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A New Panel Database on Business Incentives for Economic Development Offered by State and Local Governments in the United States

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OVERVIEW

With slower or no growth in the last 30 years in many Americans living standards, political pressure has increased for state and local policymakers to "do something" to improve job opportunities. Many state and local governments have responded with efforts to attract or increase local business activity via "economic development" policies, including lower business tax rates and higher "business incentives." Such incentives provide targeted new or expanding businesses with special tax credits or other special financial benefits or services. Two examples of business incentives are property tax abatements, which reduce property taxes below normal property tax rates; and job creation tax credits (JCTCs), which provide tax benefits tied to jobs or payroll created. Despite the increase in such economic development policies, we have imprecise knowledge about how state and local incentives and business taxes vary across states, industries, and time. This lack of knowledge limits our ability to subject economic development policies to rigorous evaluation. If we don't know how large incentives are, whether they are going up or down, or how they vary in different places or for different industries, how can we subject incentives to an informed debate?

This report addresses the gap in our data and knowledge by outlining a new database with better information on state and local business taxes and economic development incentives. For a firm locating a new facility in a particular state or city, the database estimates what state and local business taxes would be owed before considering economic development incentives, and what the facility would be eligible for in incentives. Although other databases previously have simulated the magnitude of state and local incentives and business taxes, this new database is distinguished by its breadth, covering more states, industries, and years. The database estimates,

from 1990 to 2015, marginal business taxes and business incentives for 47 cities in 33 states for 45 industries for 26 years. The 33 states compose 92 percent of U.S. GDP, and the 45 industries compose 91 percent of U.S. labor compensation. The database also has more depth: it describes how business incentives vary over the term of a new business investment (from year 1 to year 20), and it breaks down incentives into different types, including JCTCs, property tax abatements, investment tax credits (ITCs), research and development (R&D) tax credits, and customized job training. Therefore, this new database allows incentives to be subjected to more in-depth descriptive analyses. Such descriptive analysis can include examination of time trends in different types of incentives, and analysis of how incentives vary with a state's economic prosperity or with an industry's wage rates. With more precise knowledge of how incentives vary with states, industries, and time, the database also will permit better estimates of incentive effects.

This report includes an explanation of how the database is constructed. It also subjects the database to some preliminary analyses to begin to answer questions about how incentives vary.

Key conclusions from analyzing this new database include the following:

- **Business incentives are large.** For "export-base" industries (industries that sell their goods and services outside the local economy), incentives for new or expanding businesses in 2015 had a present value that averaged 1.42 percent of business value-added, about 30 percent of average state and local business taxes. This incentive percentage leads to a projection that, for the entire nation, state and local business incentives had an annual cost in 2015 of $45 billion.

- **Business incentives are insufficiently targeted in many states, although targeting is better in some states and has improved somewhat over time.** Among export-base industries, incentives today for the average state do not vary as much as they should with industry characteristics that predict greater local benefits, such as industry wages, employment, and R&D. For example, for each 10 percent increase in an industry's wages, average predicted incentives increase by only 3 percent. Industry wage variations are likely to be associated with greater variation than that in local benefits. However, some states do considerably better in targeting; for example, in some states a 10 percent increase in wages increases incentives by over 7 percent. In addition, back in 1990, a 10 percent increase in industry wages was only associated with an incentive increase of 1 percent.
- **Business incentives vary greatly by state.** Even among adjacent states, business incentives often vary by a factor of 2- or 3-to-1. Incentives vary much more across states than across export-base industries. In many cases, states have higher incentives than nearby states, even though economic conditions are no worse and gross business taxes are similar or lower. A state's political culture and past practices seem to dictate incentives more than state economic and fiscal conditions.
- **Business incentives have more than tripled since 1990.** However, the average national rate of increase has slowed since 2000, and in recent years some states have even subjected incentives to cutbacks.
- **On average in the nation, business incentives are concentrated more in the first years of a business investment, but are still large even after 5 or 10 years of an investment.** Given the high discount rates businesses are likely to apply to incentives,

longer-term incentives are less effective per dollar than shorter-term incentives in altering business decisions. States vary widely in the degree to which incentives are up front. On average in the nation, up-front incentives have increased over time.

- **Averaged over all states in the database, the biggest type of incentive is JCTCs, followed by property tax abatements.** Together, these two types of incentives in 2015 made up over 70 percent of total incentive costs. Since 1990, the incentive type with the biggest increase has been JCTCs. Increased JCTCs make up two-thirds of the 1990–2015 increase in incentive costs.
- **Incentive costs can be significantly reduced by a wide variety of reforms.** In addition to eliminating or limiting certain incentive types, simulations using the database show that incentive costs can be significantly reduced by restricting incentive "refundability," that is, restricting the ability of businesses to receive incentives even if they have no state corporate income tax liability. Incentive costs can also be significantly lowered by reducing the term of incentives, that is, by restricting the incentives to the first few years of an investment. More modest effects on net business taxes are caused by changes in the rules for how business income is apportioned among states. However, changes in business apportionment rules have the potential to increase long-run business tax revenue but at a lower present value cost to businesses.
- **Preliminary work suggests that a state's incentives are not highly correlated with a state's fortunes.** Incentives do not have a large correlation with a state's current or past unemployment or income levels, or with future economic growth.

However, this preliminary work does not include many other control variables, which might alter results.

The rest of this report is organized as follows. The next section provides context, including reviewing previous research. The methodology and data sources for this database are then outlined. The bulk of the report then uses the database to describe incentives and how they vary, by industry and state, over time, and by type of incentive. The report also considers how different policies alter net taxes after incentives, and describes some simple correlations between taxes, incentives, and state economic characteristics and trends.

CONTEXT FOR THIS NEW DATABASE

State and local governments in the United States have increasingly become more active in seeking to boost growth through policies that target specific industries or firms, including tax breaks or services that are customized to favor particular firms or industries. Such economic development policies are in part politically motivated by recent earnings problems for many Americans. In recent decades, many Americans have experienced either actual real earnings losses, or real earnings growth that is slower that what occurred in the quarter-century after World War II. In the absence of federal policies to effectively address these earnings challenges, state and local policymakers have sought to fill the gap with economic development policies to create more or better jobs in targeted firms or industries.

Targeted economic development policies can be justified by increased evidence that some firms or industries may have particularly high multiplier or other spillover effects. For example, there is evidence that high-technology industries have extraordinarily high multiplier effects—as high as 6-to-1 (e.g., one job in high-tech industries leads to total local jobs increasing

by six; Moretti [2010]). These large multiplier and spillover effects can be rationalized as being due to powerful "agglomeration economies," which is economics jargon for productivity advantages due to a concentration of related economic activities in a particular geographic area. Such productivity advantages may occur because companies benefit from one or more of the following: the business ideas of other nearby firms, a large local pool of skilled workers, or specialized local markets in input industries. Agglomeration economies provide a rationale for state and local subsidies to help develop industry clusters.

Such state and local government economic development incentives have been estimated to be as great as $65 billion per year (Thomas 2011) or $90 billion per year (Story 2012).[1] (The exact amount depends on what is defined as an "incentive" versus what is seen as "neutral" tax policy.) The large costs lead to concerns that many of these incentives are ineffective or have negative effects. Good Jobs First, an advocacy research group, has argued that many incentives subsidize low-wage jobs and go to large, profitable companies (Mattera, Tarczynska, and LeRoy 2014; Tarczynska, Cafcas, and LeRoy 2016). If incentives mostly leave business location decisions unchanged, then they mainly would serve to redistribute income from average taxpayers to capital owners, who are mostly upper income. Many conservative groups argue that such targeted incentives amount to "picking winners;" however, picking winners could lead to picking the wrong businesses, either because of political lobbying or the inevitable limitations of knowing which business investments have the greatest payoffs. Picking the wrong businesses would harm economic growth by distorting investment toward less productive uses. The political factors that potentially influence incentives might encourage businesses to devote more efforts

[1] I adjust Thomas's figure for 2005, of $46.8 billion in incentives, to 2015 using the ratio of nominal GDP in 2015 versus 2005. Story's 2012 figure of $80.4 billion is similarly adjusted to 2015.

toward lobbying and less toward figuring out how to do a better job of making a good product or service (e.g., LaFaive [2016]).

Another concern about incentives is whether they are adequately evaluated. As documented by the Pew Research Center, "No state regularly and rigorously tests whether [their incentives] are working and ensures lawmakers consider this information when deciding whether to use them, how much to spend, and who should get them" (Brockmyer et al. 2012, p. 1).

The incentives debate has also led to calls for various reforms. Greg LeRoy of Good Jobs First has argued that incentives should be subject to greater transparency and disclosure (LeRoy 2007). The Pew Center has outlined specific ideas for improving incentive evaluation and has worked with states to improve such evaluation. Art Rolnick, former director of research at the Minneapolis Federal Reserve Bank, has argued that Congress should seek to make state and local incentives illegal and impose extra federal taxes on businesses receiving such incentives (Rolnick 2007). The European Union (EU) provides a possible model for U.S. efforts to rein in incentives. Under EU rules, a country's incentives are regarded as export subsidies, which, if they exceed a certain size, are deemed illegal except for special cases. If the EU finds a country's incentive to a firm to be illegal, the firm can be forced to repay the incentive (Sinnaeve 2007).

A problem with the debate over incentives is that evidence and data are lacking. How do incentives affect job growth? On this topic, research has failed to reach a consensus (see review in Bartik and Erickcek [2014]). The majority of studies suggest incentives are not cost-effective, with either no statistically significant effects or large costs per job created. However, the incentives' research literature has exceptions: studies of some incentives suggest that these incentives can create jobs at reasonable costs. For example, some favorable evidence has been found for customized job training (Hollenbeck 2008; Holzer et al. 1993; Hoyt, Jepsen, and

Troske 2008), manufacturing extension services (Jarmin 1998, 1999), and job creation tax credits (Chirinko and Wilson 2016). However, our incentive knowledge is still far from being definitive or precise.

The impact of incentives can be extrapolated from that of state and local business taxes. If taxes and incentives with a similar effect on business costs have similar impacts on business location and expansion decisions, then the research literature on how state and local business taxes affects business location/expansion decisions or job growth can be used to infer the effects of incentives. Because data are more available on business taxes than incentives, this approach seems more promising. Unfortunately, the research on how business taxes affect location decisions suggests a wide range of plausible impacts. The literature suggests that a local business tax or other policy that reduces costs of business investment by 1 percent of value-added will increase long-run business activity by somewhere between 2 and 12 percent (Bartik 1991; Bartik and Hollenbeck 2012; Wasylenko 1997).[2] This wide range of estimates implies that the cost per job created of business tax reduction or incentives will also range widely. For example, using this range of cost sensitivity, Bartik and Erickcek (2014) estimate annual costs per job created of a Michigan incentive program that range between $8,000 and $46,000.

One problem inhibiting incentive research is that good data have been lacking on different incentives' magnitude and how it varies by industry, state or city, and year. Industry variation is important because we want to know whether incentives are targeted toward industries that plausibly have higher local benefits (e.g., higher-wage or high-tech businesses), or

[2] This statement of effects translates the state and local business tax elasticity range of an elasticity with respect to overall business taxes between −0.1 and −0.6 into effects as a percentage of value-added using the estimated average state and local business tax share in value-added of 5 percent, which is consistent with both past research and the current study. These business cost effects from the tax literature are consistent with some of the incentive literature, for example, Bartik and Hollenbeck (2012) and Moretti and Wilson (2013).

whether most incentives go to low-wage businesses. State and local variation is important, because it helps reveal what variation in incentive regimes is deemed politically and economically feasible by practical politicians. Variation over time is important, because it sets the context for whether incentives are a rapidly growing issue or not. And variation across all these dimensions, by industry, local area, and year, is important for providing sufficient data variation for precise estimates. Finally, including multiple taxes and incentives in the analysis is important, as empirical analyses that focus on one incentive at a time may suffer from omitted variable bias.

Previous attempts have aimed to simulate the magnitude of incentives (Fisher and Peters 1998; Papke 1987; Peters and Fisher 2002), but these efforts have not been updated; for example, the Fisher and Peters data extend from 1990 to 1998. Since then, some studies have simulated the magnitude of state and local business taxes or incentives, but usually only for a few years or a few industries (Cline, Phillips, and Neubig 2011). For example, recent reports for the Tax Foundation attempts to estimate marginal tax rates, after incentives, for two years (2010 and 2014) for seven specific types of firms (Tax Foundation 2012, 2015). In addition, these past efforts to analyze incentives have not done extensive analysis of what determines their bottom-line results for net taxes, and they do not answer the important question of how much a given incentive or tax matters to net state and local business taxes.

