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ABSTRACT

This paper simulates job and fiscal impacts of Michigan's MEGA tax credit program for job creation. Under plausible assumptions about how such credits affect business location decisions, the net costs per job created of the MEGA program are simulated to be of modest size. The job creation impacts of MEGA are simulated to be considerably larger than devoting similar dollar resources to general business tax cuts. The simulation methodology developed here is applicable to incentives in other states.

JEL Classification Codes: R11, R23, R28, R30, R58, H70

Key Words: State and local economic development policy, tax incentives, fiscal impact analysis, labor market benefits, regional multipliers

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Simulating the Effects of Michigan's MEGA Tax Credit Program on Job Creation and Fiscal Benefits

How can we estimate the job and fiscal impacts of a state's unique economic development incentives? The impact of incentives is a pressing issue, both because of the need for jobs in the wake of the Great Recession, and because annual incentive costs are in the tens of billions of dollars nationwide (Bartik, 2001, p. 251; Peters & Fisher, 2004; Thomas, 2000).

This paper illustrates a methodology for estimating employment and fiscal impacts of a state-specific incentive. The incentive program considered is Michigan's MEGA tax credit program, which was in existence from 1995 to 2011. MEGA is in acronym that stands for Michigan Economic Growth Authority. The MEGA program provided discretionary incentives to firms, mostly in the manufacturing sector and other export-based industries. These incentives were tied to the firms' job creation. MEGA's incentives were large (over $2,000 per year per job created) and long-lasting (over 15 years on average).

This paper's estimates of the employment and fiscal impacts of MEGA are not only relevant to this specific program but have broader implications. At least 24 states have tax incentives in which the amount of the incentive is directly tied to business job creation (Chirinko & Wilson, 2010b). This paper's methodology is also applicable to other state-specific incentives.

The main methodological problem with estimating impacts of state incentives is these incentives' endogeneity. These incentives are awarded to individual firms or to geographic areas with some discretion. This discretion makes it difficult to find a suitable comparison group for evaluating the incentives' impact. Incentives could be selectively awarded to firms or areas that are high-growth, which would bias estimates towards finding positive impacts. Alternatively, the incentives could be selectively awarded to firms or areas that have problems, which would bias estimates towards finding negative impacts.

Furthermore, because each state's incentive program has many hard-to-measure qualitative features that are state-specific, using state incentive policy as an explanatory variable faces problems due to measurement error. State incentive programs will differ not only in statutory design, but in administrative procedures and political climate, both of which affect the ease of obtaining incentives. A state with seemingly generous incentives may in practice have incentives that are harder to get. As a result, some error will be present in the measurement of a state's incentive policy. Even if state incentive policies were exogenously chosen, errors in measuring incentive policies will bias impact estimates towards zero.

This paper estimates incentive impacts using simulation methods. We simulate the probability that an incentive will be decisive. The simulated probabilities are based on the incentive's impacts on costs, and are also based on previous estimates of how business location and expansion decisions respond to costs. These previous estimates are based on the extensive literature on how state business growth is affected by business taxes and wages. As we will argue, this previous literature helps set a plausible range for how business location and expansion decisions respond to incentives. Probabilities of an incentive being decisive are then plugged into a state econometric model and a state fiscal impact model; these two models generate estimated job impacts and fiscal impacts.

This simulation methodology is most useful when no direct estimates of causal impact are available for a particular state incentive program. If direct estimates are available but the identification of causal impact rests on questionable assumptions, the simulation methodology provides a useful comparison.

The plan of the paper is as follows. We begin by reviewing the previous research literature on state and local economic development incentives. We describe the MEGA program. We then describe our data and methodology and present our estimates. A conclusion summarizes the results and suggests implications for future research and policy.

PREVIOUS RESEARCH LITERATURE ON ECONOMIC DEVELOPMENT INCENTIVES

What does the research literature say about the effects of state and local economic development incentives? By “economic development incentives,” we mean cash (tax breaks or otherwise) or services that are at least somewhat customized to the needs of an individual business and are awarded with some discretion. The discretion may be over which firms receive incentives. In other cases, such as enterprise zones, all firms in a targeted geographic area receive incentives, but there is discretion over which geographic areas are chosen. Such incentives are intended to affect business location, expansion, opening, downsizing, or closing decisions.

A larger, related research literature considers the effects of more general state and local tax policy and public services. More general taxes and public services are distinguished from incentives by not being customized for individual businesses, and by the lack of governmental administrative discretion in targeting benefits to specific firms. This more general research literature has been reviewed by Bartik (1991, 1992), Phillips & Goss (1995), and Wasylenko (1997).

The incentives literature has been most recently reviewed by Buss (2001). The following review selects some highlights of the literature since Buss’s review.

The incentives literature can be categorized in different ways. One categorization is by type of incentive considered. One group of studies analyzes the effects of overall incentive levels, or considers a wide variety of incentives (Calcagno & Thompson, 2004; Chirinko & Wilson, 2010a; Gabe & Kraybill, 2002; Lee, 2008; Luger & Bae, 2005). In this category one might also include studies that have examined whether actually landing a large new plant opening leads to local growth (Edmiston, 2004; Fox & Murray, 2004; Greenstone & Moretti, 2004). Today, most large new plant openings would receive significant incentives. But even if an opening was induced by incentives, the opening may substitute for growth that would have occurred anyway, or repel growth by increasing wages and land prices.

Other studies consider effects of specific types of incentive policies. Many studies consider the effects of enterprise zones. Such enterprise zones are geographic areas in which businesses or people in the defined area are eligible for special tax breaks or services (Busso, Gregory, & Kline, 2010; Elvery, 2009; Greenbaum & Landers, 2009; Hansen & Kalambokidis, 2010; Lynch & Zax, 2010; Neumark & Kolko, 2010; Peters & Fisher, 2002).

Another group of studies considers the impact of tax-increment financing districts (Byrne, 2010; Dye & Merriman, 1999; Mason & Thomas, 2010; Merriman, Skidmore, & Kashian, 2007, 2011; Weber, Bhatta, & Merriman, 2003). Under this incentive policy, local governments divert increments to normal property-tax revenue (or other tax revenue), within a designated district, to support services, infrastructure improvements, or tax breaks to businesses in the designated district.

