DO ECONOMIC DEVELOPMENT INCENTIVES CROWD OUT PUBLIC EXPENDITURES IN U.S. STATES?

Jia Wang

Abstract: This paper sets out to investigate whether incentives spending crowds out public spending in U.S. states. Using data from an evolving national database, this paper employs a two-way fixed effect panel framework and GMM approach to account for the dynamic features associated with public expenditures. Potential endogeneity of policy variables and problems with unbalanced panels are also considered. Estimation results indicate that incentives expenditures are significantly and negatively associated with public expenditures, particularly for some productive public goods. Findings of this paper carry practical importance for policymakers concerning the efficacy of incentives.

Keywords: economic development incentives, public goods provision, state and local governments

JEL Codes: H41, H71, H72

I. INTRODUCTION

"Economic development incentives waste a lot of money on a microscopic fraction of employees and states should focus on investing in infrastructure and education that benefit everyone, rather than showering big companies with dollars."— Greg LeRoy[1]

Economic development incentives, including tax instruments such as property tax abatements, sales tax exemptions, corporate income tax credits and tax increment financing as well as non-tax incentives such as business grants and loans, are prominent in the state and local

[1] Greg LeRoy, head of Good Jobs First, an economic development watchdog group, who was concerned about extensive offers of incentives to companies. "Sweet land of subsidy": http://www.economist.com/news/united-states/21576669-downturn-has-forced-states-be-savvier-and-more-careful-about-providing-tax.

Jia Wang: Department of Economics, University of Oklahoma, Norman, OK USA <jiawang@ou.edu>

fiscal landscape in the United States. According to the New York Times, state and local governments offer more than $80 billion in incentives each year. Recipients range from oil and gas companies, technology and entertainment companies to banks and big-box retail chains. Some 5,000 companies have received more than $1 million in recent years. Notably, these incentive offers account for a substantial portion of the overall spending in many communities.

The worry that economic development incentives may crowd out resources for productive public goods such as education and infrastructure is not new (Bartik, 1994; Burstein and Rolnick, 1995; Wilson, 1999; Gorin, 2008; Kenyon, Langley, and Paquin, 2012). In 2011 alone, states cut public services and raised taxes by a collective $156 billion according to the Center on Budget and Policy Priorities. Despite an extensive literature on economic development incentives, however, few studies focus on this aspect. Two notable exceptions are Greenstone and Moretti (2003) and Patrick (2012), both of which examine the effects on county finances following the opening of a large plant ("Million Dollar Plant"). This paper extends the literature by examining the effect of economic development incentives on the provision of public goods at the state level.

This paper contributes to the literature in a number of important ways. First, given the widespread use of economic development incentives, it is of paramount importance that policymakers have a better understanding of the costs of such policies. The opportunity costs in terms of forgone public goods and services have been demonstrated to play an important role in the state's economic growth (Helms, 1985; Mofidi and Stone, 1990; Fisher, 1997). Second, this study is aggregated at the state level. Previous literature has pointed out that the fiscal impacts of incentives at the state level are likely to be different from those at the local level (Peters and

Fisher, 2004). Notably, incentives are more likely to be revenue positive at the local level.[2] It is important to analyze the effectiveness of incentives at the state level, because state governments have offered most of the tax incentives since the Tax Reform Act of 1986 (Luger and Bae, 2005). Third, by exploiting an evolving national database on incentives, I am able to explore the aforementioned question using panel data across U.S. states. My research, therefore, provides more generalizable results in contrast to previous literature which focuses on evaluating particular incentives or incentive programs in a single geographic area.

This paper empirically examines the relationship between incentives use and public expenditures using panel data for U.S. states from 1984 to 2008. Specifically, a two-way fixed effects dynamic panel data model is employed. The Arellano and Bond (1991) GMM approach is used to control for potential issues associated with public expenditures being dynamically correlated with its lagged value. I also use a forward orthogonal deviation to transform the data for GMM estimation to mitigate the problem of magnified gaps in an unbalanced panel associated with traditional first-differenced GMM estimator. Following convention, the empirical model includes lags of incentives to account for lagged effects of incentives expenditures.

The GMM estimation results indicate that economic development incentives have a lagged effect on public expenditures. A dollar increase in incentives spending is associated with a $0.186 decrease in direct expenditures two years later. There is also evidence of decreases in expenditures on some categorized productive public goods. At the same time, however, incentives are associated with increases in higher education expenditures. Overall, results of this paper substantiate the concern that economic development incentives lead to crowding out of

[2] Peters and Fisher (2004) point out that incentives are more likely to influence the location of investment among closely matched local areas (such as neighboring cities) than among states. When factor and non-tax transaction costs are more similar, differences in taxation become more important. Elasticity estimates of the impact of local tax differentials on growth generally support this view.

public goods. Considering the critical role that productive public goods and services play in promoting state economic growth, these results serve as additional warning for policymakers who contemplate using economic development incentives to stimulate economic growth.

The paper proceeds as follows. Section II provides a brief review of previous literature. Section III presents the econometric models which will be used to investigate the effect of incentives expenditures, while Section IV describes the state level panel data used for the estimation. Section V presents an analysis of empirical results. Robustness checks are discussed in Section VI, and some concluding remarks are provided in Section VII.

II. STATUS OF LITERATURE

There is extensive literature examining the efficacy of economic development incentives in attracting business investments, creating jobs and stimulating economic growth. However, no consensus has been reached regarding the effectiveness of such policies (Bartik, 1991; Peters and Fisher, 2004; Patrick, 2014). Advocates of incentives see them as an effective means for growth and claim that incentives can "pay for themselves". They argue that business decisions will be influenced by incentives, leading to job creation and growth. As a result, revenues stemming from the new economic activity will more than cover the incentives granted. They also argue that the costs of incentives will be effectively lower if job creation reduces state's spending on welfare programs. Critics, however, maintain that incentives may actually have little impact on business location decisions, and thus, any increases in economic activity induced by incentives are likely to be small. In addition, even if higher levels of economic activity are achieved, population growth may ensue. The additional strain on crowded public goods like infrastructure, education and other services are likely to prevent the expected growth from happening. Taken as a whole, the literature is not very useful for policymakers in determining, under which circumstance, if any, to offer economic development incentives.

The lack of consensus in existing literature is attributable to differences in data and methodologies. This can be seen most prominently in case studies (Bartik and Erickcek, 2012; Weiner, 2009; Calcagno and Hefner, 2009; Wong and Stiles, 2007; Hoyt, Jepsen and Troske, 2007; Luger and Bae, 2005; Goodman, 2003). The myriad of case studies, however, suffer from lack of generalizability. Such case studies do not inform the use of economic development incentives elsewhere due to idiosyncratic nature of programs, industries, and location specific factors.

Existing state level studies generally find that incentives are positively correlated with state income and job growth (OhUallachain and Satterthwaite, 1992; De Bartolome and Spiegel, 1997; Goss and Phillips, 1997). However, results based on indirect measures of incentives in earlier research may not be very meaningful (Fisher and Peters, 1997).