Compared to these prior analyses, the new database described in this report is more comprehensive. The database is broader in considering 45 industries in 33 states, comprising the majority of U.S. private business activity, and considering each year from 1990 to 2015, which provides a lengthy time trend. In addition, the database is designed to allow for more in-depth analysis of incentive design. For example, the database allows incentives to be turned on and off,

or for other modifications to incentive design. The current report includes some initial analysis of incentive design.

METHODOLOGY

Basic Idea of Tax and Incentive Simulation

The database's simulations consider the following scenario: a business in some industry *i* creates a new branch facility. That new facility is set up in some particular city *c*, in some state *s*, and starts operation in some year *t*. Taxes and incentives for the new facility are projected for the facility's first 20 years of operation, and the facility is assumed to operate at the same scale during that time. In assigning taxes and incentives to this new facility over the 20 years, the same incentive and tax rules in place for year *t* are assumed to remain unchanged through year *t* + 20. This assumption can be seen as taking the perspective of a business that myopically projects current tax and incentive rules into the future. (When taxes and incentives are calculated for the same city and state in some future year *t*1, the tax rules and incentives for year *t*1 are carried forward for 20 years.) To calculate state and local taxes for this new facility, data based on industry averages are used for the firm's balance sheet. The relevant balance sheet information for the new facility includes value-added, pretax profits, mix of property assets, employment, wages, and R&D spending. From this balance sheet information, and from information on state and local business tax rates, and information on rules for how incentives are determined based on firm characteristics, state and local taxes and incentives are calculated for each year of the assumed 20 years of operation of the new facility. The present value of the 20-year stream of such taxes and incentives is calculated using a discount rate. Most of this analysis computes

these present values of taxes and incentives as a percentage of the present value of the new facility's value-added over the same 20 years.

Industries

These projections of future taxes and incentives are done for 45 industries, mostly defined at around the 3-digit level, constituting most of the economy. (The level of industrial detail was based on the data sources available for the balance sheets, as will be described later.) Thirty-one of these industries are considered to be "export-base" industries, and 14 are considered to be "non-export-base." Export-base is a concept in regional economics that describes businesses whose goods and services are either sold outside the local area, or whose goods and services compete with goods and services that are produced outside the local area. (That is, export here reflects exports to other areas, not necessarily to other countries.) Export-base is judged based on preliminary work looking at how much the "location quotient" of each industry varies across metropolitan areas. (An industry's location quotient in a metropolitan area equals the share of the area's employment in that industry divided by the national share for that same industry.) The idea is that export-base industries will tend to have some areas specializing in that industry's production and other areas without such specialization, resulting in high variation across areas in location quotients for those industries. All 18 manufacturing industries are export-base, but there are also 13 nonmanufacturing export-base industries.

Some preliminary analysis led to dropping 16 industries from the original list of 61 private industries, in cases where the tax or incentive data were felt to be unreliable or the industry was strongly location-tied. Many industries in transportation, mining, funds and trusts, and real estate had high simulated taxes, which seem unlikely to reflect true taxes because such industries frequently have special tax rules that are not reflected in our tax measures.

Furthermore, it seems unlikely that mining industries, agriculture/forestry/fishing industries, and transportation industries are very footloose, so the remaining industries in those broad industrial categories were also dropped. Finally, the database also dropped the motion pictures industry. The current version of the database's model does not include film incentives, so results for that industry would clearly not be accurate. Appendix C reports some basic data from these preliminary analyses that included the 16 later-dropped industries.

Table 1 lists the industries in each of the industrial categories. As can be seen, the list is quite wide, even with some industrial categories dropped.

Despite dropping 16 of the original 61 private industries, the remaining 45 industries compose over 90 percent of private-sector employment and wages. Table 2 reports some basic data on the share of private activity made up by these 45 industries. The table also reports a further breakdown of the share of private activity in the 31 export-base industries, the 14 non-export-base industries, and the 31 export-base industries divided into those that are in manufacturing and those that are in nonmanufacturing. In addition to constituting over 90 percent of private employment, wages, and compensation, these 45 industries constitute over 97 percent of private R&D, mostly in manufacturing industries. The share of value-added is lower, at about 75 percent. The lower share of value-added occurs because of one of the dropped industries, real estate, which is estimated to have around 14 percent of value-added, even though this industry has very little employment or wages.

Table 3 reports some balance sheet information for these 45 industries and other industry groupings. These balance sheet ratios are reasonable. Overall, value-added is about half of output, and compensation is about 60 percent of value-added. Profits are about 20 percent of value-added and about 17 percent of total business property value. Property is about 58 percent

Table 1 List of 45 Included Industries, Classified by Export-Base (Manufacturing and Nonmanufacturing), Non-Export-Base

Manufacturing export-base industries	Other export-base industries	Non-export-base industries
Textile mills and textile product mills	Accommodation	Educational services
Apparel, leather and allied product manufacturing	Waste management and remediation services	Amusement, gambling, and recreation industries
Wood product manufacturing	Management of companies (holding companies)	Hospitals, nursing, and residential care facilities
Nonmetallic mineral product manufacturing	Broadcasting and telecommunications	Other services
Primary metal manufacturing	Warehousing and storage	Retail trade
Furniture and related product manufacturing	Computer systems design and related services	Credit intermediation
Paper manufacturing	Performing arts, spectator sports, museums and entertainment	Food services and drinking places
Computer and electronic product manufacturing	Publishing industries (includes software)	Miscellaneous health care and social assistance
Machinery manufacturing	Information and data processing services	Offices of health practitioners and outpatient care centers
Fabricated metal product manufacturing	Miscellaneous professional, scientific, and technical services	Wholesale trade
Printing and related support activities	Insurance carriers and related activities	Administrative and support services
Plastics and rubber products manufacturing	Securities, commodity contracts, other financial investments, and related activities	Rental and leasing services and lessors of intangible assets
Motor vehicles, bodies and trailers, and parts		Construction
Electrical equipment, appliance, and component manufacturing		Legal services
Other transportation equipment		
Food, beverage, and tobacco manufacturing		
Miscellaneous manufacturing		
Chemical manufacturing		
Petroleum and coal products manufacturing		

SOURCE: BEA industry classifications; export-base designation based on author's analysis.

Table 2 This Database's Industries' Share of Totals for All Private Industries

	Share of 45 industries in model (%)	Share of 31 export-base industries (%)	Share of 14 non-export-base industries (%)	Share of 19 manufacturing industries (%)	Share of 12 nonmanufacturing export-base industries (%)
Value-added	75.5	34.1	41.5	14.4	19.7
Compensation	91.7	38.7	53.0	13.6	25.1
Wages and salaries	92.0	38.7	53.4	13.0	25.7
FTE employment	92.6	27.3	65.3	11.2	16.0
R&D	97.4	94.3	3.1	78.2	16.0

NOTE: Totals are percentage of each grouping of industry out of total for all private industries in the United States, as of 2011.
SOURCE: Author's calculations based on data from IRS Statistics of Income and BEA, as described in report text.

Table 3 Descriptions of Average Characteristics of Different Industry Groupings in Model

	Characteristics of:				
	45 Model industries	31 Export-base industries	14 Non-export-base industries	19 Manufacturing industries	12 Nonmanufacturing export-base industries
Value-added/gross output (%)	52.5	44.3	61.9	34.5	55.9
Compensation/value-added (%)	59.5	55.7	62.7	46.3	62.6
Wages/compensation (%)	83.5	83.1	83.8	79.5	85.1
Intermediate inputs/gross output (%)	47.5	55.7	38.1	65.5	44.1
Energy/intermediate inputs (%)	2.8	2.2	3.8	2.6	1.4
Materials/intermediate inputs (%)	46.2	57.0	28.1	82.1	12.9
Services/intermediate inputs (%)	51.0	40.8	68.1	15.2	85.6
Profits/gross output (%)	10.7	10.8	10.5	8.9	13.1
Profits/value-added (%)	20.3	24.4	16.9	25.7	23.4
Profits/property (%)	17.1	19.3	15.1	18.6	20.0
Property/value-added	1.19	1.26	1.12	1.38	1.17
Real property/total property (%)	58.7	55.2	62.0	38.9	69.2
Land/real property (%)	4.0	4.3	3.5	5.3	3.8
Structures/real property (%)	96.0	95.7	96.5	94.7	96.2
Personal property/total property (%)	41.3	44.8	38.0	61.1	30.8
Inventories/personal property (%)	17.9	20.8	14.7	24.1	15.0
Noninv. personal/personal property (%)	82.1	79.2	85.3	75.9	85.0
Deprec. structure/value (%)	2.49	2.71	2.3	3.0	2.55
Deprec. machinery/value (%)	14.2	12.8	15.6	11.2	15.2
Value-added/FTE ($)	106,925	163,795	83,194	167,893	160,924
Compensation/FTE ($)	63,645	91,222	52,138	77,686	100,710
Wages/FTE ($)	53,142	75,823	43,678	61,740	85,693
R&D/output (%)	1.4	2.5	0.1	3.8	0.9
R&D/FTE ($)	2,824	9,286	127	18,707	2,683
Property/FTE ($)	126,747	206,656	93,207	232,394	188,617
Mach & equip/FTE ($)	42,945	73,372	30,250	107,666	49,336
Profits/FTE ($)	21,714	39,975	14,065	43,230	37,693

NOTE: Figures are average characteristics of different industry groupings, based on summing relevant variables across industry groupings, as of 2011. Row concepts come from BEA or IRS. Noninventory personal property is mainly machinery and equipment. "Deprec. structure/value" and "Deprec. machinery/value" are annual depreciation as percentage of value of structures or machinery and equipment. "FTE" is full-time equivalent employment, so those rows are reporting ratios of various balance sheet items to FTE employment.
SOURCE: Author's calculations, based on IRS Statistics of Income and BEA, as described in text.

land and structures, almost all of which is structures, and about 42 percent so-called personal property, most of which is machinery and equipment. Manufacturing tends to be more capital-intensive, in particular having much higher ratios of machinery and equipment to workers. Manufacturing also has much higher ratios of R&D to other balance sheet items.

Cities and States

The database includes the United States' major cities and industrial states. It also seeks geographic coverage that overlaps with past incentives research. The 30 main cities in the 30 largest metropolitan areas were all included.[3] At the request of the Pew Center, which funded the initial development of this database, the database added in the following six states: New Mexico, Louisiana, Nebraska, Indiana, North Carolina, and Virginia. In each of these six states, we chose the largest city, because these are the cities for which it proved easiest to get business property tax data from the Lincoln Institute of Land Policy and the Minnesota Center for Fiscal Excellence (see below for more discussion). In addition, those institutions argue that New York City and Chicago do not have typical property tax structures for their state, so they add in business property tax information for Buffalo, New York, and Aurora, Illinois, which we therefore add to our database as well. Kalamazoo, Michigan, is also added, both from personal interest and because Detroit might not be typical in Michigan. Finally, the database adds the largest cities in eight additional states; these eight states are added so that the database includes all states in the past incentive databases developed by Fisher and Peters (Fisher and Peters 1998; Peters and Fisher 2002). These states were included to allow analysis of how well the Fisher/Peters model and this database match. (Appendix E to this report considers this issue, as well as comparisons to other prior studies.)

[3] These cities have been extensively studied by Pew's American Cities Project.

The database ends up with 47 cities in 32 states plus the District of Columbia (DC). (See Table 4 for a list). These 32 states plus DC comprise 92 percent of all U.S. private sector Gross Domestic Product (GDP) in 2013. The metropolitan areas that include these 47 cities constitute 61 percent of all private sector GDP in 2013.

Table 4 Cities and States Included

City	State	City	State	City	State
Albuquerque	NM	Detroit	MI	Orlando	FL
Atlanta	GA	Houston	TX	Philadelphia	PA
Aurora	IL	Indianapolis	IN	Phoenix	AZ
Baltimore	MD	Kalamazoo	MI	Pittsburgh	PA
Birmingham	AL	Kansas City	MO	Portland	OR
Boston	MA	Las Vegas	NV	Riverside	CA
Bridgeport	CT	Los Angeles	CA	Sacramento	CA
Buffalo	NY	Louisville	KY	San Antonio	TX
Charlotte	NC	Memphis	TN	San Diego	CA
Chicago	IL	Miami	FL	San Francisco	CA
Cincinnati	OH	Milwaukee	WI	Seattle	WA
Cleveland	OH	Minneapolis	MN	St. Louis	MO
Columbia	SC	New Orleans	LA	Tampa	FL
Dallas	TX	New York City	NY	Virginia Beach	VA
Denver	CO	Newark	NJ	Washington	DC
Des Moines	IA	Omaha	NE		

Why not include all states? This is a question of available resources. Increasing coverage from 33 to 51 states would add at least 50 percent more work. But adding in the remaining 18 states would only add in a minor portion of U.S. business activity.