Some studies examine customized job training (Hollenbeck, 2008; Holzer, Block, Cheatham, & Knott, 1993; Hoyt, Jepsen, & Troske, 2008). Customized job-training programs provide businesses with free or subsidized job training, customized to the needs of the individual businesses, for new or existing workers. The training is frequently tied to a plant opening or expansion decision, but may also help retain a business or strengthen its competitiveness.

A few studies look at manufacturing extension services (Jarmin, 1998, 1999; MEP, 2010). Manufacturing extension services provide small- and medium-sized businesses with free or subsidized advice/management training on improving manufacturing productivity and product design and on finding new markets. These services are funded in part by the federal Manufacturing Extension Partnership, although many state and local economic development organizations also provide support.

Finally, some studies examine tax credits tied to job creation (Chirinko & Wilson, 2010b; Faulk, 2002; Hicks & LaFaive, 2011). The MEGA credit is of this type. Such tax credits are awarded with some discretion to businesses that add a minimum level of jobs in a state's economy. The credits are sometimes tied to the personal income tax or other revenue associated with the new jobs.

Another categorization of incentive studies is by empirical findings. Most studies conclude that incentives are not cost-effective, either having no statistically significant effects or large costs per job created. However, there are some exceptions. For example, customized job training has some favorable evidence (Hollenbeck, 2008; Holzer, Block, Cheatham, & Knott, 1993; Hoyt, Jepsen, & Troske, 2008). Manufacturing extension services have some support (Jarmin, 1998, 1999; MEP, 2010). Job-creation tax credits are supported by Faulk (2008), but not by Luger and Bae (2005) or Hicks and LaFaive (2011).

Another categorization of incentive studies is by methodology. Most studies attempt to explain either the growth of individual firms as a function of incentives, or the growth of a geographic area as a function of incentives. In a few cases, the incentive's specific provisions are modeled (Chirinko & Wilson, 2010b; Lee, 2008). But in most cases, what is measured is the dollar magnitude of incentives received by a firm or an area.

Other studies, rather than statistically explaining growth using incentives, rely on interviews that ask incentive recipients how the incentive affected their location or expansion decisions (Hollenbeck, 2008; MEP, 2010).

Finally, a few studies use simulation methods to model the effects of incentives (Chirinko & Wilson, 2010a; Luger & Bae, 2005). These studies predict incentive impacts by extrapolating from what we know about the response of firms to other cost factors. The present study falls into this category.

BIASES IN ESTIMATING INCENTIVE EFFECTS

The interest in interview or simulation methods reflects the difficulties in estimating incentive effects. To illustrate the problem, consider the following simple model:

$$G_{st} = B_0 + \mathbf{B}_x * \boldsymbol{X_{st}} + B_I * (Incentives_{st}) + e_{st} \,. \tag{1}$$

G_{st} is the percentage growth in some area *s* over a time period *t*, or in some cases the percentage growth in some firm in area *s* over a time period *t*. $\boldsymbol{X_{st}}$ is a vector of control variables, either for the state and time period, or for a firm in that state and time period. $Incentives_{st}$ represents the incentives variable for that state and time period, or for that firm in the state or time period. This incentives variable frequently is the dollar volume of incentives, either in that area or for that firm. e_{st} is the disturbance term.

The problem in estimating Equation (1) is that because the incentives are awarded with discretion, the simplest empirical procedures will be biased. The incentives variable is likely to be correlated with the error term. If incentives are targeted at firms or areas that are already likely to grow, the estimation is biased towards finding that incentives have larger positive effects on growth. If incentives are randomly awarded to growing firms, this will also bias the estimation towards finding positive effects. If incentives are targeted at firms or areas that suffer some disadvantage that impedes growth, then the estimation will be biased against finding that the incentive boosts growth.

This bias in incentive estimates is likely to be particularly large, because incentives have modest effects on growth compared to how they might be affected by growth. For example, the ordinary least squares' estimate of coefficient B_I will be biased because it estimates the following coefficient:

$$B_I(\text{biased}) = B_I(\text{true}) + B_{gI}. \tag{2}$$

B_{gI} is the coefficient on incentives in aregression of the error term, which includes unobservables shocking firm or area growth, on incentives and the observed variables X_{st} affecting growth. $B_{I(}$true$_{)}$ is likely to be small, because incentives are small compared to overall costs. But because incentives are awarded with discretion, they can be very responsive to growth. As a result, B_{gI} may be large in absolute value relative to $B_{I(}$true$_{)}$.

This bias problem is difficult to solve. One solution is to find instrumental variables that are correlated with incentive awards but uncorrelated with unobservables affecting growth. Good instruments may arise if incentives have been awarded for some exogenous reason that is unrelated to growth. For example, Holzer, Block, Cheatham, and Knott (1993) compared the behavior of firms that received incentives versus firms that applied after the incentives were exhausted. Jarmin (1998, 1999) compared firms that were more or less likely to use incentives because of their distance to the organization providing customized services. Greenstone and Moretti (2004) compared counties in which a new plant was located to counties that were runners-up. Busso, Gregory, and Kline (2010) compared successful with unsuccessful applicants for federal Empowerment Zone status. But we cannot count on always having such exogenous variation in incentive awards.

This bias problem increases the interest in other alternatives for estimating incentive effects. One alternative is to ask firms about incentive effects. However, firms may not give accurate responses, either because they are concerned about not receiving future incentives, or because whoever answers the survey may not know what the firm might have done without the incentive.

Another alternative is simulations. Simulations assume we can use information from other research to determine how sensitive firms are to local costs. Extensive research examines how business location and expansion are affected by state and local business taxes. State and local business tax rates are less endogenous than incentive awards, as tax rates are set by statute. Although tax rates may respond to the state economy, tax rates may also be set based on political ideology. Tax rates are also harder to change over time than incentive awards.

State and local business taxes are a larger share of business costs than are incentives. Therefore, the true effect of business taxes on state or local growth is larger than for incentives. However, the absolute value of the bias term, which depends on how business taxes are affected by unobserved shocks to local growth, is of similar magnitude to the bias term for incentives (see Equation [2], above). Therefore, compared to incentives, for business taxes the bias is likely lower in percentage terms relative to the true coefficient.

Wages' share of business costs exceeds the share of taxes. However, wages are highly endogenous in response to business growth. This bias has a known direction. Because higher growth raises wages, the negative effects of wages on business growth will be biased in a positive direction by the endogeneity of wages. Therefore, the estimated effects of wages on business growth set a lower bound to the effects of local costs on business growth.