More recent research exploits more detailed data and more advanced econometrics techniques. Greenstone and Moretti (2003) and Patrick (2012) are prime examples. The former examines the consequences for county-level labor earnings, property values, and public finances of successfully bidding for a plant using runner-up counties (i.e., the 'losers') as a counterfactual for winners. They fail to find any deterioration in local governments' financial position as a result of winning the bid. Patrick (2012) uses a matching strategy to identify the effect on county-level employment, earnings and public finances of million dollar plant openings. She finds that winning counties appear to provide an increased level of public services to their growing populations, but that service improvements are funded by borrowing rather than the creation of a fiscal surplus.

The previous literature largely neglects the issue of how economic development incentives affect the provision of public goods and services. To my best knowledge, no study has explored the question at the state level. This question is important in that if incentives are not effective in influencing business location decisions, then using them would detract from growth by reducing funds available for spending on productive public goods and services.

Bartik (1991), Fisher (1997), and Wasylenko (1997) among others have reviewed how state and local fiscal policy in general affects growth.[3] Using a budget constraint approach, Helms' (1985) seminal paper establishes that economic growth is enhanced if increased revenue through higher taxes is used to fund public goods and services such as education, highways, and public health and safety; while economic growth is retarded if revenue is used to finance transfer payments. The explanation is that benefits from improved public goods and services outweigh the disincentive effects of the associated higher taxes. His findings underscore the importance of considering impacts of a state's expenditures as well as by its taxes. Following Helms (1985), Mofidi and Stone (1990) reach similar findings regarding the effect on investment and manufacturing employment. They suggest that there are tradeoffs in state and local tax and expenditure policies and point out that raising transfer payment at cost of less public investments in education, health, highways and other public infrastructure has adverse consequences.

III. REGRESSION MODEL

A. Baseline Model for Public Expenditures

Following the spirit of Case, Hines and Rosen (1993), the baseline model with all variables in levels is specified as follows:

(1) $y_{it} = \beta_0 + \beta_1 I_{it} + \beta_2 x_{it} + \delta_i + \mu_t + \nu_{it}$,

where Yy_{it} is a category of public expenditures for state i in year t, I_{it} is incentives expenditures, and x_{it} is own state characteristics. The conditioning variables (x_{it}) include intergovernmental transfers (i.e. federal grant or federal intergovernmental revenue), state

[3] Fisher (1997) reviewed the literature on the connection between public services and economic development. Acknowledging the conceptual and measurement challenges inherent in these types of analyses, he concluded that at least "some public services clearly have a positive effect on some measures of economic development in some cases."

personal income, population density, and percentage of young and elder population. Grants and income measure resources available to state and local governments, while population density captures potential congestion effects or economies of scale in the provision of public services. Demographic variables are included to account for the influence of age composition on demand for public services. State and year fixed effects are included to control for time-invariant, state-specific unobserved factors and common shocks associated with national business cycles. This mitigates the concern of biased coefficient estimates associated with omitted variables.

B. Dynamic panel – GMM Estimation

Public expenditures, like many other economic factors, are dynamic in nature: a jurisdiction's spending decision in this period is likely to follow historical patterns besides being influenced by contemporaneous factors. Following Kelejian and Robinson (1993), Redoano (2007), and Zhuang (2013), I include a one year lag of dependent variables in baseline model (1) in order to accommodate the sluggish adjustments in public expenditures over time. Expenditures on public goods and services for state i in year t are then modeled as follows:

(2) $$y_{it} = \beta_0 + \beta_1 y_{it-1} + \beta_2 I_{it} + \beta_3 x_{it} + \delta_i + \mu_t + \nu_{it},$$

Introducing lagged dependent variables, however, brings estimation challenges as illustrated below. To address these concerns, I use the Generalized Method of Moments (GMM) estimator developed by Arellano and Bond (1991). The GMM estimator first differences the model to remove state fixed effects and then estimates the transformed model using lagged levels of dependent variable and endogenous variables, and differences of exogenous variables as instruments. A problem with first-differenced GMM estimator is that it magnifies gaps in data for an unbalanced panel, which is the situation in my case. To mitigate the problem, I adopt "forward orthogonal deviation" to transform my data instead of using first differencing (Roodman, 2009).

1. Estimation Concerns

To see estimation challenges in a dynamic panel as laid out in (2), the model is written in a more generic form below:

(3) $y_{it} = \alpha y_{it-1} + \beta' x_{it} + \varepsilon_{it}$,

$\varepsilon_{it} = \delta_i + \mu_t + \nu_{it}$, for $i = 1, 2, \ldots, N$, $t = 2, \ldots, T$.

Using the lagged dependent variable as a regressor restricts the sample to $t = 2, \ldots, T$. Equation (3) is a two-way fixed effects dynamic panel regression with a lagged dependent variable on the right hand side. Assuming that components of error terms, δ_i and ν_{it}, are independently distributed across i, then the following holds.

(4) $E(\delta_i) = E(\nu_{it}) = E(\delta_i \nu_{it}) = 0$, for $i = 1, 2, \ldots, N$ and $t = 2, 3, \ldots, T$

(5) $E(\nu_{it} \nu_{is}) = 0$, for $i = 1, 2, \ldots, N$ and $t \neq s$.

Several assumptions have been made about the data generating process. First, the process is dynamic, with current realizations of the dependent variable influenced by past ones. Second, there may be arbitrarily distributed fixed individual effects. Third, some regressors may be endogenous or predetermined. Fourth, there may exist heteroskedasticity and serial correlation within individuals but not across them. The econometric specification combined with the characteristic of my panel dataset motivates the GMM estimator.[4]

2. First-Differenced GMM: Arellano and Bond (1991)

Traditional estimators like OLS, 2SLS, or panel fixed effects estimator (FE) cannot get around the endogeneity problem due to the correlation between lagged dependent variable and fixed effect in the error term, which results in the dynamic panel bias (Nickell, 1981; Bond,

[4] My panel has a short time dimension relative to the state dimension ("small T, large N"). If T is large, the correlation between regressor and error term would be insignificant after within group transformation (Roodman, 2009).

2002).[5] Arellano and Bond (1991) proposed taking first differences to get rid of the individual effects and using all the past information in y_{it} as instruments to construct more efficient estimates. Following Arellano and Bond (1991), the first differenced version of (3) is specified as below.

(6) $\Delta y_{it} = \alpha \Delta y_{it-1} + \beta' \Delta x_{it} + \Delta \varepsilon_{it}$,

$\Delta \varepsilon_{it} = (\delta_i - \delta_i) + \Delta \mu_t + \Delta \nu_{it}$, for $i = 1, 2, \ldots, N$ and $t = 2, \ldots, T$,

where the state specific effects are removed by the differencing operation. Assuming away the serial correlation in the error terms $\Delta \varepsilon_{it}$, two year or longer lagged values of y serve as instruments for Δy_{it-1} in the first-differenced system.[6] This implies the following moment conditions.

(7) E $(y_{it-s} \Delta \varepsilon_{it}) = 0$ for $t = 3,4,\ldots,T$ and $s >= 2$.

The GMM estimator uses lagged values of the independent variables as additional instruments. If the explanatory variables are strictly exogenous, then current, past and future values of Δx are valid instruments:

(8) E $(\Delta x_{it-s} \Delta \varepsilon_{it}) = 0$ for $t = 3,4,\ldots,T$ and all s.