Focusing on major cities raises the issue of whether their incentives will be typical of the rest of the state. In the case of state incentives, these major cities' incentives frequently are not typical of the entire state measured in land area. For example, in North Carolina, South Carolina, and Georgia, larger incentives are offered to businesses locating in lower-income rural counties than in the larger and richer cities of Charlotte, Columbia, and Atlanta. On the other hand, a perennial complaint in all these states is that despite this incentive targeting, most of the

incentives still go to businesses locating in the major metro areas. So, our focus on major metropolitan areas at least focuses on the states' main economic engines. It would be interesting in follow-up work to calculate incentives for the average rural county in each state.

Focusing on cities also raises the question of whether a city's property tax rate and property tax abatement policy will necessarily be representative of its metropolitan area. City property tax rates may be higher and more generous than their surrounding suburbs. But competition within metro areas would pressure local jurisdictions to have similar net property taxes, after abatements. In addition, these within-metro area property tax differentials are probably significantly outweighed by even more major differences in property tax and abatement regimes across states. Therefore, the model probably does a good job of capturing overall tax and incentive regime differences across states, including differences in property tax and abatement regimes, even if some of the property tax information may not represent all jurisdictions even in these metro areas.

In this report, most of the analysis focuses on state and national averages. This focus is justified because most of the variation in incentive regimes is across states and over time. These broad patterns of variation across states and over time should be described before work, to be done later, that explores the cross-city variations.

For calculations of state averages, the analysis uses a simple unweighted average of all the modeled cities in that state. For example, for Illinois, the state average tax rate is simply the average of Chicago's and Aurora's tax rate as a percent of value-added. The analysis uses this simple averaging procedure rather than some weighted average because of uncertainty as to how representative each city in the model is of other geographic areas in the state. For example, in

Illinois, although Chicago is obviously much larger than Aurora, Aurora may be more representative of the rest of the state.

For averages across industries, the analysis uses weighted averages based on each industry's share in value-added.[4] For national averages, the analysis relies on weighted averages of the state averages using each state's share of private GDP as of 2014.[5] For all years and all industries, national averages use the same 2014 aggregate state weights. This is done because it seems undesirable to allow the time trend calculations or industry averages to be altered by different state weights over time or different state weights for different industries. If the analysis did not do this, then differences across industries in average incentives would be due in part to what states the industry was concentrated in, and differences over time in average incentives would be due in part to changes over time in geographic location of business. While these differences in industry location are of interest, in this preliminary analysis it seemed better to use the same weights for all industries and years. This means that industry and year variations in taxes and incentives are due to differences in policy, not differences in industry location.

Years Covered

The database sought to go as far back in time as possible—far enough to overlap with some previous incentive analysis. The database goes back to 1990, which overlap with the Fisher-Peters' incentive and tax analysis (1990–1998). In trying to describe tax and incentive regimes, it proved increasingly difficult to figure out state and local business taxes and incentives as the research went back to the early 1990s, and 1990 seemed a logical stopping point.

[4] As described below, the industry data are all for 2011. Therefore, the actual calculations can simply add incentives and taxes across industries (and add value-added across industries) and divide the former by the latter to get averages of incentives or taxes as a percent of value-added for some industry aggregate.

[5] Private sector GDP by state in 2014 was used as a weight in forming national averages, for any national average figure, regardless of specific industry or industry grouping.

Taxes Included

The database seeks to include the main state and local business taxes, which apply to most industries. It includes business property taxes, which, according to Ernst and Young researchers, were 36 percent of total state and local business taxes in 2014 (Phillips et al. 2015). The database includes state and local sales taxes on business inputs, which are 21 percent of state and local business taxes (Phillips et al. 2015). (The sales tax paid on a business's sales are *not* included, as these are assumed to be passed on to buyers.) The database includes state taxes on corporate income and state gross receipts taxes, which together are 8 percent of state and local business taxes (Phillips et al. 2015). (Although gross receipts taxes are included, they are treated as a sales tax, and hence the business tax burden is what is implicitly paid on inputs, not what is paid on the business's own gross receipts.)[6]

The database does not include local taxes on corporate income, which occur in some of our model's cities (e.g., New York and Philadelphia). Such taxes nationwide are about 1 percent of state and local business taxes. These local corporate income taxes may be added in a revised database.

The database also does not include taxes on business income via the individual income tax system. Such taxes are of increasing importance because of changes in business organization in the United States (Cooper et al. 2015). According to the Ernst and Young analysis, such state and local business taxes through the individual income tax system make up about 5 percent of overall state and local business taxes. However, the tax rates and incentives that apply to corporations in many states would often apply similarly to other forms of business organization,

[6] The model also includes state value-added taxes, which Michigan had in the past. In addition, the main state corporate tax since 2008 in Texas is treated as if it was a value-added tax, as research suggests that the burden of this complex tax resembles a value-added tax (Texas Taxpayers and Research Association 2011). State VATs are classified with state corporate income taxes in statistics generated for this report.

so one would expect the net tax rates across different forms of business organization to be highly correlated.

The database also does not measure public utility taxes, insurance premium taxes, or severance taxes. Therefore, our measures of net taxes for utilities, the insurance industry, and energy-related businesses may not be right. Similarly, states often have different tax treatment of financial institutions, which our database does not include. As mentioned above, the 45 industries reported here exclude many of these industries with special tax treatment, in particular, dropping energy-related industries, utilities, and some financial industries.

Finally, the database does not include unemployment insurance taxes, which are measured by Ernst and Young as about 7 percent of state and local business taxes. It is questionable whether this tax should be included as a business tax, as it provides benefits to workers and indirectly to businesses. Much of the UI tax burden should be expected to be shifted to workers, so it is unclear whether this should be counted as a net business tax.

Overall, it seems likely that the database includes over two-thirds of the true state and local business tax burden for the 45 industries included. The calculations based on Ernst and Young say that the included taxes sum to 65 percent of total state and local business taxes. Some of the excluded taxes are mainly imposed on excluded industries, and unemployment insurance taxes probably are not a true business tax burden, so the percentage of the true state and local tax burden for the 45 included industries will be somewhat greater than 65 percent.

Incentives Included

The database does not attempt to include all incentives; rather, it aims to include the incentives that are commonly used by medium to medium-large export-base firms. Furthermore,

the database only includes incentives that can be readily used at most industrial sites in a city or state.

The specific incentives included in the database are property tax abatements, customized job training subsidies, investment tax credits (ITCs), job creation tax credits (JCTCs), and research and development (R&D) tax credits. Such incentives make up most of the available economic development incentive dollars.[7]

Some states also have "deal-closing" programs under which the governor or some state economic development authority has considerable flexibility to make whatever offer is perceived to be needed to tip the location decision toward the state. "Deal-closing" programs are only included if we have program data that give some statistics to measure the likely cash incentive that would be provided, such as if the program releases data on the average cash award per job incented or per dollar of capital investment. Otherwise, the database must regretfully leave out deal-closing programs because there simply is no way to quantify their magnitude.

The database does not include two categories of incentives that are of some importance, but whose value is hard to quantify. First, the database does not include geographically targeted incentives, such as enterprise zones or brownfield programs, unless there is clear evidence that they apply to most plausible industrial sites in a city or state. The database avoids including such incentives because without much more detailed data, it is hard to gauge how much this increases the net attractiveness of the state or city. If an enterprise zone program or brownfield program is limited to a few very distressed neighborhoods or communities or properties, then it may not be so much of a net attractant to the city or state as it is a way of reallocating economic activity

[7] This statement is based on my experience with state and local economic development incentives and economic developers and also on available data on tax expenditures. Appendix F analyzes economic development incentives by state and shows the importance of these incentives.

within a state. In order to gauge the net attractiveness of geographically targeted incentives, much more information would be needed about what percentage of readily developable sites are included, and how distressed the covered sites are. In some states and cities, enterprise zones and brownfield programs may be so widely available that they effectively act as general incentives, whereas in others the net effect on business attractiveness of such geographically tied incentives is much reduced because the incentive is conditioned on the firm being willing to incur considerable additional costs by locating at a distressed site. Ideally, a database on incentives would measure the net incentive effect of geographically targeted incentives after controlling for the extra costs associated with the marginal enterprise zone or brownfield site that is chosen. These extra costs of marginal enterprise zone or brownfield sites will vary considerably across different state or city programs.

Second, the database does not include tax increment financing (TIF) incentives. These incentives typically involve the firm paying its normal tax rates, but then the funds are diverted to benefiting the development of a geographically defined TIF area in which the firm is located. Usually this diversion is of property tax funds, which may in some cases be used for direct services to firms, such as job training, access roads, or infrastructure needs of a particular industrial site. In other cases, the TIF funds may be diverted to more general infrastructure and service needs of the TIF area. Such general services may still benefit the firm, but by a lesser amount compared to what would otherwise occur. For example, TIF funds frequently are dedicated to making the payments on bonds used to finance TIF-area infrastructure. In some cases, this TIF-area infrastructure goes beyond what would have occurred without the TIF. In other cases, the TIF is an alternative way to finance infrastructure that would have been provided anyway. In still other cases, some of the TIF funds may implicitly go to support the bureaucracy

of quasi-public development agencies. Ideally, an incentives database would quantify the value of the TIF incentive to the firm over what would have occurred without the TIF, which will be some percentage of the dollar cost of the TIF. To do so would require considerable information on exactly how TIFs are designed and administered in a given city and state. In addition, TIFs are typically geographically targeted, and again the net value of such an incentive must be net of any spatial disadvantages of the TIF area compared to the typical industrial area near that city and state.

The database currently does not include film incentives, and hence excludes the film industry from the analysis. A revised future database may add in such film incentives.

Another category of incentives that is excluded from the current database is discretionary incentives that relieve firms of sales tax burdens on input purchases. The database includes general sales tax exemptions that states have for categories of inputs such as manufacturing machinery and equipment or manufacturing fuel purchases. But some states provide such exemptions on a discretionary basis, which is not measured in the current database, but may be added in future revisions.

The database also does not include incentives that are so rarely used that they only apply to a few very large location decisions. In practice, even if we had included such incentives, it is unclear whether this would be a good guide to what incentives are actually provided to the very largest firms and new facilities. Many very large location decisions end up getting special incentives assigned to them by firm-specific state legislation. Therefore, in practice, the very largest location decisions have different rules apply to them than can be quantified by our database, or any database that relies on what is currently legally permitted.

On the other hand, the database does include discretionary incentives that have some reasonable size criteria that includes many firms. The practical limit is that the database excludes incentives that impose a minimum investment requirement of greater than $100 million.

Where it is possible to ascertain program activity, the database attempts to only include incentives that have been used many times with many firms. The database seeks to exclude incentives that have only been used occasionally for a few firms.

The goal is to measure the "standard deal" that would be offered to a medium-sized export-base new facility that the state and city wished to attract. These incentives may not be offered to all firms, but they are commonly offered to many firms.

The property tax abatement portion of the model is specific to the city being considered. The database seeks to determine not just what the state allows in property tax abatements, but what that specific city actually does. For example, in Texas, the cities of Dallas, Houston, and San Antonio all have significantly different property tax abatement programs, although the state law regulating such abatements is the same for all three cities.

Complexities of Modeling Taxes and Incentives Due to Interactions among Taxes and Incentives, and Dynamics over Time

In the simulation model that generates this database, measuring each tax and incentive separately, in a given year, is generally not complex.[8] Instead, the main source of complexity is that the value of many taxes and incentives depends on other taxes and incentives, both in this year and in previous years.

[8]There are some complexities for individual incentives. For example, some incentives depend on the proportion of jobs exceeding a particular wage, which requires some creativity to estimate for each of the 45 industries. In addition, the R&D credit calculations in some cases are complex. See Appendix A for more discussion of some of these complications.

For example, property tax abatements are some percentage of base property tax liability, and so depend upon the property tax. Corporate income taxes depend on corporate profits, which in turn will depend on the sales tax on business inputs, property taxes, property tax abatements, and customized job training subsidies.