DESCRIPTION OF THE MEGA PROGRAM

The MEGA program was created in 1995, and it was terminated (except for existing contracts) in 2011. MEGA provided discretionary tax credits to employers that created or retained jobs in Michigan. The credit was based on the personal income taxes for the workers in those new or retained jobs. Credits were provided for up to 20 years. If the credit exceeds the business's tax liability, the business receives a cash payment. Credits were not an entitlement going to all eligible businesses, but rather were awarded by a state board. The Michigan Economic Development Corporation (MEDC), the state's economic development agency, ran MEGA.

Eligibility for MEGA credits was restricted to industries in the state's "export base" (industries that primarily sell their goods or services to nonstate residents). Retail businesses were generally excluded from MEGA. For a project to be eligible for MEGA, there were minimum job creation and retention requirements, with relaxed requirements for rural or high-tech projects.

The MEGA program was terminated by the Michigan Legislature in 2011, based upon a recommendation by Governor Snyder, elected in 2010. The MEGA program termination was part of an overall fiscal package that included a business tax cut and increases in some household taxes. In addition, subsequent state action has replaced MEGA with an incentive fund, which can provide credits similar to MEGA.

Compared to most economic development programs, MEGA was generous. This single program provided a tax credit whose annual value per job-year, over the life of the program, averaged $2,294.[1] The annual per-job value of all incentives in leading industrial states is $1,247 (Bartik, 2005; Peters & Fisher, 2002). The MEGA incentive was provided for a time period that averaged 15.75 years over the life of the program.[2]

The MEGA program focused on Michigan's traditional manufacturing base. Forty-nine percent of the credits were in the motor-vehicle and motor-vehicle-parts industries, and 31% in other manufacturing industries.[3]

Given Michigan's high manufacturing wages and strong manufacturing supplier base, MEGA projects had high wages and high multiplier effects. Average annual wages in MEGA projects were $75,627.[4] Our simulations suggest that the multiplier effects of the direct job creation by MEGA were 3.88 in 2007.[5]

Because of its generosity, MEGA was more likely to affect business location and expansion decisions than the typical state incentive package. Because of MEGA's high wages and multipliers, MEGA projects have relatively large economic and fiscal effects. Therefore, the gross benefits of MEGA were likely to loom large compared to typical business incentives.

[1] Authors' calculation, in 2011 dollars, using data provided by MEDC on actual credits awarded and actual new or retained jobs that are associated with credits, from 1996 to 2007, and with the average calculated weighted by job-years.

[2] Authors' calculations using program data from 1996 to 2007, and with the length of program weighted by job-years for subsidized new or retained jobs.

[3] Authors' calculations using MEDC data.

[4] In 2011 dollars. The calculated numbers are based on MEDC figures on nominal weekly wages for each project. The averages are weighted by job-years for credited new or retained jobs.

[5] Simulations were done using the Upjohn Institute's REMI (Regional Economic Models Inc.) model for Michigan.

DATA AND METHODOLOGY

Outline of Our Approach

We obtained data from the MEDC on MEGA credits paid, and the job creation on which these credits are based, for each MEGA project for each tax year from 1996 to 2007. These data were used to simulate the MEGA program's economic and fiscal impacts on the Michigan economy for each year from 1996 to 2007. We simulated the effects of the MEGA program using the Upjohn Institute's version of the REMI model. (Fan, Treyz, & Treyz, 2000). We simulated the economic and fiscal effects of the MEGA program both by simulating the effects of any jobs created and by simulating the effects of how the MEGA program's credits are financed.

To derive the final simulation, we first did two preliminary simulations. First, we simulated the effects on the Michigan economy if 100% of the MEGA jobs were created by MEGA. This simulation used information on actual new or retained jobs associated with MEGA by year and by the 70 REMI industries. The analysis understates MEGA-associated jobs by only counting jobs that receive MEGA subsidies. For example, the analysis would not count jobs previously associated with MEGA if during some year they fell below the minimum job number requirement or if the subsidy period had expired.

Second, we simulated the negative effects on the Michigan economy of financing the MEGA credits in two different ways. The first way of financing the cost of MEGA credits was by reducing government spending. (These costs were lagged one year, because MEGA credits were typically paid with at least a one-year lag.) The REMI model structure means that the negative effects of reduced government spending will be solely due to demand effects. Given the modest funds involved, it is plausible that such spending reductions could be achieved through spending reforms that did not diminish public service quality.

The second way of financing MEGA was to increase state business taxes. This increase in business taxes was entered into an adjusted REMI model. As described below, the business tax effect was adjusted to be consistent with the assumed effects of the MEGA credits on business location, expansion, and retention decisions.

The net effects of MEGA on the state economy are then assumed to be equal to some proportion *k* of the direct effects of the MEGA-credited jobs, plus the negative effects of reduced government spending or increased business taxes. The proportion *k* is the proportion of MEGA-subsidized jobs that would not have existed in Michigan but for the MEGA program. That is, we assumed that, if the program had never existed, the proportion (1 – *k*) of MEGA-subsidized jobs would have been created or retained in Michigan anyway, whereas the proportion *k* of MEGA-subsidized jobs exist in Michigan because of the program. Below, we will discuss further how we chose this proportion *k*.

The REMI model only permits alternative simulations of the future, not of the past. Therefore, we estimated the historical impact of MEGA from 1996 to 2007 by simulating MEGA’s impact in a simulated future from 2010 to 2021. This method of simulating historical impacts will be accurate if shocks to jobs by industry and real government spending have similar multiplier effects in the 1996-to-2007 period as in the 2010-to-2021 period. This procedure is likely to understate the multiplier effects of MEGA-induced jobs, as because of globalization the state’s supplier linkages and wages have declined over time.

Our simulations resulted in predicted percentage effects on state personal income and population for each year from 1996 to 2007. As detailed below, we used these population and income impacts to calculate effects on state and local tax revenue and spending needs.

Incentive Effect Simulation

To provide plausible values for the parameter *k*, the probability that the MEGA credit was decisive in triggering job creation, we rely on the research literature on business location decisions. We use this literature's consensus range for the elasticities of business growth with respect to state and local business taxes, and with respect to wages.