However, strict exogeneity rules out any feedback from the idiosyncratic shock at time t to a regressor at time $s > t$. Given the potential endogeneity issue due to reverse causality of some covariates, current and one year lagged explanatory variables may be correlated with error terms.

(9) E $(x_{ir} \varepsilon_{it}) \neq 0$ for $r >= t$.

To address this issue, weak exogeneity of independent variables is assumed.

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[5] Nevertheless, the model has been estimated by OLS and FE for comparison and completeness because a good estimate of true parameter is expected to lie within or near the range of OLS and FE estimates.
[6] This assumption is necessary for instruments to be valid, the tests of which will be detailed in section 4.

(10) E ($x_{ir} \varepsilon_{it}$) = 0 for $r < t$.

Therefore, only a subset of equation (8) can be used as additional moment conditions (Arellano and Bond 1991):

(11) E ($\Delta x_{it-s} \Delta \varepsilon_{it}$) = 0 for $t = 3, 4,\ldots, T$ and $s >= 2$.

3. Forward Orthogonal Deviation Transformation – Adapted to an Unbalanced Panel

First differencing, however, shrinks the data set and amplifies gaps in an unbalanced panel. If y_{it} is missing, for example, then both Δy_{it} and Δy_{it+1} are missing in the first differencing transformed data. This motivates the second common transformation, called "forward orthogonal deviations" or "orthogonal deviations" (Arellano and Bover 1995). In contrast to the first differencing transformation, which subtracts the previous value from the current value, the forward orthogonal deviation transformation subtracts the average of all available future observations from the current value. Thus, the forward orthogonal deviation transformation drops the last observation for each individual. It is computable for all periods except the last period, even in the presence of gaps in the panel. And it minimizes data loss.

Further, lagged observations are valid instruments since they do not enter the formula. A recent simulation study by Hayakawa (2009) shows that the GMM estimator transformed by forward orthogonal deviation tends to work better than the one transformed by first differencing. Given that my panel is unbalanced with gaps, I adopt the forward orthogonal deviation transformation to preserve observations.[7]

Mathematically, the forward orthogonal deviation proceeds as follows. Borrowing notation from Roodman (2009), suppose Z_{it} is a variable, then the forward orthogonal transformation can be written as

[7] For more applied work using forward orthogonal transformation, please refer to Abdul Karim (2010), Dieleman, Graves, and Hanlon (2013), and Baum, Checherita-Westphal and Rother (2013).

(12) $Z^F_{i,t+1} = C_{it}(Z_{it} - \frac{1}{T_{it}} \sum_{s>t} Z_{is})$,

where the sum is taken over the future observations, T_{it} is the number of such (forward) observations, and the scalar factor is such that $C_{it} = \sqrt{T_{it}/(T_{it}+1)}$. One nice property of this transformation is that if Z_{it} are independently distributed before transformation, they remain so afterwards. The choice of C_{it} further assures that if Z_{it} are not only independent but also identically distributed, this property is preserved (Roodman, 2009).

4. Specification Tests for GMM Estimators: AR (1), AR (2) and Sargan Tests

The consistency of the difference GMM estimator depends critically on the validity of the moment conditions listed in (7) – (11) and the lack of second order serial correlation in the error terms. Sargan test is used to examine the validity of selected instruments. The null hypothesis is that the instruments are exogenous as a group. It compares the value given by the minimized GMM criterion function with the critical values from a chi square distribution whose degree of freedom equals the difference between the number of moment conditions and the number of parameters. If the former is smaller, the null cannot be rejected. Accordingly, the larger the p-value of the Sargan statistic is, the stronger the instruments are.

The other important diagnostic is the AR test for autocorrelation of the residuals. The consistency of the GMM estimator relies on the lack of second order serial correlation. By construction, the residuals of the first differenced equation should possess serial correlation. Accordingly, the null is always rejected for AR (1) test. But if the assumption of serial independence in the original errors is warranted, differenced residuals should not exhibit significant AR (2) behavior. A high reported p-value in AR (2) test indicates that the moment conditions are valid due to the lack of second order serial correlation in level residuals. If a significant AR (2) statistic is encountered, the second lags of endogenous variables will not be appropriate instruments for their current values, in which case the researcher has to start with longer lags.

C. Capturing Lagged Effects of Incentives

Lastly, considering incentive packages may not go into effect immediately due to business planning, construction time and moving issues, I include lagged values of incentives expenditures to capture possible delayed effects of incentives. Specifically, the dynamic panel model in (2) is modified as follows:

(13) $Y_{it} = \beta_0 + \beta_1 Y_{it-1} + \beta_2 I_{it} + \beta_3 I_{it-s} + \beta_4 X_{it} + \delta_i + \mu_t + \nu_{it}$, where s =1, 2, or 3.

IV. DATA

A. Measures of Economic Development Incentives

Existing literature establishes that ideal measures for economic development incentives do not exist (Fisher and Peters, 1997; Patrick, 2014). Many studies during the 1980s and 1990s are based on flawed data or use independent variables that failed to adequately reflect how active governments were in offering incentives. Simple counts of incentives programs, for example, can be severely misleading and are a poor measure of a state’s economic development efforts. Programs on a state’s book may be outdated and states may combine or divide programs without changing the generosity of incentives offered (Fisher and Peters, 1997). A state’s economic development agency spending is another flawed measure because development agency funds can be used for noneconomic activities and funding for incentives may not come from a development agency’s budget.[8] Conclusions based on a measure like this are suspectful.

[8] Gorin (2008) provides an excellent example from Oklahoma. Notably, the data source for state economic development agency expenditure, i.e. the website for the National Association of State Development Agencies (NASDA), does not exist anymore.

This paper exploits a new exciting database, Subsidy Tracker, gathered by the non-profit, non-partisan group Good Jobs First, as discussed in the literature (Jansa and Gray, 2014).[9] Their database brings together public records of incentives granted to businesses under a wide variety of state programs and is publicly available online. It includes the actual dollar value of incentives granted, providing a measure of state economic development incentives spending, a measure that was previously elusive.

Subsidy Tracker is the first national search engine for state economic development incentives. It includes 12 broad categories of both tax and non-tax incentive programs (tax credits/rebates, property tax abatements, megadeal, grants/low-cost loans, enterprise zones, tax increment financing, training reimbursements, cost reimbursements, infrastructure assistance, industrial revenue bonds, tax credits/rebates and grants, tax credits/rebates and property tax abatements). Despite extensive efforts to collect data, this database is unlikely to be inclusive of all incentive programs and the granted values, as discussed in the literature (Kenyon, Langley, and Paquin, 2012). Still, it is the most comprehensive database of incentives available.[10]

I downloaded the Subsidy Tracker database (2013.09.10 version). Each observation is a subsidy granted by a state to an individual firm. Due to limited data availability of government finance data, only observations up to 2008 are included. Observations that do not provide a value for the subsidy granted are dropped. Subsidy values are aggregated by state-year.

B. Other Variables

[9] Subsidy Tracker database: http://www.goodjobsfirst.org/subsidy-tracker. For detailed description of incentives types included, please refer to appendix.