Investment tax credits, JCTCs, and R&D tax credits are in some cases refundable credits, payable regardless of tax liabilities, but in many other cases will be limited by some tax liability. The most common limit is that the sum of ITCs, JCTCs, and R&D tax credits are limited to be no more than 100 percent of the firm's liability under the state's corporate income tax. Credits that cannot be claimed in a given year can usually be carried forward for a specified period of time, which varies by type of credit and by state and year. This is further complicated because some ITCs, JCTCs, and R&D tax credits are initially provided for various terms. Therefore, credits may be earned at one point, then nominally awarded in several subsequent years, with a portion being actually used in each such subsequent year and the remainder being carried forward even further into the future.

An additional complexity is that some of these credits can be claimed against nonbusiness taxes. For example, it has become increasingly common for states to allow ITCs or JCTCs to be claimed not only against the corporate income tax but against the payroll tax withholdings the company makes to the state for its workers' individual income tax liabilities. The worker is still credited with making those income tax payments, but the company either does not make the full withholding payments or receives reimbursement from the state for a portion of those withholding payments. As a result, the simulation model needs to add in calculations of the firm's likely payments under some taxes that are not really business tax liabilities.

Furthermore, the firm's tax liability may depend on the order in which credits are claimed. This order is in some cases dictated by the state, but is more commonly chosen by the firm. Therefore, the simulation model has to assume something about what order of credit claiming would be most likely to maximize net-after-tax-and-incentive profits for the firm. The assumption made is that refundable credits are claimed last, and that otherwise the firm first claims credits with the shortest remaining carry-forward, unless state law has other requirements.

As an extreme example of complexity: under some state tax regimes, a new facility may receive a separate R&D tax credit for each of its 20 years of operation. Therefore, the simulation model then has to keep track of 20 separate vintages of R&D tax credits, which are claimed against various taxes and carried forward, and in some cases expire without being fully used.

Dealing with Formula Apportionment

A challenging issue is how to deal with formula apportionment of corporate income. In general, states tax firms not simply on the profits in the state, but rather on nationwide profits. These nationwide profits are then "apportioned" to the state based on a formula that traditionally involved the share of property, payroll, and sales in that state. The traditional formula was based on a one-third weight each on the percentage of the firm's property, payroll, and sales in the state. More recently, most states have shifted to a formula that overweights sales. For example, some states put a 50 percent weight on sales and a 25 percent weight each on property and payroll. Other states put a 100 percent weight on sales. The idea is to lower taxes on firms that have a great deal of out-of-state sales. Such firms are part the state's "export-base."

State formula apportionment also must consider how to treat sales to states in which the firm has no property and payroll. Under court rulings, if a firm has no property or payroll in a state, then the firm has no "taxable nexus" with that state and cannot be taxed by that state.

Traditionally, the way in which states have treated this is by a "throwback" rule: sales by a firm to states in which the firm has no taxable nexus (e.g., no property and payroll) are "thrown back" to the state from which the sales originated and treated as sales in that origin state. But some states never had a throwback rule, and when they shifted to overweighting sales, which makes this issue more important, they never adopted one. Other states have abolished throwback in order to lower taxes on export-base firms. Without a throwback rule, and with more weighting on sales, some portion of a firm's profits become "nowhere income," taxed by no state.

Formula apportionment leads to a complicated tax structure. The taxes paid by a new firm in a state depend on its operations in other states, and on the taxes in those states. Opening up a new branch plant in this state not only creates new profits that the state can tax, but also potentially reallocates the firm's existing profits across states. A new branch plant location could lead to lower overall corporate taxes, summed across all states, or it could increase overall corporate taxes by more than would be expected based on this state's effective tax rates.

However, as shown in Appendix B, under certain assumptions the marginal tax burden on a new facility can be expressed more simply, as equal to the state's average effective corporate tax rate times the new facility's profits. This simplification occurs if either of the following two assumptions hold: 1) if this new state has tax rates and apportionment rules that are similar to the states in which the firm already has operations, or 2) if the new state and other states with which the firm has taxable nexus have apportionment formulas in which the relative share of profits taxed in each state is approximately similar to the relative property and payroll shares in each state. These are heroic assumptions, but they make the problem tractable.

What about the consequences of a greater sales factor, or moving to a no throwback rule? In theory, if all states have similar apportionment formulas, and there is no nowhere income,

moving to the sales factor, with or without throwback, should lead on average to no reduction in taxes.[9] This theoretical expectation is violated for a number of reasons. First, states' formulas do differ, and so do firms' circumstances. Moving to a sales factor encourages firms to locate in states in which they have little sales relative to production, particularly if other states in which they are located do not have a formula that overweights sales. This selection effect will mean that, on net, new firms choosing the state will pay less with an overweighted sales formula. Second, as Fox, Murray, and Luna (2005) note, it is harder for states to monitor the sales factor than the payroll or property factor. This monitoring problem may lead to firms shifting sales in a way that will minimize their tax burden.

Studies come up with widely varying estimates of the revenue loss due to greater sales weightings in formula apportionment. For the states considered in Table 1 of Mazerov (2005), the average revenue loss due to moving to a sales-only apportionment formula across the 11 states considered here is 8.2 percent. But the estimated losses range from 1.1 percent up to 16.7 percent. A more recent study in Minnesota suggests an even higher revenue loss, at 28.4 percent. But Minnesota might be unusually high as the state is relatively small in population. In general, it is hard to tell whether these studies are detecting true differences across states or are simply using different methodologies.

Taking all this into account, we assume that the revenue loss of moving from a 33.3 percent to 100 percent sales factor is 8.2 percent, based on Mazerov (2005). We assume all of this is due to effects on export-base firms, who can arrange their affairs to lower taxes with the sales factor. As profits for export-base firms are about 56 percent of overall profits, the revenue loss for export base firms from moving from a 33 percent to a 100 percent sales factor is about

[9] Appendix B also shows this proposition.

15 percent. The database adapts this into a formula that takes all this into account. The effective corporate income tax rate for non-export-base firms is assumed to simply be equal to the nominal corporate tax rate.[10] The effective rate for export-base firms is the nominal corporate tax rate times the quantity (1 + parameter b × the sales factor), where the sales factor potentially varies from zero to 1, and in practice varies from one-third to 1. Parameter b is equal to −0.20549.[11]

As for throwback, there are even fewer estimates of how throwback rules affect business tax revenue. The available estimates for reductions due to a no-throwback rule include 8.6 percent (Wisconsin), 4.8 percent (New Jersey), and 2.6 percent (Minnesota). The only specific study of the magnitude of thrown-back income is an Oregon study by the Legislative Revenue Bureau (Oregon Legislative Revenue Office, 2012) that uses a sample of Oregon tax returns to estimate that thrown-back sales are 10 percent of sales for Oregon manufacturing companies. Based on this, it would not be unreasonable to assume nowhere income due to a no-throwback rule of 10 percent for export-base firms, zero for other firms. This throwback rule is taken care of in the model by further lowering the effective corporate income tax rate. The corporate income tax rate previously calculated (after adjusting for the effects of sales factor apportionment) is multiplied, for export-base firms only, by the quantity (1 − 0.10 × sales factor), where the 0.10 comes from the nowhere income.[12]

An Outline of How the Simulation Model Works

The model proceeds by imagining for each industry and year that a new facility in located in a particular state and city. The new branch plant has exactly the mix of output, value-added,

[10] In four states, this nominal corporate income tax is adjusted because federal corporate income taxes are deductible. See Appendix A.

[11] A little figuring indicates that if g is the ratio of revenue at 100 percent sales factor to revenue at 33.3 percent sales factor, b must equal $3 \times (1 - g)/(g - 3)$. At $g = 0.8529$, we get $b = -0.20549$.

[12] Wisconsin had 50 percent throwback from 1979 to 2009. For Wisconsin for those years, we multiply the previous effective rate times (1 − 0.05 × sales factor).

real and personal property, labor, and purchases of intermediate inputs that are described by the constructed balance sheets.[13] In this initial year, the real and personal property represent new investment, the jobs are newly created, and R&D spending is relative to a baseline of zero in that state.

Mechanically, the model proceeds in the first year by calculating the property tax due and then property tax abatements, which are typically a percentage of property tax payments. Following this, the sales tax owed by the firm on its business inputs (both on the initial capital stock and on intermediate inputs) is calculated. The model calculates both the sales tax actually paid (equal to sales tax rate times the percentage of these items taxed times the amount of item purchased) and the amount taken as a deduction (equal to the sales tax rate times the percentage of these items taxed times the annual depreciation amounts on these items). The model then calculates the customized job training subsidy for these newly created jobs.

Net property taxes after abatements, the sales tax deduction, and customized job training grants are all used to adjust the facility's profits. The state's corporate income tax rate, adjusted for sales factor apportionment and throwback rules, is then applied to those profits to calculate corporate income tax payments before tax credits.

The model then calculates the nominal value of the following incentives: ITCs, JCTCs, and R&D tax credits. The nominal value of each tax credit is calculated first before considering any limits on those tax credits. The model calculates how much of these tax credits can be taken against the corporate profits tax or against other taxes, given state law. As outlined above, the

[13] Mechanically, the model acts as if the firm were actually as big as the industry. That is, the industry totals from this balance sheet spreadsheet are used. This fiction is adopted because although the percentages actually preserve all the needed information to calculate tax rates and incentive rates for each industry, they do not immediately and easily preserve the likely relationship between the sizes of these taxes and incentives across industries of different sizes. By using the aggregate numbers, it is possible later to easily calculate weighted averages of tax rates and incentive rates across groups of industries (e.g., manufacturing, export-base industries) without a need to once again look up the appropriate weights.

order in which these tax credits can be taken is either dictated by state law or is chosen to minimize tax liability by taking the credit with the smallest remaining carry-forward first, and taking refundable tax credits last.[14] If some tax credit remains, the model then sees if that tax credit can be carried forward to the next tax year, and the model preserves a record of how many years that can be done.

In the next year, the model does a similar calculation with the following differences:

- The jobs in that year are not new. Therefore, the customized job training subsidies for new jobs are inapplicable. In addition, if the JCTC only subsidizes new jobs for one year, then the JCTC from the first year will not apply. However, in other cases the JCTCs are calculated as a certain amount per year (or a certain percentage of payroll) for a specified number of years. This is different from carry-forward in that the tax credit is automatically carried over to the next year, whereas in the carry-forward case, what is carried over depends on what is left over after the offsets in the corporate income tax and other taxes are exhausted.
- The property in that year is no longer from a new investment. Therefore, there is no investment tax credit that applies to that new investment for the second year, unless the state's investment tax credit has the feature of having a term greater than one year.
- In addition, because the structure and buildings and machinery and equipment for the investment have already been purchased, there is no sales tax due in this second year on their purchase.
- However, beginning with this second year, the model assumes that the depreciation on the structure and on machinery and equipment are fully offset by new

[14] Among nonrefundable incentives with the same carry-forward, the model arbitrarily assumes the firm will take the investment tax credit first, followed by the job-creation tax credit and then the R&D tax credit.

investment.[15] That new investment of those depreciation amounts ensures that the property value remains the same as it was in the first year. Therefore, the property tax will be the same. Depending on the term of the property tax abatement, which will typically be at least 5 years but sometimes is as great as 20 years, the property tax abatement will also be applied to the same property value. In addition, that new investment in structures and machinery and equipment will be subject to some sales tax. In theory, it might also be subject to an ITC, but many state tax incentives for investment require a certain investment minimum, so the model ignores ITCs in the second and subsequent years. Subsequent versions of this model might allow for those ITCs that can be used for much smaller annual investment amounts.

- There also is the question of what sales tax on capital items is actually written off in the second year. The model assumes that amount stays the same at the sales tax rate, times the proportion of each capital item (structures vs. machinery and equipment) that is actually taxed, times the annual depreciation for that industry of each type of capital item. Why does this amount stay the same in the second year? From the first year's purchase of these capital items, the amount that can be deducted in the second year is equal to (1 − depreciation rate) × (depreciation rate) × initial capital purchase. The second year's investment in these capital items allows an additional write-off equal to (depreciation rate) × depreciation rate × initial capital purchase. The sum of

[15] Why this assumption? In the real world, in some cases an initial investment over 20 years may depreciate and not be replaced. Or the initial investment might be followed by further investments that increase the size of the firms' operations considerably. Any particular assumption is somewhat arbitrary. The particular assumption made here, of maintaining the same capital stock, seems a reasonable middle-of-the-road assumption. In addition, this assumption makes the simulation of the firms' taxes and incentives a more tractable problem, as it eliminates the need to consider possible clawbacks if the firms' jobs and capital stock are reduced over time, or future incentives if the initial investment is followed by later investment. Finally, this assumption of a constant capital stock also allows depreciation to be constant, which simplifies the calculations.

the two is simply equal to depreciation rate × initial capital purchase, which is the same as the first year's write-off. It also happens to equal the actual sales tax paid in the second year, which is an artifact of the assumption made that actual economic depreciation is equal to depreciation for tax purposes. A more sophisticated variant of the model might allow economic depreciation and tax depreciation to differ.