We assume state and local business activity depends primarily on business costs. Therefore, the impact of any local cost factor on any measure of business activity—employment, value-added, capital stock—will be proportional to the change in costs.

This assumption means that we treat factor substitution effects as being of secondary importance. As shown in Bartik (1991, Appendix 2.1), with plausible elasticities, the effects on employment of some changes in factor prices will mostly be due to overall effects on business activity, not factor substitution. As shown in Wasylenko (1997) and Phillips and Goss (1995), in practice the measure of business activity does not matter much.

To measure how business activity responds to overall costs, we use estimates of the long-run elasticity of state or metro-area business activity with respect to overall state and local business taxes. These long-run business elasticity estimates were developed in Bartik (1991), added to by Wasylenko (1997), and analyzed by Phillips and Goss (1995).

These literature reviews adjust estimates from different studies to approximate long-run elasticities with respect to overall state and local business taxes. As outlined in Bartik (1991, Appendix 2.2), tax elasticities were measured by considering an equal percentage increase in all tax rates included in the study. This assumes that business location decisions are driven by business taxes, not household taxes, and that if only some taxes are included, the percentage change in the taxes included in the study will roughly reflect percentage variations in overall state and local business taxes. In practice the tax measure does not make a significant difference to the estimated elasticity (Phillips & Goss, 1995, Table 4).

Some studies have an explicit dynamic model of long-run business activity, but other studies use either gross new business activity (new branch plants, start-ups, gross investment) or net business activity change over some time period. In the former case, the elasticity of gross new-business activity during the time period is assumed to represent the long-run business elasticity. Bartik (1991) shows this is consistent with a model in which business death rates are constant and long-run adjustment occurs by shocks to gross new-business activity. In the latter case, local business activity is assumed to adjust to the long-run equilibrium as estimated in Helms's (1985) well-known study, which estimates 9% per year adjustment towards the long-run equilibrium. Long-run business elasticity estimates do not vary much with how they are derived (Phillips & Goss, 1995).

Based on 57 studies, Bartik (1991) argues that a plausible range for the long-run elasticity of state or metro-area business activity with respect to state and local business taxes is from −0.1 to −0.6, with a plausible "best guess" elasticity of −0.2 to −0.3. Wasylenko added in another 17 studies and argued for a best guess elasticity of −0.2. An elasticity of −0.2 is consistent with the meta-analysis in Philips and Goss (1995). Their Table 3 predicts that a study that controlled for wages and area fixed effects, allowed public services to endogenously adjust, and looked at individual firms would get an elasticity of −0.195.

Under some special assumptions, the elasticity could be closer to −0.6. If we control for public services, Philips and Goss predict an elasticity of −0.488. Hines (1996) compares location decisions for foreign firms that can credit state and local taxes against their home country taxes versus firms that only take state and local taxes as a deduction. Hines's estimated elasticity is about −0.6. This should be an upper bound, as foreign firms would be particularly footloose.

Bartik (1991) had suggested a lower bound to the long-run tax elasticity of −0.1. Wasylenko finds that in many cases the median estimates cluster around −0.1.

Another possible lower bound is the elasticity of state and local business activity with respect to wages. Bartik (1991, Table 2.6) reports a mean long-run wage elasticity of −0.67. Wages are 14 times the cost share of state and local business taxes. If impacts depend on costs, a business tax elasticity consistent with this wage elasticity would be around −0.05 (= −0.67 ÷ 14). This implied elasticity is a lower bound because estimated wage elasticities are biased towards zero. Wages will endogenously increase with local growth.

Based on this research literature, our simulations assume a range of long-run business tax elasticities. We initially assume a business tax elasticity of −0.2. But we also consider three other possible values: −0.05, −0.1, and −0.6.

To translate these elasticities into parameter k, the probability of the MEGA incentive being decisive, we first determine what present value of cost per induced job is implied by these various elasticities. Suppose T is state and local business taxes per job, J is the original number of jobs in the state or local area, dT is a change in state and local business taxes per job, and dJ is the change in jobs induced by that tax change. We consider the cost of the lower business taxes in lost tax revenue before accounting for fiscal impacts of the increase in jobs. (Fiscal impact is considered separately later.) The cost in lost tax revenues per induced job is

$$C = JdT / dJ. \tag{3}$$

The long-run elasticity of jobs with respect to taxes is defined as

$$E = (dJ/J) / (dT/T). \tag{4}$$

Combining these two equations yields

$$C = T / E. \tag{5}$$

The cost per induced job is equal to state and local business taxes per job divided by the elasticity of business activity with respect to business taxes.

Based on Peters and Fisher (2002), average state and local business taxes per job in the U.S. are $4,631 (in 2011 dollars). This dollar amount divided by the business tax elasticity is the annual cost of inducing one job due to permanently lower business taxes.

But to evaluate MEGA, which had varying annual dollar incentives over time, we need to know the present value of foregone taxes needed to create jobs. Based on Poterba and Summers (1995), we assume business executives use a 12% real discount rate. Therefore, the present value of the foregone business taxes needed to induce one job is the annual flow of state and local business taxes per job ($4,631), divided by the elasticity (−0.05, −0.1, −0.2, or −0.6), and then discounted at a real discount rate of 12%.

Table 1 shows implied annual values and present values of costs per job induced by lower business taxes. These numbers do not mean that if the business tax elasticity is −0.2, providing a new branch plant with a perpetual annual subsidy of $23,155 per job will induce 100% of the plant's jobs. The tax studies behind these numbers are considering much smaller annual tax differences. We should not extrapolate these numbers to much larger tax differences. But the MEGA subsidies are small enough to be in the range of the cross-state tax variations in these tax studies.

As mentioned, MEGA averaged an annual subsidy of $2,294 per job for a period of 15.75 years. The present value at a 12% discount rate of this average MEGA subsidy is $21,411. For the MEGA program's effects to be consistent with business tax elasticities, the present value of the MEGA credit, divided by the present value of the cost of inducing a job, must be equal to the probability *k* that the MEGA credit was decisive.

Table 1's last column presents these calculated values for *k.* This percentage varies from 2.06% to 24.74%. At an elasticity of −0.2, 8.25% of MEGA credits were decisive.