[10] Harpel (2014) has a detailed discussion about Subsidy Tracker. http://www.smartincentives.org/blogs/blog/14754093-good-jobs-first-and-subsidy-tracker-2-0.

Following Case, Hines and Rosen (1993), the measure for government expenditures of state *i* in year *t* is the sum of the direct expenditures of state and local governments.[11] I estimate the model using annual data on U.S. states over the period 1984—2008. State and local government finance data were compiled from various issues of Annual Survey of State and Local Government Finances and Census of Governments. All dollar figures are on a per capita basis and deflated using the personal consumption expenditure deflator (using 1982—1984 as the base year). Population, the proportion of population under age 15, and the proportion of population above age 65 are from US Census. Bureau of Economic Analysis (BEA) provides data on personal income as well as Consumer Price Index (CPI). Financial data was matched with demographic information. This study focuses on different categories of public expenditures including administration, corrections, education, health and human services, highways, police and fire protection, sanitation and utilities.[12]

Summary statistics of the variables are shown in Table 1. The dataset contains 378 observations. The descriptive statistics indicate considerable variation in expenditures on economic development incentives and spending on different categories of public goods and services across states. A closer examination of my sample reveals that Alaska in 1990 spent the most on incentives, about $653per capita; while Virginia in 1991 spent the least on incentives, about $0.01 per capita. Of the average annual total state and local expenditures of $3748.86 per capita, about 20 percent is spent on elementary education ($759.32), 20 percent on health and human services ($774.55), 7 percent on highways ($246.78), 6 percent on utilities ($209.82), and 4 percent on police and fire protection ($157.37).

[11] Case, Hines and Rosen (1993) propose using the sum of state and local government expenditure instead of analyzing only state but not local government expenditure. They argue that the latter measure may be more likely to reflect variation in the cross-state assignment of spending responsibilities between state and local governments.

[12] Following Case, Hines and Rosen (1993), expenditures on health and human services are the sum of health and hospital spending and public welfare expenditures.

Following Case, Hines and Rosen (1993) and Redoano (2007) among others, expenditures in various categories of public goods are regressed on a set of control variables, which include total grants, personal income, population density, and the proportion of young and elder population. In addition, up to three lags of incentives expenditures have also been added on the right hand sided to take into account of possible delayed effect, which restricts sample to 27 or 28 states.

V. RESULTS

Table 2 summarizes the regression results of equation (13) with each column representing a specific category of public goods.

OLS, FE and Difference GMM estimation have been performed. As discussed in the literature (Roodman, 2009), the lagged dependent variable was positively correlated with the error, which biases β_1, the coefficient associated with Y_{it-1}, upward for OLS estimation; while the estimates of β_1 is biased downward due to the negative sign in front of the within group transformed error from the fixed effects regression. Therefore, a reliable estimate should lie in between the two values, which serves a useful check. This is exactly the case with my results. The GMM estimates of β_1 lie between the OLS and FE estimates.[13]

Coefficient estimates are generated using a one-step GMM estimator with asymptotic standard errors robust to cross-section and time-series heteroskedasticity shown in parentheses. Bond (2002) states that one-step estimator is usually the focus of applied work rather than a two-step estimator used for GMM estimation due to the downward bias in the computed standard errors in the two-step procedure. Simulation studies have suggested very modest efficiency gains from using the two-step version, even in the presence of considerable heteroskedasticity (Arellano and Bond, 1991; Blundell and Bond, 1998; Blundell et al., 2000). But more

[13] Only GMM results are presented here due to space limitation. OLS and FE results are available upon request.

importantly, the dependence of the two-step matrix on estimated parameters makes the usual asymptotic distribution approximations less reliable for the two-step estimator. For this reason, my estimation uses the robust one-step estimator.[14]

The second lag or more of endogenous variables (lagged public expenditures Y_{it-1}) are selected as instruments while all lags for exogenous variables (grants, personal income, incentives, population density and percentages of old as well as young population) serve as instruments. Sargan test statistics are presented to examine the validity of the instruments. The reported P-values of Sargan test support the validity of selected instruments. In addition, both AR (1) and AR (2) are presented to ensure consistency of the GMM estimator. It can be seen from the reported AR (1) and AR (2) tests that there is no significant autocorrelation in error terms when two year lags are used.

In general, the results indicate that incentives expenditures at the state level do not seem to be contemporaneously correlated with public expenditures. They are instead negatively correlated with direct expenditures after two years, and the relationship is statistically significant at conventional levels. There is also evidence of decreases in expenditures on corrections, elementary education, health and human services, police and fire protection, sanitation and utilities associated with incentives expenditures. Spending on higher education, on the other hand, is found to be positively associated with incentives expenditures. It is worth noting that most of the decreases in spending do not occur until two years later, which seems to indicate that at least in the very short run incentives do not contribute to spending on public goods and services. The coefficients associated with incentives spending are not only statistically significant, but also have potential huge economic effects.

[14] For applied work using the one-step GMM estimator, please refer to Arai, Kinnwall, and Thoursie (2004), Falk (2006) , Huang, Hwang, and Yang (2008), and Yao (2006).etc.

For the average state, one dollar increase in incentives is correlated with $0.186 decrease in direct expenditures two years later. That is a 100 dollar increase in per capita incentives spending is correlated with 18.6 dollar decrease in per capita direct expenditures. Given that the average state spends 20.2 dollars per capita on incentives during sample period, this implies a 3.76 (20.2*0.186) dollars drop in per capita direct expenditures about 0.1% of direct expenditures two years later. Take New Mexico in 2004 as an example. It is one of the states that top our list for incentives expenditures. 557.74 dollars of incentives spending would be associated with 103.74 dollars less per capita spending two years later, accounting for about 2.5% of direct expenditures in 2006 (103.74/4105.73*100=2.5%).

Take health and human services as another example. A dollar increase in per capita incentives is associated with 16 cents of decrease in per capita spending on health and human services two years later. Given that the average state spends 20.2 dollars per capita on incentives during the sample period, this implies a $3.23 (20.2*0.16) drop in per capita health and human services expenditures two years later, about 0.2% of average health and human spending (3.23/774.5*100=0.4%). For New Mexico in 2004, 557.74 dollars of incentives is associated with 89.24 dollars less per capita spending two years later, which about 10% of its spending on health and human services in 2006 (89.24/893*100=10%).

Regarding other control variables, grants are generally positively and significantly correlated with expenditures on different categories of public goods and services. The estimated coefficient on grants for direct expenditures in GMM estimation suggests that, ceteris paribus, states spend roughly half a dollar for each dollar obtained in grants. This is an enormous effect compared with that of state personal income. The phenomenon that state and local governments spend much more out of their grant income than personal income of their residents is called flypaper effect, which has been observed by several researchers. My estimate of this "flypaper effect” is comparable to previous estimates, which range from as small as 0.25 to around unity with most estimates around 0.5 (Hines and Thaler, 1995).

Demographic characteristics can influence the composition of public spending providing they determine the needs and preferences of population for public goods. The inclusion of population density provides information about scale economies and potential congestion effects in the provision of public goods. The estimated coefficients for population density are either insignificant or positive. The latter indicates diseconomies of scale. My results are similar to those of Ermini and Santolini (2010) and Silva, Veiga, and Portela (2011). The proportion of population above 65 is mostly negatively associated with expenditures on public goods, consistent with previous studies (Case, Hines and Rosen, 1993; Redoano, 2007). The effect of the share of young population (under 15) varies with the category of public goods.