- The R&D base needs to be calculated. The R&D spending is assumed to be the same in the second year, but depending on the state law, the base period receipts or base period percentage may change. This continues to happen differently each year going forward.
- In the second and subsequent years, there are carry-forward credits to consider. These credits are combined with any credits with a remaining term (JCTCs, ITCs), any new R&D tax credits generated by the same R&D spending with a new base calculation, and taken against the corporate profits tax and any other taxes they can be taken against, such as payroll taxes. Any new credits may also have a carry-forward if they cannot be fully utilized. The model assumes that in each year, the type of credit (ITC vs. JCTC vs. R&D tax credit) and the vintage of credit with the shortest carry-forward is used first.

Therefore, in the second year, there is the same balance sheet, except with the addition of some sales tax on the investment to offset depreciation in structures, and machinery and equipment. But the jobs and property associated with the new branch plant are no longer new, which means no *new* job creation credit and investment tax credit is authorized. The base period and base percentage of the R&D tax credit may change. The property tax abatement and JCTC generally will have a term longer than one year, and therefore will have a "carry-over" (as

distinct from a carry-forward) of the remaining term of the agreement. Whatever tax credits have an offset must be combined with any new tax credits up to the limit on those credits. The model generates a net tax liability and a new carry-forward in year two.

This process continues into the third year, and up to 20 years later, which is the time period considered in this model. The subsequent years will have similar calculations. They will still have the same sales tax paid on replacement capital, and a sales tax write-off, both equal to the depreciation rate × initial capital on each type of capital.[16] Property tax rates without abatement will still be the same. The corporate income tax will remain the same. All these tax rates are the same because the model considers projected tax rates as if the firm myopically assumes current tax rates never change. However, the various tax abatements and tax credits will vary because they are paid out over time and have various terms; this is particularly common for property tax abatements and JCTCs. R&D tax credits will change because of changing base periods and formulas, which cause the base period gross receipts and base period R&D percentage to change. Finally, there will be changes due to different carry-forwards, and an eventual write-off of some tax credits after exhausting their carry-forwards.

Some of the further complexities in how the model works are treated in Appendix A.

Calculations Made with This Model

For each city, state, and starting year, the model ends up with a time series over a 20-year period of operation of the new facility of the following variables: gross taxes before incentives, incentives, net taxes after incentives, and value-added in each year (this value-added is the same each year). The present value of each of these will be calculated. The initial real discount rate

[16] Each year, the net additional investment to keep up the capital stock results in an additional tax write-off that is just sufficient to offset the depreciation of the write-off on earlier capital stock investments.

used is 12 percent, based on research on typical real discount rates used by corporate executives in making investment decisions (Poterba and Summers 1995). The present values of the tax and incentive variables are divided by the present value of the value-added variable to generate tax and incentive rates.

It should be noted that a 12 percent real discount rate, which reflects corporate executives' perspective on investment returns, implies that future taxes, incentives, and profits are considerably discounted. A dollar of taxes/incentives/profits 10 years from now is worth only $0.32 today. A dollar 20 years from now is worth only $0.10 today. This also means that even though the model only tracks taxes and incentives for 20 years, it captures most of the present value effects of these taxes and incentives in affecting corporate investment returns.

Some calculations also consider alternative weightings of the 20 years of data. This report also consider the effects of assuming a 3 percent real discount rate, which might correspond to the present value as seen by society.[17] In addition, as described below, the report uses alternative weightings of the 20 years to approximate the distribution of firms across age classes of firms.

This report primarily focuses on the ratio of the present value of incentives to the present value of value-added. The report also will consider the ratios of the present value of gross taxes before incentives, and net taxes after incentives, to the present value of value-added.

Why focus on value-added rather than profits as a denominator? First, the value-added figures seem likely to be more economically meaningful and consistent across industries, whereas the profits figures, as described in the below Data section, are ultimately derived from IRS data that reflect tax planning. Second, the research literature on business location decisions

[17] As reviewed by Bartik (2011), in a world of certainty, the analysis in Moore et al. (2004) suggests a social discount rate of 2.2 percent on future income flows.

examines how various cost figures affect business location decisions when costs are measured as a percent of value-added (Bartik 1991).

The model is designed so that the various taxes and incentives can be turned on and off. In other words, the model can eliminate one or more of the following:

- Property taxes
- Property tax abatements
- Sales taxes
- Customized job training subsidy
- Investment tax credit
- Job creation tax credit
- R&D tax credit
- Corporate income tax

In addition, the model can also consider:

- Turning off refundability where it is allowed
- No carry-forwards
- Shortening the term of all tax incentives to some shorter time period
- Changing the sales factor to 33.3 percent
- Adopting throwback for out-of-state sales in non-nexus states

To implement the model, the applicable tax incentives need to be awarded in each year, and the model must also remember the term of the tax credits so they can be allowed to expire. The model also needs to remember the carry-forwards that will be used to carry forward unused tax credits to the next year. This needs to be done anew with each year's crop of tax credits. For example, R&D spending with a 10-year carry-forward may generate a new stream of tax credits

each year for 20 years, and each vintage of credit will have its own carry-forward. Each vintage of credit needs to be somehow tracked to keep the carry-forwards straight.

The model can be estimated in some form over all years from 1990 to 2015. In each year, the model is calculated as if the firm expects that the tax rates and incentives in that year continue in the same form for the next 20 years. In other words, the firm is assumed to behave myopically. So each state and year is essentially a separate submodel with its own set of tax and incentive rules.

The results differ across industries not only because industries differ in characteristics, but also because the state tax rules and incentives sometimes differ across industries. For example, some of the incentives only apply to manufacturing, or only to export-base industries. In addition, sales tax exemptions for machinery and equipment or fuel purchases frequently only apply to manufacturing industries.

DATA

Balance Sheet Data

As mentioned above, the model begins by constructing a hypothetical firm balance sheet. The model principally uses Bureau of Economic Analysis (BEA) industry data, with some IRS data merged in on some key variables. This is supplemented by information from a few other sources.

The BEA Industry Accounts data for 2011 provides the main information on overall output, value-added, compensation, wages, employment, full-time employment, structures, machinery and equipment, and inputs such as energy, materials and services. The model relies on data for the 61 private industries in the BEA Industry Accounts data; as mentioned above, for

various reasons, the analysis ends up focusing on 45 of these 61 industries. The IRS data supplement the BEA data with information on profits, land, and inventories by industry.

The IRS data require some manipulation and adjustment to be made more compatible with the BEA data. First, the IRS data are Statistics of Income data for corporations with positive net profits for 2011. These figures will be necessarily smaller than the BEA data because they only include corporations, not all business activity, and because the IRS data chosen for this project are for corporations with positive net profits. This decision is made to avoid the possibility of negative profit rates, and also because the location decision being considered is assumed to be one that anticipates profitability, so one assumes that the profitability of this new location will be somewhat greater than the overall average.[18]

To adjust the data, the IRS land and inventories data are simply blown up by the ratio of gross output of the entire industry in the BEA data to the gross receipts of the corporations with positive net income in the IRS data. This ratio averages about 1.1 over all industries.

The profits data are also blown up in the same way. However, the net income figure in the IRS data is after state and local taxes. Therefore, we need to add in state and local taxes to get a before tax figure. We approximate this by adding in 5 percent of industry value-added, based on Phillips et al. (2012).[19] (As it turns out, this is also close to the figure for gross taxes derived

[18] One might be concerned that the model is sensitive to assumed profits. However, as shown in Appendix D, the estimates of gross taxes, incentives, and net taxes if one assumes a uniform profit rate as a percent of value-added for all industries are very highly correlated with what are found using the profit rates derived using the described procedures. While the estimates would vary with some extreme alterations to the profit figures (for example, if one assumed zero profits in the balance sheet), the estimates are not sensitive to reasonable variations in profit rates about some reasonably positive percentage of value-added and/or capital.

[19] For six industries, some cities and years had negative profits after calculating property tax and sales tax liabilities. To avoid this, for these industries, the model added in a fixed percentage of value-added for that industry that is sufficient to set the minimum profits for that industry at 1 percent of value-added, after property and sales taxes, for all observations. These industries were Accommodation, Air Transportation, Funds & Trusts, Oil and Gas Extraction, Rail Transportation, and Real Estate. All except the Accommodation industry ended up being dropped for other reasons from the 45 industries that are the focus of this report's analysis.

in the model in this report, and not too much above the figures for net taxes derived later in this report.)

The BEA data contain some industry detail not in the IRS data. To match the BEA data, the IRS totals for larger industry categories are allocated across the BEA categories using variables in the BEA data set. BEA data on the dollar value of structures (e.g., building structures) are used to allocate land across industries, BEA data on industry output are used to allocate inventories, and data on value-added are used to allocate profits.

R&D data come from the National Science Foundation (2013) and are generally projections from a 2010 survey of what businesses expect to spend in 2011 on domestic R&D, both internally and by subcontracting out. Some disclosure problems are overcome by examining 2010 data on worldwide R&D. Some industry detail is provided by allocating R&D across more detailed industries in an industrial category by each industry's output.

Tax Data

The tax data on state corporate income tax and state sales taxes relied heavily on Commerce Clearing House's *State Tax Guides* (1990–2013). This was supplemented for recent years by data from the Tax Foundation. Local sales tax data were gathered from various online sources. The property tax data relied heavily on the Lincoln Institute on Land Policy, and the Minnesota Center for Fiscal Excellence.

Incentives Data

The incentives data began with the invaluable summaries of each state's recent history with economic development incentives by Good Jobs First (2014). The research also checked on major state incentive programs in the incentives database maintained by Council for Community and Economic Research (C2ER). The research also involved checking both the state and local

area economic development websites for what state and local economic developers in the state and local area thought the major state and local incentives were.[20]

Cross-Checking with State and Local Laws, Ordinances, and Policy Documents

The summaries by these sources were supplemented by checking the details of these laws and policies. In a few cases, there are detailed governmental audits or annual reports or policy documents that give detailed information on average cost per job of various incentives, and details of exactly how the incentive works and has changed over time. In many other cases, in order to determine the full details of how the tax or incentive worked, this research project had to examine the relevant law and regulations passed by the state government or the city council. The research also relied on reading through all these states' corporate income tax instructions to determine exactly how the credits interacted, and how the various provisions related to limits on credits and carry-forwards are actually implemented in state tax procedures.

Uncovering Incentive History

A key task was to not only describe the current incentives, but also their development over time, back to at least 1990. This task relied heavily on uncovering policy documents in the various states that discussed policy developments. State and local laws and ordinances were also helpful in uncovering when certain laws and ordinances were passed or modified. Also helpful were profiles of state incentives and incentive history done by Good Jobs First, available at the Good Jobs First website.

[20] Dan Wilson and Bob Chirinko were gracious in sharing their data on JCTCs and ITCs. I ended up not using their data, as the hypothetical firm model required more detailed information on credit rules.

Property Taxes

Property tax measures were based on a combination of information from the Lincoln Institute of Land Policy/Minnesota Center for Fiscal Excellence,[21] Internet searches for relative millage rates by state, and Commerce Clearing House data on how state law treats "personal property," "machinery and equipment," and "inventories."

From the Lincoln Institute/Minnesota Center information on how property taxes varied for industrial property with different percentages of personal property, it is possible to infer relative property tax rates for overall real property, and overall personal property, for most of the cities in our sample. Commerce Clearing House information on state tax treatment of different tax treatment of personal property then allows a distinction between the tax rate on machinery and equipment versus inventories. Cities that are not covered by the Lincoln Institute/Minnesota Center are included by looking up online the relative millage rates of those cities versus covered cities.

For nonindustrial business property, the Lincoln Institute/Minnesota Center do not state property tax rates with different percentages of personal property, so this procedure will not work. But property tax rates can be inferred by making some assumptions about the relative tax treatment of different classes of property in the same state. This enables the derivation of nonindustrial business property tax rates.