Some simulations consider MEGA when it is financed by increased business taxes. These simulations should use consistent elasticities for business taxes. Some preliminary simulations using the REMI model examined how Michigan responded to changes in state business taxes. These default responses were consistent with a long-run business tax elasticity of −0.24. We adjusted these REMI model responses up or down to match the various elasticities assumed in our different scenarios.

Fiscal Effects Simulations

We made assumptions about how shocks to personal income and population would affect various categories of state and local revenue and spending. Some revenue categories were assumed to respond to income, such as individual income taxes, sales taxes, and corporate income taxes.

For personal income and sales tax revenue, we used long-run elasticities, adjusted for rate changes, as estimated by Bruce, Fox, and Tuttle (2006) for Michigan. The long-run elasticity is 1.40 for the personal income tax and 0.772 for the sales tax. For the main Michigan state business tax during this time period (the Single Business Tax and then the Michigan Business Tax), we assumed an elasticity with respect to personal income of 1.00.

Most other categories of revenue and spending were assumed to change by the same percentage as state population. One exception is that these shocks were assumed to leave welfare-related spending unaffected. The "welfare" categories are public welfare, health spending (but not hospital spending), and employment security administration. This is likely to understate fiscal benefits, as increases in state employment rates and wages may reduce state welfare spending.

One revenue category assumed to increase proportionally with population is property tax revenue. Because of Michigan's Headlee Amendment to the state constitution, increases in property values require a readjustment of the property tax rate to yield the same real revenue, except for increases in assessments due to new development. We assumed that the percentage increase in property tax revenues due to new development is roughly equal to the percentage increase in Michigan population.

Baseline figures for each revenue and spending category come from the U.S. Census Bureau's Census of Governments' figures for Michigan general own-source revenue and expenditure from 1996 to 2007 (2001 and 2003 were skipped by the census, so these values were interpolated as a percentage of state personal income). These baseline figures and the above-assumed elasticities yielded estimates of how net Michigan state and local government revenue and expenditure responds to shocks to state income and population. These estimates were combined with estimated income and population effects from the REMI model to generate net fiscal benefits or costs.

RESULTS

MEGA Net Effects When Financed by Cuts in Government Spending

Table 2 presents MEGA's net effects when financed by reduced government spending. As the table shows, by 2007, MEGA was awarding credits that were associated with over 60,000 jobs. These credits cost almost $100 million per year.

Even without multiplier effects or fiscal benefits, if all MEGA credits were decisive, MEGA is a cheap job creation program. The average annual value of MEGA credit costs, divided by the average of job-years subsidized, is $1,653. This is cheap given that the jobs pay almost $75,000 per year.

But this analysis doesn't consider various negative and positive factors that affect MEGA's impact. On the negative side, many projects subsidized by MEGA would have occurred without the MEGA subsidy. Also, financing MEGA by cuts in government spending would reduce employment in state and local government, with negative multiplier effects. On the positive side, MEGA projects will have some multiplier effects. In addition, any job creation effects of MEGA will provide fiscal benefits.

The remainder of the table considers these positive and negative effects for various business tax elasticities: −0.05, −0.1, −0.2, and −0.6. We also considered an elasticity that is consistent with MEGA having zero net present-value fiscal costs over the 1996-to-2007 period. This elasticity is −0.41, which implies a probability of being decisive of 17%.

At one extreme, a −0.05 elasticity results in huge costs per job created. The average present value cost per job-year created is about $45,000. This seems excessive if there are any opportunity costs of labor.

At the other extreme, at a −0.6 elasticity, MEGA clearly is beneficial. The program makes money for the state, almost $100 million in 2007.

Does this mean that we have no definite conclusion about MEGA's effects? Only if we regard the entire range of elasticities as equally plausible does it mean that. The results suggest that it does not take a sizable tax elasticity for MEGA to be a reasonable investment. For example, even if the elasticity is −0.1 and MEGA is only decisive 4% of the time, the program has net costs of job creation of only $13,000 per job. Given Michigan's high unemployment during much of this period, the benefits of job creation probably exceed these costs. And −0.1 is the minimum elasticity that is consistent with the research literature on state and local business taxation. Four percent decisiveness does not seem too high for a subsidy of over $2,000 per job, or about 3% of labor costs.

For the consensus business tax elasticity of −0.2, the case is even clearer: MEGA then has average costs of under $4,000 per job-year created.

Therefore, there is some uncertainty about whether MEGA passes a benefit-cost test. However, under most reasonable scenarios, the program does pass such a test.

These favorable results are for a program with unusually high multiplier effects. A state incentive program that targeted lower-wage industries, or an incentive program in a state with weaker supplier networks, would have less favorable results.

MEGA Net Effects When Financed by Increases in the State's Business Tax

Table 3 simulates the effects of financing MEGA by increasing the state's business tax. MEGA's annual costs only correspond to modest percentage increases in the main state business tax. In 2007, eliminating the $91 million in MEGA credits (see Table 2) would only have allowed about a 4% cut in the main state business tax.

As Table 3 shows, MEGA creates many more jobs than the equivalent dollar cut in the main state business tax. For example, in 2007, the gross effect of the MEGA credit by itself is to create a little less than 20,000 jobs. The equivalent cut in business taxes would only create a little more than 3,000 jobs. As a result, the net effect of substituting the MEGA credit for a cut in the overall business tax is to create about 17,000 jobs.

Although the substitution of a MEGA tax credit for a business tax cut is a balanced-budget change using static revenue estimation, our dynamic fiscal impact estates suggest considerable fiscal benefits. By 2007, fiscal benefits are over $58 million.

Table 3 assumes a −0.2 business tax elasticity. What about other elasticities? Job and fiscal effects of both MEGA and business cuts vary proportionately with the business tax elasticity. Results for an elasticity of −0.6 will be three times as great; results for a −0.05 elasticity will be one-fourth as great.

Regardless of the business tax elasticity, the MEGA credit is more effective than an overall business tax cut in creating jobs. The intuition behind this result is that MEGA is targeted, as opposed to an overall business tax cut. The targeting occurs in two ways. First, MEGA is only awarded to projects involving new investment decisions. In contrast, an across-the-board business tax cut goes to firms regardless of whether they are considering new investment.

Second, MEGA is targeted to high-wage, export-based businesses, whereas an across-the-board business tax cut is not targeted. MEGA has multiplier effects on non-export-based businesses that do not receive the credit. In contrast, across-the-board business tax cuts go to many businesses that are not export-based. Non-export-based businesses will not respond much to a business tax cut, as their business activity is determined more by state demand.