Baseline GMM estimation indicates that the share of young population is negatively associated with expenditures on higher education, sanitation and highways, while positively associated with health and human services expenditures. This makes sense as higher education expenditures are devoted to population aged 17 years or above. Additionally, younger people generally live with their parents. Hence a greater percentage of young population implies fewer households, which reduces spending on sanitation and utilities. Similar reasoning applies to highways expenditures: a higher percentage of young people implies fewer drivers on the road, and consequently less need to maintain/expand highways. A larger proportion of young people, however, can be expected to increase expenditures on health and hospitals as well as public welfare. The proportion of young people is also correlated with higher direct expenditures overall.

VI. ROBUSTNESS CHECKS[15]

I investigate a number of alternative estimation to test the robustness of my results. First, to test potential impact of outliers, I limit my sample to the time period after 1990 when data coverage on incentives is more comprehensive. I then perform the same GMM estimation as before. Results are presented in Table 3.

Most coefficients are estimated to have the same signs and similar magnitudes as in the previous estimates (Table 2). The coefficient on one year lag of public expenditure variables remains positive and significant at conventional levels. Total grants are positively associated with public expenditures when significant. Incentives coefficients estimates are qualitatively similar to that of baseline estimation but the magnitude becomes smaller for direct expenditures, which decreases from 0.186 to 0.146. Estimated coefficients on administration and highways expenditures remain insignificant. In corrections estimates, incentives are only associated with decreases in expenditure three years later. The magnitude of the estimated impact of elementary education also becomes bigger, from 0.065 to 0.071. Incentives continue to be positively associated with expenditures on higher education but of smaller magnitudes. Expenditures on police and fire, sanitation, utilities are still negatively associated with incentives expenditures; however, estimated coefficients are smaller. Overall, the results are qualitatively similar except that estimated coefficients on incentives are smaller using the limited sample.

In a second robustness check, I estimate the basic model using difference GMM (DGMM) where incentives are treated as endogenous. Because the extent to which states use incentives might depend on other unobservable factors which influence spending choices, incentives variable I_{it} may be correlated with error term. To deal with this potential endogeneity problem, I

[15] I also estimated alternative model to investigate if the changes in incentives expenditures have an impact on changes in expenditures on public goods. The first differenced model, however, essentially looks at contemporaneous effects of incentives on the provision of public goods. It is, therefore, not surprising that most results are insignificant considering it takes time for incentives to have an impact.

instrument I_{it} with its lags. The results using instruments for I_{it} are presented in Table 4. Compared with the results in Table 2, the estimated negative correlation between incentives and expenditures on public good are strengthened in most cases: not only do coefficients become larger in absolute terms, the significant level also increases. The estimated coefficient for direct expenditures increases in magnitude to 0.193. For police and fire protection, health and human services, sanitation and utilities expenditures, estimated coefficients also become larger and the significance level increases to 5%. Overall, this suggests that the effects of incentives may be underestimated if potential endogeneity is ignored. Estimates on demographic variables are very similar to the baseline estimates except that the percentage of young population is also found to be negatively associated with administration spending: a one percentage increase in young population is associated with about 2.5 dollars decrease in per capita administration spending.

A potential problem with difference GMM is that lagged regressors, particularly the time-invariant explanatory variables, may be poor instruments for the first-differenced model because they are eliminated in the first-differencing operation. This is particularly problematic for regressors that are nearly constant over time because the first differences of these variables are relatively uninformative. This is not a real problem for my estimation; nevertheless, a third robustness check is performed to estimate the baseline model through dynamic system GMM.

The dynamic system GMM estimator was proposed by Blundell and Bond (1998) to address the aforementioned problem with difference GMM by utilizing additional moment conditions which are based on the level equation. Accordingly, variables in the level equation are instrumented with their own first differences. Following Blundell and Bond (1998) the first-differenced GMM is expanded by including the level equation (3) into the system. The lagged differences of dependent variables are then used as instruments in (3).

Table 5 reports system GMM regression results with the incentives expenditure variable treated as exogenous. The results are basically consistent with the baseline estimates in Table 3, where the incentives variable is treated the same way. The only major difference is that the estimated coefficient in front of direct expenditures is much larger, almost doubling from previous estimate, reaching -0.334. And one year lag of incentives now is negatively associated with expenditures on highways. Demographic variables are similar to previous estimates. Table 6 presents the last robustness check, where I estimate the model using system GMM estimator with incentives being treated as endogenous. Again, the results are similar.

VII. CONCLUSION

Economic development incentives are a prominent tool used by state and local governments to attract investment, create jobs and ultimately induce economic growth. Despite sizeable incentives offered, few states have been willing and able to produce meaningful analyses of incentive programs (Pew Center Report, 2012). The prominence of business incentives in debates on public policy and economic development has led to extensive theoretical and empirical research. Most empirical research to date, however, has focused on evaluating the employment and investment/growth effects of a particular incentive program in a single geographic area.

This paper takes a novel approach by investigating whether incentives spending crowds out spending on other public goods and services at the state level. With the benefit of for a national database of state economic development incentives, dynamic panel data analysis is implemented. Estimates using a GMM estimator controlling for the dynamic nature of state spending as well as possible lagged effects of incentives show that public expenditures are negatively associated with incentive use. In particular, the main findings indicate that incentives expenditures are associated with decreases in expenditures on productive public goods such as education, health and human services, sanitation and utilities. Empirical evidence shows that incentives do not seem to contribute to more spending on productive public goods and services after two years in the future. This contradicts the claims that incentives lead to beneficial growth in the economy. Or if growth occurs, it does not lead to expansion of spending on productive public goods and services.

It is worth noting that Subsidy Tracker database by no means provides the ideal measure for economic development incentives; nonetheless, it is the best data available to the author. In times of fiscal stress, it is of paramount importance to understand what states are giving up especially given the close link between public services and economic growth (Helms, 1985; Mofidi and Stone, 1990; Miller and Russek, 1997). Findings of this paper echo the long standing criticism against incentives spending. Burstein and Rolnick (1995) believe that competition for specific businesses in the form of preferential treatment leads to misallocation of private resources and causes state and local governments to provide too few public goods. Fisher and Peters (2004) have echoed this sentiment, and proposed that economic development incentives be discontinued in favor of spending on infrastructure and education. For policymakers who care about long term economic growth, the extensive use of incentives is questionable.

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APPENDIX

12 Incentive Types Tracked in *Good Jobs First, Subsidy Tracker* Database

Tax Credit/Rebate: corporate income tax credits, sales tax exemptions and other programs in which a company's tax obligation is reduced or the firm is rebated taxes previously paid

Property Tax Abatement: most taxes on real property and business personal property are paid at the local level. But some programs in which the state allows companies to reduce their payments for the state and/or local portions of their property tax obligations are also included.