The resulting data give property tax rates by city for industrial real property, industrial machinery and equipment, and industrial inventories. The data also include property tax rates by city for nonindustrial real property, and nonindustrial personal property. For implementing the property tax abatements part of the model, the model needs to distinguish between land and

[21] This information is in a series of annual publications; see, for example Lincoln Institute of Land Policy and Minnesota Center for Fiscal Excellence (2014).

buildings, and between machinery and equipment and inventories. The model assumes that the property tax rate on land and buildings is always the same as the overall real property tax rate. (This is generally true in the United States, although at some point in the past it was not true for Pittsburgh and for a few other cities in Pennsylvania influenced by the Henry George "single tax" movement.) For nonindustrial business personal property, the model assumes that the stated rates apply only to machinery and equipment personal property, and not to inventories.

The available property tax data for most (not all) cities starts in 1995 and stops in 2013. Not all years are included, and some cities don't have data going as far back. When data are missing, the model interpolates by assuming a linear trend between the two years. When extrapolating beyond the range of data, the model currently assumes the same property tax rates going backward as in the first year for which we have data, and the same property tax rates going forward as in the last year of the available data.[22]

Property Tax Abatements

Property tax abatement information was largely derived by checking city and county and local economic development websites for information on business incentives. The research project also checked to see if abatements were mentioned by Kenyon (2012) for that state, or mentioned in the C2ER (n.d.) or Good Jobs First (2014) summaries.

Customized Job Training

The model seeks to measure what customized job training benefits the firm might be eligible for if all of its new workers in the first year were trained. A variety of sources, including

[22] An exception is that for Michigan, the model did adjust the 1990–1993 data for the major changes brought about by Proposal A. Future improvements in this data base will seek to fill in the early 1990s property tax data in a more systematic way for all states.

Good Jobs First and C2ER, internet searches, and state economic development websites, were used to determine which states offer customized training for new workers. Customized training for incumbent workers was not included in our modeling.

For each customized training program, the research project attempted to determine from an annual report how much is spent per trainee, and also which industries might be eligible for training. Although customized training programs run by state economic development agencies tend to target export-base industries or even just manufacturing industries, customized training programs run by state workforce departments or the state community college system often tend to have much broader definitions of eligible firms, for example frequently including hospitals.

Many state customized training programs only have modest spending per trainee. On the other hand, some training programs provide much larger amounts per trainee. In some cases, this training appears to be more intense training provided by the community college. In other cases, this training in many cases appears to be a disguised JCTC or hiring subsidy.

For example, Iowa provides training that includes on-the-job training provided by the firm. This training averages over $5,000 per trainee, and it seems unlikely that all these new workers are receiving an extra $5,000 in firm training beyond what they would have been provided anyway.

Some of these larger training subsidies are financed by bonds issued by community colleges, which are paid back through diverting some payroll tax withholding from the firm's new workers. Because no figures are available on the magnitude of this diversion, it is ignored in the model. In the real world, in some cases this diversion of payroll taxes might make it more difficult to offset other economic development incentives.

The model assumes that the firm receives a benefit from customized training in its first year equal to the number of full-time equivalent (FTE) workers, times the annual amount spent per trainee. No benefit is assumed for subsequent years.[23] The models' benefits from customized training are added to the firm's profits in its first year, which will affect taxable profits under the corporate income tax.[24]

Sales Factor Data

To get sales factor data, the research project began with data provided by David Merriman (see Merriman [2014]), which in turn was originally derived from data collected by research teams led by Donald Bruce at the University of Tennessee and Andrew Reschovsky at the University of Wisconsin. These data were then refined with data provided by Michael Mazerov of the Center for Budget and Policy Priorities. This refinement involved correcting some errors, and in particular getting the dates at which various transitions took place. In addition, the information from Mr. Mazerov allowed a creation of different formula apportionment for manufacturing or other industries versus the general apportionment formula. In a few cases, where information was still lacking, state websites and legal codes were checked for the language of formulas and when they became part of state law. Finally, the current numbers were checked versus the figures presented in Kasprack (2011), and discrepancies identified and resolved checking online state sources.

[23] Future versions of the model might allow the benefits of training to diverge from costs, and to be spread over time.

[24] The customized job training amount per trainee is assumed to be a real amount. That is, the model assumes that the amounts found in reports for spending per trainee are adjusted over time with inflation. This seems reasonable, as in general the amount spent per trainee has some discretion by the local training authorities.

Throwback Data

Throwback data were constructed in a similar way, beginning with the data from Merriman, and then supplementing these with data from Michael Mazerov. The Mazerov data, in particular, were allowed to override the other data for years after 2002. The Mazerov data also better matches current data from the Tax Foundation and from various state compendia of throwback rules.

INCENTIVES: VARIATION BY INDUSTRY AND STATE, AND OVER TIME

This section provides some descriptive analysis of overall incentives. This includes describing how incentives vary by industry, state, and over time. In addition, some less extensive information is provided on overall gross state and local business taxes.

Overall Incentives

State and local tax incentives are sizable for export-base industries (Table 5). For all 31 export-base industries, and over all 33 states in our model, incentives in 2015 averaged 1.42 percent of value-added. (This is the present discounted value of incentives provided/promised over a 20-year period for a new facility opened in 2015, divided by the present value of value-added, with present value calculated using a 12 percent discount rate, and with industries and states averaged together based on their relative share of value-added.) Gross state and local business taxes, before incentives, for export-base industries average 4.74 percent of value-added. Therefore, for export-base businesses, state and local business incentives on average offset 30 percent of state and local business taxes (30.1 percent = 1.42 / 4.74).

For non-export-base firms, incentives are far less, averaging only 0.16 percent of value-added. The nonexport incentives are only one-ninth of incentives for export-base firms. As a

Table 5 National Averages for State and Local Business Taxes and Incentives, 2015, Various Industry Groupings (%)

	Gross taxes/value-added	Incentives/value-added	Net taxes/value-added	Incentives/gross taxes
Export-base industry average	4.74	1.42	3.31	30.1
Non-export-base industry average	5.18	0.16	5.02	3.1
Manufacturing industry average	4.22	1.56	2.66	36.9
Nonmanufacturing export-base industry average	5.11	1.33	3.79	25.9

NOTE: First three columns of numbers show present value of taxes or incentives as percent of value-added. Right-most column shows present value of incentives divided by present value of gross taxes. Present value calculated using 12 percent discount rate, for new facility begun in 2015, and operated at same scale for 20 years. National average is calculated over 33 states, and uses 2014 private industry value-added by state as weights. Export base is 31 export-base industries; non-export-base is 14 industries; manufacturing is 19 industries; nonmanufacturing export-base is 12 industries. Industry averages calculated using 2011 industry value-added as implicit weights.
SOURCE: Author's calculations, see text.

percent of state and local business taxes, nonexport incentives offset about 3 percent of gross business taxes (3.1 percent = 0.16 / 5.18 percent).

Among export-base industries, incentives are slightly larger for manufacturing industries than for nonmanufacturing. For manufacturing, average incentives are 1.56 percent of value-added, and 36.9 percent of average state and local business taxes, which average 5.18 percent of value-added. For nonmanufacturing export-base industries, average incentives are 1.33 percent of value-added, and 25.9 percent of state-local business taxes, which average 5.11 percent of value-added.

These incentive differences largely occur because most states restrict most incentives, and in particular the most expensive incentives, to export-base industries. For some incentives in some states, eligibility is restricted to manufacturing.

These incentive data imply a total national incentive cost in 2015 of $45 billion.[25] This figure is roughly consistent with previous attempts to total incentives, which include political

[25] The derivation of this figure is explained in Appendix F. The short version is that the 20-year sequence of incentives for each of the 33 states for export-base industries is aggregated based on an assumed distribution of firms across age classes of investment. The figure is then blown up from the 33 states to a national total based on the

scientist Ken Thomas's (2011) estimate of $65 billion and *New York Times* journalist Louise Story's (2012) estimate of $90 billion.

Industry Variation in Incentives

After controlling for whether or not an industry is export-base, the cross-industry variation in incentives is modest. Table 6 ranks the 45 industries by their 2015 incentive level. Each and every one of the export-base industries is higher in incentives than each and every one of the non-export-base industries. Within export-base industries, the majority of manufacturing industries have higher incentives than nonmanufacturing industries. But within export-base industries, most industries have similar levels of incentives, although some are moderately higher in incentives, and some are moderately lower. For example, 20 of the 31 export-base industries have incentives between 1.29 percent and 1.85 percent of value-added. Six industries are somewhat higher than that range, with a maximum of 2.66 percent of value-added. Five industries are somewhat lower than that range, with a low of 0.68 percent of value-added.

In this database's simulation model of incentives, the incentives received by a firm in a particular industry, for a given state, city, and year, are completely determined by the industry's characteristics: the industry's mix of property assets, its jobs per value-added and its wages, its R&D, and its purchases of different types of inputs. But this model is complicated. To understand how incentives tend to vary with industry characteristics, it is helpful to summarize this variation with descriptive regressions.

At the national level, the cross-industry variation in incentives for the 31 export-base industries is described by two regressions. Each regression takes as a dependent variable the

33 states' share of national GDP. Thus, the figure represents a national total for export-base industries if the 2015 incentives could be seen as representative of what firms would be receiving, even though some incentives received in 2015 would have been awarded in the past.

Table 6 Incentives by Industry: National Averages for 2015, Sorted by Incentive Size

Industry	Industry percentage of total private value-added (%)	Export-base industry?	Manufacturing industry?	Incentives/ value-added (%)	Gross taxes/ value-added (%)	Net taxes/ value-added (%)	Incentives/ gross taxes (%)
Textile mills and textile product mills	0.117	1	1	2.66	7.48	4.82	35.6
Apparel, leather and allied product mfg.	0.078	1	1	2.35	5.18	2.82	45.5
Accommodation	0.894	1	0	2.27	10.53	8.26	21.5
Wood product manufacturing	0.165	1	1	2.22	5.54	3.32	40.0
Nonmetallic mineral product manufacturing	0.274	1	1	2.11	6.32	4.21	33.4
Primary metal manufacturing	0.453	1	1	2.02	7.68	5.66	26.4
Furniture and related product manufacturing	0.172	1	1	1.85	3.39	1.54	54.6
Paper manufacturing	0.399	1	1	1.84	6.10	4.25	30.2
Computer and electronic product mfg.	1.850	1	1	1.74	3.73	1.98	46.8
Machinery manufacturing	1.019	1	1	1.73	4.16	2.43	41.5
Fabricated metal product manufacturing	0.938	1	1	1.72	4.14	2.41	41.7
Printing and related support activities	0.291	1	1	1.69	3.74	2.05	45.2
Plastics and rubber products manufacturing	0.493	1	1	1.64	4.17	2.53	39.3
Waste management and remediation services	0.328	1	0	1.64	8.30	6.67	19.7
Motor vehicles, bodies and trailers, and parts	0.851	1	1	1.63	4.34	2.71	37.6
Management of companies (holding companies)	2.116	1	0	1.60	6.07	4.46	26.4
Electrical equipment, appliance, and component manufacturing	0.374	1	1	1.60	3.80	2.20	42.1
Broadcasting and telecommunications	2.816	1	0	1.58	10.70	9.12	14.7
Other transportation equipment	0.824	1	1	1.56	3.29	1.73	47.4
warehousing and storage	0.342	1	0	1.53	4.58	3.04	33.5
Food, beverage, and tobacco manufacturing	1.645	1	1	1.50	4.73	3.23	31.7
Miscellaneous manufacturing	0.610	1	1	1.49	3.30	1.81	45.0
Securities, commodity contracts, other financial investments, and related activities	1.373	1	0	1.42	4.83	3.41	29.5
Chemical manufacturing	2.536	1	1	1.41	3.73	2.32	37.7
Computer systems design and related services	1.545	1	0	1.30	2.24	0.94	58.0

Table 6 (Continued)

Industry	Industry percentage of total private value-added (%)	Export-base industry?	Manufacturing industry?	Incentives/ value-added (%)	Gross taxes/ value-added (%)	Net taxes/ value-added (%)	Incentives/ gross taxes (%)
Performing arts, spectator sports, museums and entertainment	0.615	1	0	1.29	5.55	4.26	23.2
Publishing industries (includes software)	1.381	1	0	1.24	3.34	2.09	37.3
Information and data processing services	0.538	1	0	1.11	4.95	3.84	22.4
Miscellaneous professional, scientific, and technical services	4.890	1	0	1.11	2.85	1.75	38.8
Insurance carriers and related activities	2.831	1	0	0.95	3.24	2.29	29.3
Petroleum and coal products manufacturing	1.293	1	1	0.68	3.89	3.22	17.4
Educational services	1.302	0	0	0.47	9.91	9.44	4.7
Amusement, gambling, and recreation industries	0.509	0	0	0.37	9.00	8.63	4.1
Hospitals, nursing, and residential care facilities	3.605	0	0	0.31	6.87	6.56	4.5
Other services	2.524	0	0	0.28	6.29	6.01	4.5
Retail trade	6.692	0	0	0.22	5.02	4.80	4.4
Credit intermediation	3.034	0	0	0.19	7.96	7.78	2.3
Food services and drinking places	2.192	0	0	0.17	4.35	4.18	3.9
Miscellaneous health care and social assistance	0.682	0	0	0.15	3.54	3.39	4.2
Offices of health practitioners and outpatient care centers	4.009	0	0	0.09	3.61	3.52	2.6
Wholesale trade	6.802	0	0	0.07	2.78	2.71	2.6
Administrative and support services	3.133	0	0	0.07	2.34	2.27	3.1
Rental and leasing services and lessors of intangible assets	1.246	0	0	0.07	8.72	8.65	0.8
Construction	4.085	0	0	0.06	7.80	7.73	0.8
Legal services	1.636	0	0	0.04	2.10	2.06	1.9

NOTE: Industries are sorted by incentives/value-added. The percent each industry is of total private value-added is from 2011 figures. The incentive and tax figures use present value calculations, based on 12 percent real discount rate.
SOURCE: Author's calculations, as described in text.