A Comparison with the Hicks/LaFaive Results

Our results appear to contrast with those of Hicks and LaFaive (2011), who also analyze the MEGA program. They conclude that MEGA has no statistically significant positive impact on a county's overall employment level.

However, there is sufficient statistical uncertainty in their results that it is unclear whether our respective results are contradictory. While their preferred results (Table 2's 2SLS results for county employment) show that MEGA credits destroy jobs, the 95% confidence interval includes the possibility that MEGA creates jobs. The implied cost per job appears high: $192,264. (This takes their coefficient estimates plus 1.96 times the standard error, and then takes one over this result. In addition, we adjust to 2011 dollars.)

However, their cost estimates are for the total MEGA credits for a project. The average length of a MEGA contract was 15.75 years. If we divide these estimates by 15.75, we get an approximation of annual MEGA costs per job created. A $192,264 project cost implies an annual MEGA cost of $12,215 per job created.

In contrast, suppose we apply our model to the 1995-to-2002 time period considered by Hicks and LaFaive. As shown in Table 4, the resulting annual cost per job created, assuming a −0.2 elasticity of business activity with respect to state and local business taxes, is $10,015. This is close to the "optimistic bound" implied by Hicks and LaFaive's paper. Our most pessimistic simulation, with a tax elasticity of −0.05, results in a MEGA cost per job-year created over this time period of $102,860. Therefore, our simulation results overlap with those implied by the Hicks and LaFaive estimates.

Of course, their point estimates suggest MEGA does not create jobs. How can this be reconciled with our results? One possibility is that their point estimates are biased because the endogeneity of their MEGA credit variable is not corrected for by their instruments. Their regression explains county-level employment in a given year as a function of lagged employment in the county, current and lagged employment in surrounding counties, county labor force participation rates, a recession dummy, an overall state time trend, county dummies, and the MEGA credit variable.

The endogeneity problem is that the MEGA credit variable may be correlated with unobserved factors affecting county growth. If MEGA credits were awarded randomly, we would expect MEGA credits to be positively correlated with unobserved factors affecting county growth. If MEGA credits were awarded more to distressed counties, then MEGA credits would be negatively correlated with unobserved factors affecting county growth.

Their instruments include county population, whether the MEGA credit program existed in the state during that year, and whether any MEGA credit was approved during that year. (MEGA credits were sometimes approved in the same year that the project started, and other times would lag behind the project's start for up to six years.) Whether the MEGA credit program existed could be seen as exogenous to county growth trends. But it is not clear that county population or whether a MEGA credit was approved during that year for that county would be uncorrelated with unobserved factors affecting county growth trends. County population will respond to recent shocks to county employment growth, which may persist over time, and county population may affect employment. Whether MEGA's discretionary authority to award credits is used to offset county economic distress is one of the main factors that may cause MEGA credits to be endogenous.

CONCLUSION

This paper uses a simulation approach to examining the effects of Michigan's MEGA tax credit. Under plausible assumptions, MEGA appears likely to have large effects on job creation relative to its net fiscal costs. Moreover, MEGA appears to provide greater fiscal and job-creation benefits relative to cutting overall state business taxes.

The former conclusion, that adopting MEGA and cutting government spending has relatively low costs per job, is likely to be specific to Michigan and MEGA's design. The extremely high multiplier effects of MEGA may not be easily reproducible by other states' business tax incentives. The latter conclusion, that a marginal export-based business incentive is more cost-effective at creating jobs than overall state business tax cuts, is more robust.

Simulation exercises such as this are useful for getting a range of plausible estimates of effects of business tax incentives. In some cases, such as this one, even a plausible range may suggest whether a given policy proposal is sensible.

Simulation exercises complement but do not substitute for convincing direct estimates of the effectiveness of state business tax incentives. Studies that can plausibly identify the causal effects of business tax incentives can provide more precise and more convincing estimates.

REFERENCES

Bartik, T. J. (1991). *Who benefits from state and local economic development policies?* Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

Bartik, T. J. (1992). The effects of state and local taxes on economic development: A review of recent research. *Economic Development Quarterly, 6*(1), 102-111.

Bartik, T. J. (2001). *Jobs for the poor: Can labor demand policies help?* New York: Russell Sage Foundation.

Bartik, T. J. (2005). Solving the problems of economic development incentives. *Growth and Change, 36*(2), 139-166.

Bruce, D., Fox, W. F., & Tuttle, M. H. (2006). Tax base elasticities: A multi-state analysis of long-run and short-run dynamics. *Southern Economic Journal*, *73*(2), 315-341.

Buss, T. F. (2001). The effect of state tax incentives on economic growth and firm location decisions: An overview of the literature. *Economic Development Quarterly, 15*(1), 90-105.

Busso, M., Gregory, J., & Kline, P. M. (2010). *Assessing the incidence and efficiency of a prominent place based policy* (Working Paper No. 16096). Washington, DC: National Bureau of Economic Research.

Byrne, P. F. (2010). Does tax increment financing deliver on its promise of jobs? The impact of tax increment financing on municipal employment growth. *Economic Development Quarterly, 24*(1), 13-22.

Calcagno, P. T., & Thompson, H. (2004). State economic incentives: Stimulus or reallocation? *Public Finance Review, 35*(5), 1-15.

Chirinko, R. S., & Wilson, D. J. (2010a). State business taxes and investment: State-by-state simulations. *Economic Review*, Federal Reserve Bank of San Francisco, 13-28.

Chirinko, R. S., & Wilson, D. J. (2010b). *Job creation tax credits and job growth: Whether, when, and where?* (Working Paper No. 2010-25). San Francisco: Federal Reserve Bank of San Francisco.

Dye, R. F., & Merriman, D. F. (1999). *The effects of tax increment financing on economic development* (Working Paper No. 75). Chicago: Institute of Government and Public Affairs, University of Illinois.

Edmiston, K. D. (2004). The net effects of large plant locations and expansions on county employment. *Journal of Regional Science, 44*(2), 289-319.

Elvery, J. A. (2009). The impact of enterprise zones on resident employment: An evaluation of the enterprise zone programs of California and Florida. *Economic Development Quarterly*, *23*(1), 44-59.