MEGADEAL: Entries on incentives packages worth $75 million or more each that were compiled using a variety of information sources

Grant/Low-Cost Loan: a variety of programs in which corporations are awarded a specific amount of money outright or in connection with meeting job performance or other goals. Also included are a limited number of programs that are technically loans but in many cases are "forgivable," meaning that the company may not have to pay back the money if certain goals are met

Enterprise Zone: programs tied to investment in specific geographic areas that often bundle a variety of state and/or local tax breaks

Tax Increment Financing: subsidies based on the diversion of a portion of property taxes linked to an increase in assessed value associated with redevelopment and sometimes sales taxes

Training Reimbursement: programs that pay for or reimburse companies for the cost of training new or existing workers

Cost Reimbursement: programs, usually involving film production, that reimburse companies for specific expenditures (other than worker training) in the state

Infrastructure Assistance: programs that cover costs such as installation of utilities or building of private roads at a company facility.

Industrial Revenue Bond: low-cost financing based on tax-exempt bonds

Tax Credit/Rebate and Grant: programs that combine tax credits/rebates with grants

Tax Credit/Rebate and Property Tax Abatement: programs that combine income or sales-tax credits or rebates with property tax abatements

Table 1
Summary Statistics (# of observations=378)

Variables	Mean	Std. Dev.	Min	Max
Subsidy Spending ($)	20.20	55.49	0.01	652.70
Grants ($)	673.40	200.00	317.77	1,602.35
Personal Income ($)	17,160.82	2,863.98	10,690.91	26,940.42
Population	6,648,663	6,690,211	547,160	36,600,000
Total State Area (sq.mi)	73,487.70	88,428.92	1,545.05	663,267.30
Population Density (total)	179.13	213.27	0.82	998.83
Under 15 (%)	20.77	1.60	17.02	28.03
Above 65 (%)	12.64	1.91	3.84	18.55
Expenditures:				
Direct Expenditures ($)	3,748.86	863.06	1,933.09	8,505.26
Administration ($)	155.04	55.01	72.17	502.27
Corrections ($)	91.78	30.56	24.71	174.18
Elementary Education ($)	759.32	163.88	370.67	1,339.45
Higher Education ($)	316.20	84.80	155.79	550.21
Health & Human Services ($)	774.55	201.40	335.71	1,558.95
Highways ($)	246.78	87.96	123.21	859.57
Police & Fire ($)	157.37	46.05	64.11	278.78
Sanitation ($)	92.32	27.69	34.86	175.14
Utilities ($)	209.82	143.27	39.58	1,035.49

Sources: Incentives data are from Subsidy Tracker database. Data on demographic characteristics are from Bureau of the Census. Personal Income data are drawn from Bureau of Economic Analysis, and the rest government finance data are from Census historical database.

Notes:

(1) All dollar figures have been converted to real values, deflated by CPI (1982-84=100).
(2) All dollar values are put on a per capita basis.
(3) Population density is in persons per square mile.

Table 2

Baseline Difference GMM Results

	Direct Expenditures	Administration	Corretions	Elementary Edu	Higher Edu	Health & Human	Highways	Police & Fire	Sanitation	Utilities
Control Variables										
Y(t-1)	0.833	0.921	0.690	0.822	0.800	0.822	0.438	0.770	0.671	0.325
	[0.094]***	[0.111]***	[0.059]***	[0.125]***	[0.073]***	[0.196]***	[0.135]***	[0.085]***	[0.105]***	[0.266]
Total Grants	0.520	0.005	-0.004	0.055	-0.003	0.193	0.161	0.007	-0.004	-0.044
	[0.118]***	[0.019]	[0.015]	[0.051]	[0.018]	[0.072]**	[0.055]***	[0.009]	[0.014]	[0.036]
Personal Income	0.016	0.001	0.000	0.007	0.001	-0.005	0.002	-0.001	-0.001	-0.006
	[0.014]	[0.002]	[0.002]	[0.005]	[0.002]	[0.007]	[0.005]	[0.002]	[0.001]	[0.004]*
Incentives	-0.254	0.013	-0.076	0.009	0.047	-0.034	-0.059	-0.016	-0.003	-0.150
	[0.185]	[0.009]	[0.036]**	[0.021]	[0.022]**	[0.099]	[0.036]	[0.008]**	[0.020]	[0.099]
Incentives (t-1)	0.053	0.017	-0.010	0.007	0.044	0.079	-0.016	-0.013	-0.013	-0.032
	[0.157]	[0.020]	[0.008]	[0.038]	[0.015]***	[0.088]	[0.035]	[0.009]	[0.009]	[0.034]
Incentives (t-2)	-0.186	0.002	-0.022	-0.065	0.045	-0.160	0.036	-0.007	-0.029	-0.059
	[0.076]**	[0.007]	[0.009]**	[0.019]***	[0.024]*	[0.074]**	[0.037]	[0.014]	[0.012]**	[0.026]**
Incentives (t-3)			-0.026							0.012
			[0.009]***							[0.069]
Pop_Density	2.872	0.281	0.020	0.711	-0.125	1.442	0.002	0.054	0.125	0.684
	[1.259]**	[0.079]***	[0.077]	[0.571]	[0.136]	[0.541]**	[0.409]	[0.068]	[0.106]	[0.448]
Under 15	20.241	-2.087	-1.192	4.801	-3.043	11.586	-10.585	-0.044	-3.425	-5.722
	[13.598]	[1.819]	[1.852]	[5.722]	[1.562]**	[6.432]*	[6.616]	[1.620]	[1.152]***	[4.003]
Above 65	-36.209	2.603	0.196	-3.365	5.447	7.947	-9.758	-4.129	2.746	8.957
	[21.057]*	[2.384]	[1.505]	[9.024]	[3.650]	[16.940]	[8.944]	[2.903]	[2.868]	[8.706]
No. of Obs.	201	201	170	201	201	201	201	201	201	170
No. of Groups	28	28	27	28	28	28	28	28	28	27
AR(1)	0.001	0.011	0.038	0.026	0.015	0.037	0.041	0.002	0.006	0.037
AR(2)	0.177	0.158	0.101	0.223	0.226	0.454	0.785	0.947	0.715	0.200
Sargan Test	0.287	0.278	0.487	0.519	0.306	0.169	0.405	0.124	0.300	0.310

Notes:

(1) Column variables are categories of public expenditures for state and local government.
(2) All regressions include state and year fixed effects.
(3) Standard errors are in brackets, robust to heteroskedasticity and serial correlation.
(4) Asterisks denote significance at the 1% (***), 5% (**), and 10% (*) levels.