2015 average ratio of incentives to value-added for each industry, with the average being a weighted average across all 33 states. The first regression describes how the industry's incentive to value-added ratio varies with six industry characteristics: a zero-one dummy for whether the industry is in manufacturing; the industry's ratio of real property to value-added; the industry's ratio of noninventory personal property to value-added; the natural logarithm of the ratio of industry wages to full-time equivalent employment; the natural logarithm of the ratio of industry FTE employment to value-added; the ratio of industry R&D spending to value-added.

These industry characteristics measure the capital intensity, labor intensity, R&D intensity, and wage rate of the industry, as well as whether manufacturing receives more or fewer incentives controlling for these characteristics. Given that many incentives are conditional on capital investment, the number of jobs created, wage rates, R&D activity, and whether the industry is in manufacturing, one would expect all of these industry characteristics to predict higher incentives.

The second regression also includes these six industry characteristics but adds a seventh characteristic: the average national ratio in 2015 for the industry of gross state and local business taxes to value-added. Because many incentives may go up if state and local business taxes are higher (e.g., property tax abatements are typically set as a percentage of property taxes, and many business credits are limited to no more than state corporate income tax payments), one would expect incentives to increase with an industry's business taxes.

As shown in Table 7, in the first regression, without taxes, all the industry characteristics have the expected positive sign and are statistically significant. In the second regression, when taxes are included, taxes have the expected positive sign but are not statistically significant. The point estimate of the effect of taxes on incentives is also small. Each extra $1.00 of gross state

Table 7 Two Regressions of an Industry's Incentives on Industry Characteristics

PANEL A: Regression without Taxes

R-squared: 0.932

Industry characteristic	Coefficient	Robust standard error	t-statistic	Elasticity
Manufacturing dummy	0.00425	0.00086	4.94	0.298
Real property/value-added	0.00451	0.00047	9.56	0.245
Personal property/value-added	0.00173	0.00078	2.21	0.068
ln(wages per FTE employee)	0.00382	0.00078	4.92	0.268
ln(employment/value-added)	0.00523	0.00063	8.35	0.368
R&D/value-added	0.01023	0.00441	2.32	0.034
Gross taxes/value-added				

PANEL B: Regression with Taxes

R-squared: 0.933

Industry characteristic	Coefficient	Robust standard error	t-statistic	Elasticity
Manufacturing dummy	0.00468	0.00104	4.49	0.329
Real property/value-added	0.00313	0.00160	1.96	0.169
Personal property/value-added	0.00061	0.00154	0.39	0.024
ln(wages per FTE employee)	0.00364	0.00079	4.61	0.256
ln(employment/value-added)	0.00526	0.00068	7.76	0.370
R&D/value-added	0.01051	0.00452	2.32	0.035
Gross taxes/value-added	0.04803	0.05668	0.85	0.170

PANEL C: Descriptive Statistics on Variables in Regression

Variable	Mean	Standard deviation	Min	p10	p25	p50	p75	p90	Max
Incentives/value-added (dependent variable)	0.0163	0.0042	0.0068	0.0111	0.0141	0.0160	0.0184	0.0222	0.0266
Gross taxes/value-added	0.0503	0.0207	0.0224	0.0329	0.0373	0.0434	0.0607	0.0768	0.1070
Real property/value-added	0.7716	0.5862	0.1305	0.2971	0.4406	0.5572	1.0283	1.4743	2.8021
Personal property/value-added	0.5608	0.3486	0.1041	0.1922	0.2050	0.4984	0.7476	0.9769	1.4934
ln(wages per FTE employee)	11.090	0.403	10.448	10.586	10.748	11.045	11.363	11.537	12.262
ln(employment/value-added)	−11.901	0.653	−14.268	−12.399	−12.129	−11.855	−11.468	−11.129	−10.996
R&D/value-added	0.0480	0.0616	0.0002	0.0013	0.0053	0.0187	0.0730	0.1116	0.2269

NOTE: Number of observations is 31 export-base industries. Incentive and tax values are national averages for 2015. Elasticities calculated at unweighted sample means, except that elasticities use weighted mean incentive value of 1.42 percent, not unweighted average across industries of 1.63 percent.
SOURCE: Author's calculations, as described in text.

and local business taxes only increases incentives by $0.05. Apparently property tax abatements and/or corporate income tax limits on credits taken are not important enough overall for industry taxes to have large effects on incentives. Including taxes only significantly alters the coefficients on the two property variables, lowering their effects by a moderate amount. The implication is that a significant proportion, but not all, of the correlation of higher capital investment with incentives is due to higher property taxes driving higher abatements.

The first six industry characteristics do a good job predicting incentives, with an R-squared of over 0.90. This is not surprising, as industry characteristics completely determine incentives in the model.

However, the effects on incentives of many industry characteristics are surprisingly modest in magnitude. From the perspective of what would be the optimal public policy toward incentives, the effects of these industry characteristics on incentives are too small. Better incentive policies would more tightly target incentives on industries whose characteristics predict that incentives to such industries will have larger social benefits.

For example, the regressions suggest that a 10 percent increase in wages increases incentives by a little under 3 percent. But the potential social benefits from higher industry wages probably go up by significantly more than 3 percent for a 10 percent higher wage. Higher-wage jobs directly boost earnings of local workers who get jobs. Furthermore, higher-wage jobs would also have higher employment multipliers because higher wages lead to workers who will spend more at local retailers.

For employment, the regressions suggest that if an industry offers 10 percent more jobs, holding wages constant, average incentives go up by almost 4 percent. But social benefits of incentives for local economies largely depend on new jobs increasing employment-to-population

ratios and putting upward pressure on wages. Social benefits probably go up nearly proportionally with the number of jobs. To match benefits, a 10 percent increase in jobs should increase incentives by closer to 10 percent.

For R&D, the results suggest that for each $1.00 of industry R&D spending, incentives go up by only a little more than $0.01. From the perspective of optimal incentive policy, this R&D effect seems smaller than the likely local social benefit spillovers of R&D. As discussed above, high-tech industries have very high multiplier effects on local economies. These high multipliers may be due to high agglomeration economies, in which the R&D and other innovative activity of high-tech firms in a local cluster may spill over and substantially enhance the competitiveness of other firms in that high-tech cluster.

For manufacturing, incentives are about 30 percent higher than for nonmanufacturing export-base industries. From an optimal incentive policy perspective, a differential of this magnitude or even greater might be justified if manufacturers have sufficiently higher multiplier effects on employment and earnings, all else equal. Higher manufacturing multipliers are plausible because manufacturing tends to have more extensive and more geographically concentrated supplier networks.

Overall, these results are consistent with the following hypothesis: after a few screens for export-base industries and manufacturing, state and local governments tend to hand out incentives in a relatively untargeted way to firms in all industries. An old joke in economic development circles, based on a very old ad for potato chips, is that incentives are subject to the "reverse potato chip" rule: "You can't hand out just one." Political pressures lead incentives to be broadened from any initial target to many firms in a wide range of industries. This broadening

of incentive offers makes it difficult for incentives to be targeted on the firms and industries that might offer the highest effects on increased local earnings per capita.

The national industry analysis is augmented by doing the same industry regression analysis by state. For each state, Table 8 reports elasticities of incentives with respect to industry characteristics. These reflect the incentive regime in that state as of 2015 and focus only on the 31 export-base industries. These elasticities are for the specification that omits taxes.

As the table shows, industries with higher employment tend to almost always get higher incentives. Some states do have elasticities close to 1. States with a particularly large statistically significant elasticity with respect to employment (more than 0.6) are Missouri, North Carolina, and Virginia. As will be seen later on in this report, these are all states in which JCTCs comprise the bulk of incentives. Other states have a low responsiveness of incentives to new jobs. For example, low elasticities of incentives with respect to jobs (less than 0.1) are found in Alabama, California, DC, Florida, and Massachusetts. Of these low employment elasticity states, only Florida has a job creation tax credit, and as will be discussed later in this report, its JCTC is a minor part of its incentive mix.

In terms of how state and local incentives respond to industry wages, there is more variation across states. Some states are significantly above the national average in incentive responsiveness to wages. States with above average statistically significant responsiveness to wages (greater than 0.6) include North Carolina, Oregon, Louisiana, New York, Colorado, Kentucky, New Mexico, South Carolina, and Illinois. In some cases, this may reflect explicit wage standards, for example, New Mexico and South Carolina have incentives that explicitly vary with wages. But in other cases, the greater variation with wages reflects other features of the state's incentive design that happen to be correlated with industry wages. In a few states,

Table 8 Elasticities of Industry Incentives with Respect to Industry Characteristics, Individual States (with nation for comparison)

	Manufacturing dummy	eal property/ ue-added	Personal property/ value-added	ln(wage per FTE employee)	ln(employment to value added ratio)	R&D/ value-added
Nation	**0.298245**	**0.068**	**0.268**	**0.368**	**0.034**	
Alabama	0.179	**234**	**0.109**	0.161	−0.016	−0.008
Arizona	**0.544**	0.013	0.195	0.114	**0.555**	**0.207**
California	−0.001	0.006	**−0.106**	−0.165	0.070	**0.716**
Colorado	0.1	−0.011	−0.021	**0.660**	**0.470**	−0.005
Connecticut	**1.418**	075	**0.675**	0.307	**0.412**	0.106
District of Columbia	**−0.068325**	**0.879**		−0.016	−0.016	0.003
Florida	0.143	**108**	0.004	0.072	0.061	−0.010
Georgia	0.104	022	−0.089	−0.023	**0.394**	**0.155**
Illinois	**0.692**	000	**0.253**	**0.609**	**0.437**	0.031
Indiana	**0.604**	001	**0.273**	**0.564**	**0.418**	−0.007
Iowa	**0.172544**		0.049	0.048	**0.133**	**0.027**
Kentucky	**0.290**	039	−0.054	**0.657**	**0.378**	**−0.055**
Louisiana	**0.603**	012	**0.257**	**0.703**	**0.595**	−0.010
Maryland	0.044	0.007	**−0.057**	**−0.175**	**0.143**	**0.585**
Massachusetts	**0.577**	0.024	0.063	−0.256	−0.023	**0.474**
Michigan	**0.440532**	**0.145**		−0.094	**0.321**	**−0.050**
Minnesota	0.077	**260**	−0.043	−0.032	**0.385**	0.009
Missouri	**0.256**	058	**−0.174**	**0.385**	**0.656**	**−0.087**
Nebraska	0.041	**182**	0.006	**0.465**	**0.333**	**−0.025**
Nevada	**0.053**	015	**1.013**	**−0.068**	**0.100**	**−0.016**
New Jersey	**0.372**	076	**−0.205**	**−0.372**	**0.569**	−0.004
New Mexico	**0.136268**	**0.214**	**0.639**	**0.331**	**0.018**	
New York	**0.229268**		0.025	**0.675**	**0.488**	**−0.041**
North Carolina	**0.225**	030	**−0.109**	**0.867**	**0.634**	−0.010
Ohio	**0.102507**		−0.029	**0.514**	**0.361**	**−0.032**
Oregon	**0.157**	031	**−0.109**	**0.770**	**0.545**	**0.112**
Pennsylvania	0.0	**0.935**	0.012	0.026	**0.079**	**0.037**
South Carolina	**0.850**	0.050	**0.563**	**0.618**	**0.512**	−0.019
Tennessee	**0.153577**	**0.441**		0.039	**0.113**	−0.004
Texas	**0.303399**		0.054	−0.139	**0.362**	−0.016
Virginia	**0.340**	094	**−0.256**	**−0.432**	**0.631**	**−0.099**
Washington	0.063		−1.277	1.376	0.885	−0.119
Wisconsin	**0.477313**		0.065	−0.026	**0.397**	**0.035**

NOTE: Elasticities calculated from 33 individual regressions, one regression for each state, with each regression having observations for 31 export-base industries. Bolded elasticities reflect coefficients in underlying regression that are statistically significant at 5% level using two-tail test. Elasticities use weighted mean incentive to value-added ratio for state to calculate. Elasticities use unweighted mean of industry characteristic for real property, personal property, and R&D. Elasticities for logged variables (wage and employment) simply use those variables. Manufacturing elasticity reflects percentage change in incentive for manufacturing versus nonmanufacturing.
SOURCE: Author's calculations, as described further in text.

incentives actually tend to be lower in higher wage industries. At the extreme, Virginia and New Jersey's incentive system have an elasticity of less than −0.3; that is, an industry with 10 percent higher wages would be expected to receive incentives that were more than 3 percent less.