Fan, W., Treyz, F., & Treyz, G. (2000). An evolutionary new economic geography model. *Journal of Regional Science*, *40*(4), 671-695.

Faulk, D. (2002). Do state economic development incentives create jobs? An analysis of state employment tax credits. *National Tax Journal*, *55*(2), 263-280.

Fox, W. F., & Murray, M. N. (2004). Do economic effects justify the use of fiscal incentives? *Southern Economic Journal*, *71*(1), 78-92.

Gabe, T. M., & Kraybill, D. S. (2002). The effect of state economic development incentives on employment growth of establishments. *Journal of Regional Science, 42*(4), 703-730.

Greenbaum, R. T., & Landers, J. (2009). Why are state policy makers still proponents of enterprise zones? What explains their action in the face of a preponderance of the research? *International Regional Science Review*, *32*(4), 466-479.

Greenstone, M., & Moretti, E. (2004). *Bidding for industrial plants: Does winning a 'million dollar plant' increase welfare?* (Working paper). Berkeley, CA: University of California, Berkeley.

Hansen, R. J., & Kalambokidis, L. (2010). How are businesses responding to Minnesota's tax-free zone program? *Economic Development Quarterly*, *24*(2), 180-192.

Helms, L. J. (1985). The effect of state and local taxes on economic growth: A time series–cross section approach. *Review of Economics and Statistics*, *67*(4), 574-582.

Hicks, M. J., & LaFaive, M. (2011). The influence of targeted economic development tax incentives on county economic growth: Evidence from Michigan's MEGA credits. *Economic Development Quarterly*, *25*(2), 193-205.

Hines, J. R., Jr. (1996). Altered states: Taxes and the location of foreign direct investment in America. *American Economic Review*, *86*(5), 1076-1094.

Hollenbeck, K. (2008). *Is there a role for public support of incumbent worker on-the-job training?* (Upjohn Institute Working Paper No. 08-138). Kalamazoo, MI: W. E. Upjohn Institute for Employment Research.

Holzer, H. J., Block, R. N., Cheatham, M., & Knott, J. H. (1993). Are training subsidies for firms effective? The Michigan experience. *Industrial and Labor Relations Review*, *46*(4), 625-636.

Hoyt, W. H., Jepsen, C., & Troske, K. R. (2008). *Business incentives and employment: What incentives work and where?* (Working paper). Lexington, KY: Economics Department, University of Kentucky.

Jarmin, R. (1998). *Manufacturing extension and productivity dynamics* (Discussion Paper No. 98-8). Washington, DC: Center for Economic Studies, U.S. Census Bureau.

Jarmin, R. (1999). Evaluating the impact of manufacturing extension on productivity growth. *Journal of Policy Analysis and Management, 18*(1), 99-119.

Lee, Y. (2008). Geographic redistribution of U.S. manufacturing and the role of state development policy. *Journal of Urban Economics, 64*, 436-450.

Luger, M. I., & Bae, S. (2005). The effectiveness of state business tax incentive programs: The case of North Carolina. *Economic Development Quarterly*, *19*(4), 327-345.

Lynch, D., & Zax, J. S. (2010). *Incidence and substitution in enterprise zone programs: The case of Colorado* (Working paper). Boulder, CO: Department of Economics, University of Colorado.

Manufacturing Extension Partnership (MEP). (2010). *Delivering measurable results to its clients: Fiscal year 2008 results*. Washington, DC: National Institute of Standards and Technology, U.S. Department of Commerce.

Mason, S., & Thomas, K. P. (2010). Tax increment financing in Missouri: An analysis of determinants, competitive dynamics, equity, and path dependency. *Economic Development Quarterly, 24*(2), 169-179.

Merriman, D., Skidmore, M., & Kashian, R. (2007). *Do Wisconsin tax increment finance districts stimulate growth in real estate values* (Working paper). Chicago: Institute of Government and Public Affairs, University of Illinois.

Merriman, D., Skidmore, M., & Kashian, R. (2011). Do tax increment finance districts stimulate growth in real estate values? *Real Estate Economics*, *39*(2), 221-250.

Neumark, D., & Kolko, J. (2010). Do enterprise zones create jobs? Evidence from California's enterprise zone program. *Journal of Urban Economics*, *68*, 1-19.

Peters, A. H., & Fisher, P. S. (2002). *State enterprise zone programs: Have they worked?* Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

Peters, A. H., & Fisher, P. S. (2004). The failures of economic development incentives. *Journal of the American Planning Association, 70*(1), 27-38.

Phillips, J. M., & Goss, E. P. (1995). The effect of state and local taxes on economic development: A meta-analysis. *Southern Economic Journal*, *62*(2), 320-333.

Poterba, J., and Summers, L. (1995). A CEO survey of U.S. companies' time horizons and hurdle rates. *Sloan Management Review, 37*(Fall), 43-53.

Thomas, K. P. (2000). *Competing for capital: Europe and North America in a global era.* Washington, DC: Georgetown University Press.

Wasylenko, M. P. (1997). Taxation and economic development: The state of the economic literature. *New England Economic Review, 1997*(March/April), 37-52.

Weber, R., Bhatta, S. D., & Merriman, D. (2003). Does tax increment financing raise urban industrial property values? *Urban Studies, 40*(10), 2001-2021.

Table 1 Implications of the Business Tax Elasticity for Annual and Present Value Costs per Job, and MEGA Effectiveness

Elasticity	Annual Costs per Job ($)	Present Value (PV) Costs per Job ($)	% of MEGA Subsidies Decisive
−0.05	−92,619	−864,445	2.06
−0.1	−46,310	−432,223	4.12
−0.2	−23,155	−216,111	8.25
−0.6	−7,718	−72,037	24.74

NOTE: All dollar figures are in 2011 dollars. The elasticity is the long-run elasticity of state or local business activity with respect to total state and local business taxes. The column on annual costs per job uses this elasticity, along with Peters and Fisher's (2002) estimate of annual state and local business taxes per job, to calculate the ratio of foregone business taxes to jobs created due to business tax cuts. The column on present value of costs per job uses these annual costs, and Poterba and Summers' (1995) estimate of business CEOs' real discount rate, to calculate the ratio of present value, from a business perspective, of foregone tax revenues to jobs created from business tax cuts. Costs are written with a minus sign. The column on MEGA subsidies reports the estimated percentage of MEGA jobs receiving incentives that are assumed to be induced by the incentive. The decisive percentage combines information on the PV costs of job creation column with information on the PV of the typical MEGA incentive.