Table 3

Difference GMM (Restricted Sample Period 1991-2008)

	Direct Expenditures	Administration	Corrections	Elementary Edu	Higher Edu	Health & Human	Highways	Police & Fire	Sanitation	Utilities
Control Variables										
Y(t-1)	0.810	0.822	0.669	0.778	0.839	0.775	0.550	0.649	0.678	0.333
	[0.069]***	[0.103]***	[0.051]***	[0.053]***	[0.069]***	[0.115]***	[0.118]***	[0.072]***	[0.085]***	[0.274]
Total Grants	0.541	0.006	-0.006	0.061	-0.004	0.197	0.132	0.016	0.001	-0.043
	[0.104]***	[0.021]	[0.016]	[0.042]	[0.016]	[0.063]***	[0.039]***	[0.011]	[0.011]	[0.035]
Personal Income	0.014	0.001	0.000	0.008*	0.000	-0.007	0.001	-0.001	-0.001	-0.007
	[0.012]	[0.002]	[0.001]	[0.004]	[0.002]	[0.005]	[0.004]	[0.001]	[0.001]	[0.004]*
Incentives	-0.259	0.002	0.010	0.013	0.062	-0.073	-0.084	-0.019	-0.002	-0.141
	[0.177]	[0.010]	[0.019]	[0.022]	[0.035]*	[0.085]	[0.071]	[0.007]***	[0.019]	[0.099]
Incentives (t-1)	0.036	0.012	-0.001	0.012	0.050	0.062	-0.013	-0.016	-0.012	-0.030
	[0.152]	[0.020]	[0.008]	[0.037]	[0.015]***	[0.076]	[0.024]	[0.010]	[0.009]	[0.033]
Incentives (t-2)	-0.193	-0.002	-0.011	-0.060	0.049	-0.169	0.031	-0.009	-0.029	-0.058
	[0.077]**	[0.007]	[0.009]	[0.016]***	[0.027]*	[0.069]**	[0.046]	[0.014]	[0.012]**	[0.026]**
Incentives (t-3)			-0.029							0.011
			[0.009]***							[0.069]
Pop_Density	3.039	0.352	0.037	0.895**	-0.105	1.510	0.016	0.124	0.189	0.705
	[1.111]***	[0.111]***	[0.066]	[0.414]	[0.124]	[0.415]***	[0.357]	[0.080]	[0.163]	[0.441]
Under 15	20.631	-2.537	-1.925	4.324	-2.429	11.073	-8.695	0.248	-3.606	-5.725
	[9.716]**	[1.982]	[1.562]	[4.933]	[1.775]	[4.704]**	[6.265]	[1.507]	[1.311]***	[3.835]
Above 65	-37.754	3.775	0.508	-0.908	4.610	10.505	-10.579	-3.838	4.435	7.879
	[19.499]*	[3.217]	[1.601]	[8.679]	[3.430]	[12.480]	[7.944]	[3.158]	[3.927]	[8.399]
No. of Obs.	201	201	170	201	201	201	201	201	201	170
No. of Groups	28	28	27	28	28	28	28	28	28	27
AR(1)	0.001	0.006	0.028	0.006	0.014	0.018	0.037	0.005	0.004	0.042
AR(2)	0.103	0.17	0.108	0.019	0.253	0.477	0.736	0.853	0.675	0.202
Sargan Test	0.276	0.344	0.251	0.087	0.199	0.178	0.532	0.085	0.430	0.333

Notes:

(1) Column variables are categories of public expenditures for state and local government.
(2) All regressions include state and year fixed effects.
(3) Standard errors are in brackets, robust to heteroskedasticity and serial correlation.
(4) Asterisks denote significance at the 1% (***), 5% (**), and 10% (*) levels.

Table 4

Difference GMM Treating Incentives as Endogenous

	Direct Expenditures	Administration	Corrections	Elementary Edu	Higher Edu	Health & Human	Highways	Police & Fire	Sanitation	Utilities
Control Variables										
Y(t-1)	0.810	0.822	0.669	0.778	0.839	0.775	0.550	0.649	0.678	0.333
	[0.069]***	[0.103]***	[0.051]***	[0.053]***	[0.069]***	[0.115]***	[0.118]***	[0.072]***	[0.085]***	[0.274]
Total Grants	0.541	0.006	-0.006	0.061	-0.004	0.197	0.132	0.016	0.001	-0.043
	[0.104]***	[0.021]	[0.016]	[0.042]	[0.016]	[0.063]***	[0.039]***	[0.011]	[0.011]	[0.035]
Personal Income	0.014	0.001	0.000	0.008*	0.000	-0.007	0.001	-0.001	-0.001	-0.007
	[0.012]	[0.002]	[0.001]	[0.004]	[0.002]	[0.005]	[0.004]	[0.001]	[0.001]	[0.004]*
Incentives	-0.259	0.002	0.010	0.013	0.062	-0.073	-0.084	-0.019	-0.002	-0.141
	[0.177]	[0.010]	[0.019]	[0.022]	[0.035]*	[0.085]	[0.071]	[0.007]***	[0.019]	[0.099]
Incentives (t-1)	0.036	0.012	-0.001	0.012	0.050	0.062	-0.013	-0.016	-0.012	-0.030
	[0.152]	[0.020]	[0.008]	[0.037]	[0.015]***	[0.076]	[0.024]	[0.010]	[0.009]	[0.033]
Incentives (t-2)	-0.193	-0.002	-0.011	-0.060	0.049	-0.169	0.031	-0.009	-0.029	-0.058
	[0.077]**	[0.007]	[0.009]	[0.016]***	[0.027]*	[0.069]**	[0.046]	[0.014]	[0.012]**	[0.026]**
Incentives (t-3)			-0.029							0.011
			[0.009]***							[0.069]
Pop_Density	3.039	0.352	0.037	0.895**	-0.105	1.510	0.016	0.124	0.189	0.705
	[1.111]***	[0.111]***	[0.066]	[0.414]	[0.124]	[0.415]***	[0.357]	[0.080]	[0.163]	[0.441]
Under 15	20.631	-2.537	-1.925	4.324	-2.429	11.073	-8.695	0.248	-3.606	-5.725
	[9.716]**	[1.982]	[1.562]	[4.933]	[1.775]	[4.704]**	[6.265]	[1.507]	[1.311]***	[3.835]
Above 65	-37.754	3.775	0.508	-0.908	4.610	10.505	-10.579	-3.838	4.435	7.879
	[19.499]*	[3.217]	[1.601]	[8.679]	[3.430]	[12.480]	[7.944]	[3.158]	[3.927]	[8.399]
No. of Obs.	201	201	170	201	201	201	201	201	201	170
No. of Groups	28	28	27	28	28	28	28	28	28	27
AR(1)	0.001	0.006	0.028	0.006	0.014	0.018	0.037	0.005	0.004	0.042
AR(2)	0.103	0.17	0.108	0.019	0.253	0.477	0.736	0.853	0.675	0.202
Sargan Test	0.276	0.344	0.251	0.087	0.199	0.178	0.532	0.085	0.430	0.333

Notes:

(1) Column variables are categories of public expenditures for state and local government.
(2) All regressions include state and year fixed effects.
(3) Standard errors are in brackets, robust to heteroskedasticity and serial correlation.
(4) Asterisks denote significance at the 1% (***), 5% (**), and 10% (*) levels.

