomes, including the quality of education would eventually become possible given the improved information systems that might evolve from the simpler formulations that might be needed in most developing countries.

IV. CONCLUSIONS

This paper focuses on the design of special purpose transfer systems that might make it less likely that central funds would be diverted by local officials. While regional competition helps, it is seen not to be sufficient to prevent a diversion of funds. The paper further shows that, even in the presence of regional competition, intertemporal competition is important. Moreover, when regional competition is not possible, intertemporal competition can help the central government to improve the performance of targeted expenditure programs.

In order to make the model operational, it appears that a multi-year budget framework would be desirable. It would also be helpful to be able to draw up simple and actionable contracts between the center and the local government.

In order to highlight the incentives generated by the mechanism proposed in the paper, we use a highly stylized three-period model. A number of extensions of the framework presented here are possible. These extensions would deepen the understanding of the implicit incentives deriving from the mechanisms proposed in the paper. Understanding these implicit incentives is crucial for the design of contracts (explicit incentives) in situations where the local governments can commit to these contracts. For example, it would be interesting to analyze a framework with more periods where the reelection probabilities are different from zero and may be affected by the success of the program. In such a framework, considering a local government's reputation is crucial for understanding its implicit incentives and design optimal contracts when relevant.

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