Table 2 MEGA Job Effects, Net Fiscal Costs, and Net Costs per Job under Various Assumptions about Business Responsiveness to Incentives

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	PV of Annual Costs per Present Value of Job-Year
Subsidized MEGA jobs (000s)	0.7	1.8	3.0	5.8	7.5	9.8	11.1	13.0	21.0	31.1	40.8	62.1	
Gross MEGA credit costs ($M of 2011 dollars)	0.0	−1.3	−4.2	−8.1	−13.5	−16.9	−23.9	−26.8	−34.0	−51.1	−73.0	−90.7	
Naive fiscal costs per job subsidized ($)	0	−726	−1,399	−1,396	−1,814	−1,724	−2,156	−2,057	−1,615	−1,640	−1,787	−1,459	−1,653
***k* = 2.06%; elasticity = −0.05**													
Net job effects (000s)	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.7	1.1	1.5	3.1	
Net fiscal effects ($M)	0.1	−1.1	−4.0	−7.6	−13.1	−16.2	−23.5	−26.2	−31.6	−47.0	−67.6	−79.7	
Net fiscal effects per job created ($)	3,594	−21,391	−63,481	−59,907	−13,5423	−97,124	−19,3728	−14,1820	−44,732	−41,350	−45,338	−25,566	−44,797
***k* = 4.12%; elasticity = −0.1**													
Net job effects (000s)	0.0	0.1	0.2	0.4	0.5	0.7	0.7	0.9	2.1	3.3	4.5	8.1	
Net fiscal effects ($M)	0.1	−0.8	−3.4	−6.5	−11.8	−14.6	−21.8	−24.3	−27.7	−40.3	−58.1	−63.6	
Net fiscal effects per job created ($)	3,594	−6,337	−16,284	−15,685	−25,094	−21,424	−30,149	−26,584	−13,157	−12,144	−12,982	−7,857	−12,916
***k* = 8.25%; elasticity = −0.2**													
Net job effects (000s)	0.1	0.3	0.5	1.0	1.2	1.7	1.9	2.4	4.9	7.7	10.4	18.0	
Net fiscal effects ($M)	0.3	−0.3	−2.4	−4.5	−9.2	−11.2	−18.4	−20.4	−19.8	−26.7	−39.0	−31.3	
Net fiscal effects per job created ($)	3,594	−901	−4,717	−4,469	−7,554	−6,574	−9,566	−8,624	−4,036	−3,480	−3,733	−1,734	−3,748
***k* = 16.85%; elasticity = −0.41**													
Net job effects (000s)	0.1	0.6	1.1	2.2	2.8	3.8	4.4	5.4	10.7	16.8	22.9	38.8	
Net fiscal effects ($M)	0.5	0.9	−0.2	−0.1	−3.8	−4.2	−11.4	−12.4	−3.2	1.6	0.9	36.2	
Net fiscal effects per job created ($)	3,594	1,504	−206	−53	−1,353	−1,093	−2,568	−2,298	−302	96	40	932	0
***k* = 24.73%; elasticity = −0.6**													
Net job effects (000s)	0.2	0.9	1.7	3.3	4.2	5.8	6.7	8.2	16.1	25.1	34.3	57.8	
Net fiscal effects ($M)	0.8	2.1	1.8	3.9	1.2	2.2	−5.0	−5.1	11.9	27.5	37.4	97.9	
Net fiscal effects per job created ($)	3,594	2,195	1,031	1,162	291	380	−736	−623	740	1,097	1,092	1,693	1,045

NOTE: All dollar figures are in 2011 dollars. Negative dollar amounts indicate net fiscal costs; positive dollar amounts indicate net fiscal benefits. First set of numbers simply looks at subsidized MEGA jobs and MEGA's own costs. Other groups of rows count net job creation effects, allowing for only a portion of subsidized jobs to be induced, and allowing for multiplier effects and the effects of financing MEGA by reduced government spending. Each group of rows varies in what elasticity of business activity is assumed with respect to taxes. The PV calculations are from a social perspective and therefore use a 3% social discount rate to express both costs and job-years in present-value terms as of 2011. The last column divides the PV of costs by the PV of job-years to get an average cost per job-year created.

Table 3 Estimated Job and Fiscal Effects of Substituting MEGA for Overall Business Tax Cut

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
% increase in State Business Tax needed to finance MEGA, static calculation (%)	0	0.06	0.18	0.34	0.57	0.71	1.01	1.13	1.43	2.15	3.08	3.83
Gross job effects of MEGA	0.1	0.3	0.6	1.2	1.5	2.0	2.4	2.9	5.6	8.7	11.9	19.9
Gross job effects of cutting state business tax (000s)	0.0	0.0	0.1	0.2	0.4	0.5	0.7	0.9	1.2	1.7	2.4	3.2
Net job effects of substituting MEGA for business tax cut (000s)	0.1	0.3	0.5	1.0	1.1	1.5	1.7	2.0	4.4	7.0	9.5	16.7
Fiscal effects of substituting MEGA for overall business tax cut ($M of 2011 dollars)	0.3	1.1	1.8	3.7	4.3	5.7	5.5	6.3	14.1	24.2	33.4	58.2

NOTE: This table assumes an elasticity of state business activity with respect to total state and local business taxes of −0.2. Overall business tax increase is set so that the static revenue raised from this tax increase would in each year exactly equal MEGA credit costs. However, because this substitution ends up leading to some job gain, there is some net fiscal gain. Net job effects are equal to gross gains from MEGA minus gross job losses from increasing state business taxes. The estimated effects for other elasticities would be multiples of the numbers here—that is, a −0.6 elasticity would yield numbers three times as great.

Table 4 Comparing This Study with Hicks/LaFaive

Source of Estimate	MEGA Annual Credit Costs per Job-Year Generated
Hicks LaFaive estimate	Infinite, jobs destroyed
Hicks LaFaive “pessimistic” bound	Infinite, jobs destroyed
Hicks LaFaive “optimistic” bound	−$ 12,215
This study, −0.2 elasticity	−$ 10,015
This study, −0.05 elasticity	−$ 102,860
This study, −0.6 elasticity	−$ 2,940

NOTE: For sources, see text.