Table 5

System GMM Treating Incentives as Exogenous

	Direct Expenditures	Administration	Corrections	Elementary Edu	Higher Edu	Health & Human	Highways	Police & Fire	Sanitation	Utilities
Control Variables										
Y(t-1)	1.173	0.992	0.973	0.968	1.008	1.000	0.926	1.039	0.954	0.962
	[0.179]***	[0.032]***	[0.025]***	[0.016]***	[0.026]***	[0.032]***	[0.031]***	[0.010]***	[0.067]***	[0.037]***
Total Grants	-0.253	-0.001	0.000	0.016	0.005	0.030	0.026	0.000	0.000	0.003
	[0.346]	[0.003]	[0.003]	[0.010]	[0.009]	[0.023]	[0.011]**	[0.002]	[0.003]	[0.011]
Personal Income	-0.033	0.000	0.000	0.000	0.000	-0.002	0.000	0.000	0.000	0.000
	[0.033]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]	[0.001]	[0.000]***	[0.000]	[0.001]
Incentives	-0.237	0.003	0.024	0.008	0.006	-0.016	-0.076	-0.012	0.006	-0.023
	[0.187]	[0.008]	[0.014]	[0.010]	[0.011]	[0.038]	[0.025]***	[0.010]	[0.009]	[0.036]
Incentives (t-1)	-0.342	-0.001	0.009	-0.006	0.022	0.051	0.019	-0.009	-0.011	-0.023
	[0.427]	[0.009]	[0.005]*	[0.016]	[0.008]**	[0.061]	[0.016]	[0.004]**	[0.005]**	[0.013]*
Incentives (t-2)	-0.344	-0.004	-0.005	-0.072	0.017	-0.154	0.036	-0.002	-0.026	0.027
	[0.168]**	[0.004]	[0.005]	[0.014]***	[0.022]	[0.041]***	[0.031]	[0.008]	[0.010]***	[0.065]
Incentives (t-3)			-0.023							
			[0.006]***							
Pop_Density	0.103	0.001	-0.003	0.031	-0.002	0.025	-0.012	0.000	0.003	0.002
	[0.077]	[0.003]	[0.002]	[0.011]***	[0.004]	[0.014]*	[0.007]	[0.001]	[0.005]	[0.009]
Under 15	-15.436	-0.330	-0.518	-3.585	-1.411	0.631	0.120	-0.089	-0.457	0.035
	[14.865]	[0.003]	[0.289]*	[1.777]**	[0.841]	[2.549]	[1.154]	[0.390]	[0.390]	[1.248]
Above 65	-1.810	-0.185	-0.635	-2.231	-0.686	0.157	0.082	-0.205	0.084	-0.011
	[7.908]	[0.568]	[0.185]***	[0.814]***	[0.473]	[1.787]	[0.574]	[0.217]	[0.308]	[0.889]
Constant	451.0283	13.802	15.978	129.972	30.041	54.250	12.108	7.143	23.227	4.145
	[427.862]	[0.333]	[10.051]	[45.956]***	[24.290]	[77.644]	[38.018]	[10.115]	[13.522]*	[36.122]
No. of Obs.	232	232	198	232	232	232	232	232	232	232
No. of Groups	31	31	28	31	31	31	31	31	31	31
AR(1)	0.002	0.009	0.033	0.009	0.024	0.019	0.034	0.005	0.001	0.034
AR(2)	0.179	0.171	0.101	0.020	0.267	0.496	0.732	0.745	0.716	0.170
Sargan Test	0.565	0.182	0.529	0.345	0.207	0.173	0.493	0.434	0.585	0.791

Notes:

(1) Column variables are categories of public expenditures for state and local government.
(2) All regressions include state and year fixed effects.
(3) Standard errors are in brackets, robust to heteroskedasticity and serial correlation.
(4) Asterisks denote significance at the 1% (***), 5% (**), and 10% (*) levels.

Table 6

System GMM Treating Incentives as Endogenous

	Direct Expenditures	Administration	Corrections	Elementary Edu	Higher Edu	Health & Human	Highways	Police & Fire	Sanitation	Utilities
Control Variables										
Y(t-1)	0.996	0.997	0.963	0.969	1.021	1.050	0.924	1.018	0.975	1.009
	[0.059]***	[0.024]***	[0.020]***	[0.018]***	[0.017]***	[0.034]***	[0.023]***	[0.010]***	[0.015]***	[0.009]***
Total Grants	0.193	0.005	0.000	0.023	-0.001	0.000	0.022	0.000	0.002	0.005
	[0.121]	[0.004]	[0.003]	[0.011]**	[0.008]	[0.018]	[0.012]*	[0.003]	[0.003]	[0.005]
Personal Income	-0.007	0.000	0.000	0.000	0.001	-0.003	-0.001	0.000	0.000	-0.001
	[0.013]	[0.000]	[0.000]	[0.001]	[0.000]*	[0.002]	[0.001]	[0.000]**	[0.000]	[0.000]
Incentives	-1.493	-0.032	-0.016	-0.093	0.065	0.014	-0.097	-0.035	0.008	-0.022
	[0.982]	[0.036]	[0.020]	[0.077]	[0.030]**	[0.084]	[0.077]	[0.015]**	[0.007]	[0.037]
Incentives (t-1)	-0.056	-0.007	0.013	-0.007	0.017	0.046	0.027	-0.006	-0.014	-0.033
	[0.161]	[0.010]	[0.005]**	[0.024]	[0.008]**	[0.060]	[0.018]	[0.006]	[0.004]***	[0.011]***
Incentives (t-2)	-0.339	-0.008	-0.003	-0.081	0.020	-0.167	0.038	-0.006	-0.027	0.021
	[0.117]***	[0.006]	[0.005]	[0.018]***	[0.025]	[0.033]***	[0.027]	[0.008]	[0.008]***	[0.050]
Incentives (t-3)			-0.016							
			[0.006]**							
Pop_Density	0.110	0.001	-0.001	0.034	-0.002	0.025	-0.011	0.002	0.002	0.007
	[0.053]**	[0.004]	[0.002]	[0.011]***	[0.004]	[0.013]*	[0.007]	[0.001]	[0.003]	[0.006]
Under 15	-0.864	0.018	-0.705	-3.208	-1.356	0.423	-0.196	0.124	-0.475	-0.224
	[9.325]	[0.004]	[0.308]**	[1.906]	[0.995]	[2.450]	[1.030]	[0.515]	[0.432]	[0.638]
Above 65	-6.384	-0.223	-0.755	-2.565	-0.466	0.209	-0.048	-0.194	0.111	0.196
	[4.914]	[0.630]	[0.204]***	[0.819]***	[0.526]	[1.758]	[0.499]	[0.257]	[0.295]	[0.389]
Constant	238.7291	2.488	24.884	128.025	22.350	61.522	30.271	5.717	22.277	4.477
	[274.435]	[0.316]	[10.956]**	[49.670]***	[28.323]	[72.168]	[31.045]	[12.840]	[13.707]	[19.874]
No. of Obs.	232	232	198	232	232	232	232	232	232	232
No. of Groups	31	31	28	31	31	31	31	31	31	31
AR(1)	0.002	0.012	0.033	0.011	0.028	0.022	0.034	0.006	0.000	0.031
AR(2)	0.269	0.167	0.107	0.117	0.243	0.490	0.721	0.993	0.502	0.161
Sargan Test	0.640	0.226	0.709	0.132	0.707	0.185	0.884	0.185	0.219	0.380

Notes:

(1) Column variables are categories of public expenditures for state and local government.

(2) All regressions include state and year fixed effects.

(3) Standard errors are in brackets, robust to heteroskedasticity and serial correlation.

(4) Asterisks denote significance at the 1% (***), 5% (**), and 10% (*) level