For R&D, there is also greater variation across states. In several states, more research-intensive industries tend to receive lower incentives. At the extreme, Virginia, Missouri, Kentucky, and Michigan have the "wrong sign," with the incentive elasticity with respect to R&D of less than −0.05. None of these four states currently have R&D credits. At the other extreme, states with a greater incentive responsiveness to R&D include California, Maryland, and Massachusetts, all of which have elasticities greater than 0.4. These three states all have R&D credits, but as discussed later in this report, they tend to otherwise have modest incentive packages.

How has the average national responsiveness of incentives to industry characteristics changed over time? Table 9 shows the responsiveness of incentives to industry characteristics for 1990, and compares this to 2015. As can be seen, in 1990 the average national responsiveness of

Table 9 Comparing 1990 versus 2015 Regressions that Explain Industry Incentives with Industry Characteristics

2015 regression				
Right-hand-side variable	Coefficient	Robust standard error	t-statistic	Elasticity
Manufacturing dummy	0.00425	0.00086	4.94	0.298
Real property/value-added	0.00451	0.00047	9.56	0.245
Personal property/value-added	0.00173	0.00078	2.21	0.068
ln(wages per FTE employee)	0.00382	0.00078	4.92	0.268
ln(employment/value-added)	0.00523	0.00063	8.35	0.368
R&D/value-added	0.01023	0.00441	2.32	0.034
1990 Regression				
Right-hand-side variable	Coefficient	Robust standard error	t-statistic	Elasticity
Manufacturing dummy	0.00219	0.00032	6.87	0.476
Real property/value-added	0.00315	0.00021	14.92	0.530
Personal property/value-added	0.00305	0.00038	8.00	0.372
ln(wages per FTE employee)	0.00048	0.00023	2.09	0.105
ln(employment/value-added)	0.00081	0.00022	3.67	0.176
R&D/value-added	0.00703	0.00150	4.69	0.073

NOTE: Unit of observation is industry. Number of observations is 31 export-base industries. There are two separate regressions, one for 2015, the other for 1990. Dependent variable is ratio of present value of incentives to present value of value-added as of that starting year. Elasticities use weighted average over all 31 industries of incentive to value-added ratio, which is 1.42% for 2015, 0.46 percent for 1990. See later discussion of time trends in incentives.
SOURCE: Author's calculations.

incentives to employment and wages was much lower; a 10 percent increase in wages increased incentives by only 1 percent, compared to about 3 percent in 2015; and a 10 percent increase in employment increased incentives by about 2 percent, compared to about 4 percent in 2015. In contrast, in 1990 incentive responsiveness to whether a firm was in manufacturing, or a firm's property assets, was much higher than it was in 2015.[26] As will be seen later, from 1990 to 2015, the relative importance of property tax abatements in incentive packages declined, while the importance of JCTCs, some with wage standards, have increased. In addition, some states broadened their incentive programs over time beyond manufacturing to other export-base firms.

State Variation in Incentives

If the analysis takes a step back and look at overall incentives by state, the database shows a large variation in incentives across states, even across nearby and otherwise similar states. Table 10 reports overall incentives by state, in 2015, with states ranked by incentives as a percent of export-base industry value-added. The table also reports gross taxes, net taxes, and incentives as a percent of gross taxes. This allows a look at whether high state and local incentives simply are an attempt to offset high state gross taxes.

Among the states with particularly high incentives (greater than 3 percent of value-added) are New Mexico (4.23 percent), New York (3.53 percent), and Louisiana (3.33 percent). Among the states with particularly low incentives (less than 0.5 percent of value-added) are Washington (0.09 percent), Nevada (0.23 percent), Virginia (0.27 percent), Maryland (0.36 percent), and California (0.47 percent).

[26] For R&D, elasticities of incentives were modestly higher in 1990 than in 2015, largely because incentives overall were lower in 1990. However, for a $1.00 increase in R&D, in 1990 incentives increased by 7/10ths of a penny, compared to about $0.01 in 2015.

Table 10 Incentives and Taxes by State, 2015

State	State private industry value-added as % of nation	ntives as % of ue-added	Gross taxes as % of value-added	Net taxes as % of value-added	Incentives as % of gross taxes
New Mexico	0.5	4.23	8.47	4.23	50.0
New York	8.9	3.53	4.65	1.12	75.9
Louisiana	1.6	3.33	5.26	1.92	63.4
Tennessee	1.9	2.91	6.31	3.40	46.1
New Jersey	3.5	2.83	4.32	1.49	65.5
Indiana	2.1	2.68	4.54	1.86	59.0
Iowa	1.1	2.62	6.11	3.49	42.9
Nebraska	0.7	2.54	4.81	2.26	52.9
South Carolina	1.1	2.39	5.85	3.46	40.9
Kentucky	1.2	2.34	3.51	1.17	66.6
Michigan	2.9	2.07	5.56	3.49	37.3
Alabama	1.2	1.80	4.49	2.69	40.1
District of Columbia	0.5	1.67	5.69	4.03	29.3
Pennsylvania	4.2	1.55	5.65	4.10	27.5
Wisconsin	1.8	1.52	4.41	2.88	34.5
Illinois	4.8	1.35	5.46	4.11	24.7
Texas	10.7	1.24	5.03	3.79	24.7
Florida	5.3	1.23	4.68	3.45	26.3
Minnesota	2.1	1.14	6.05	4.90	18.9
Arizona	1.8	1.06	5.21	4.15	20.3
Ohio	3.7	1.05	3.61	2.57	29.0
North Carolina	3.0	0.93	3.61	2.68	25.7
Missouri	1.8	0.79	4.84	4.04	16.4
Oregon	1.4	0.70	3.99	3.29	17.5
Colorado	1.9	0.69	4.36	3.67	15.9
Connecticut	1.6	0.65	5.90	5.25	11.0
Massachusetts	2.9	0.53	4.65	4.12	11.3
Georgia	3.0	0.52	4.04	3.52	12.9
California	14.6	0.47	4.38	3.91	10.7
Maryland	2.0	0.36	4.96	4.60	7.3
Virginia	2.7	0.27	2.77	2.50	9.8
Nevada	0.9	0.23	2.79	2.56	8.3
Washington	2.6	0.09	5.15	5.06	1.7

NOTE: Table reports present value of incentives, gross state and local business taxes, and net business taxes after incentives, all calculated as percent of present value of value-added. All incentive and taxes are weighted average, using value-added weights, across all 31 export-base industries, for a new facility starting up in 2015. States are sorted in descending order by incentive to value-added ratio. Table also reports the state's share of private value-added, which is used to create national averages across these states. Incentives as percent of gross taxes is simply ratio of the two other columns. All present value calculations use 12 percent real discount rate, and consider facility with life of 20 years.
SOURCE: Author's calculations, as described in text.

Overall, the variation across states in incentives is quite large, with 11 out of the 33 states having incentives of less than 0.8 percent of value-added, and 8 states having incentives of more than 2.5 percent of value-added. So differentials of 3-to-1 or more are common across states.

This variation is much larger than was the case for industry differentials. The standard deviation of the incentive to value-added ratio for export base industries across the 33 states is 1.08 percent. Across the 31 export-base industries, the standard deviation of the incentive to value-added ratio was 0.42 percent.

Although incentives do appear to be a bit larger for states with higher state and local business taxes, there still is some tendency for states with high incentives to also have high ratios of incentives to gross taxes. The predictive relationship between gross taxes and incentives is examined more formally a bit later.

Even among nearby states, incentive variation is large. For example, Connecticut has much lower incentives than New York or New Jersey, even though Connecticut also has higher gross state and local business taxes than New York or New Jersey. Oregon has much higher incentives than the state of Washington, even though it has lower gross state and local business taxes.

Among other pairs of nearby states, South Carolina has much higher incentives than North Carolina, and New Mexico has much higher incentives than Arizona. In these two pairs of comparisons, the higher incentives in South Carolina or New Mexico than in North Carolina or Arizona may in part be motivated by higher gross taxes. On the other hand, Indiana has higher incentives than Illinois even though Indiana has lower gross taxes. Similarly, Wisconsin has both higher incentives and lower gross taxes than Minnesota. Louisiana has much higher incentives than Texas even though the two states have similar gross taxes.

The implication of this large cross-state variation in incentives, even among nearby states, is that there is room for great policy variation in incentives. In at least some states, the perceived net benefits of having the highest incentives must be sufficiently low that the state is

willing to forego matching its neighbors' incentives. On the other hand, in other states the perceived net benefits of incentives must be much higher, leading the state to go well beyond what nearby states have done.

To describe how incentive levels vary by state, this research project ran four simple descriptive regressions. The number of observations in the regression is the number of states, 33. The dependent variable is each state's average incentives, as a percent of value-added, with the average taken across all 31 export-base industries, and for the year 2015. All regressions include dummies for region: Northeast, Midwest, and South; West is the omitted dummy. The four regressions differ in what right-hand-side predictive variable is used to measure state economic condition, and whether the regression controls for the state's gross taxes as a percent of value-added. In two of the regressions, the economic condition of the state is measured by the 2015 unemployment rate. In the other two regressions, the economic condition of the state is measured by the natural logarithm of the state's 2015 level of real per capita income, using a state-specific price index. For each economic condition variable, one regression does not include a control for state taxes, and the other regression does include a control variable for gross taxes.

The descriptive regression results are shown in Table 11. What are the main conclusions from these descriptive results? First, the results show that gross taxes play an important role in explaining incentives. For each extra dollar in gross taxes, incentives go up around $0.50. Therefore, states that have higher gross taxes do tend to have higher net taxes, but incentives offset about half of higher gross taxes on average.

Second, the West on average tends to have lower incentives. The other regions are similar to each other. But the West on average has incentives that are lower by about 1 percent of value-added.

Table 11 State Incentives: Regressions Explaining with State Characteristics, 2015

PANEL A: No taxes; unemployment on RHS

R-squared: 0.096

Right-hand-side variable	Coefficient	Robust standard error	t-statistic	Elasticity
Unemployment rate	0.25595	0.23585	1.09	0.960
Northeast dummy	0.00885	0.00736	1.20	0.622
Midwest dummy	0.01015	0.00488	2.08	0.713
South dummy	0.00570	0.00571	1.00	0.400

PANEL B: Taxes; unemployment on RHS

R-squared: 0.333

Right-hand-side variable	Coefficient	Robust standard error	t-statistic	Elasticity
Gross taxes/value-added	0.48900	0.16500	2.96	1.677
Unemployment rate	0.12129	0.17757	0.68	0.455
Northeast dummy	0.00752	0.00753	1.00	0.528
Midwest dummy	0.00775	0.00422	1.84	0.545
South dummy	0.00651	0.00358	1.82	0.457

PANEL C: No taxes; ln(real per capita income) on RHS

R-squared: 0.143

Right-hand-side variable	Coefficient	Robust standard error	t-statistic	Elasticity
ln(real per capita income)	−0.03174	0.02212	−1.43	−2.230
Northeast dummy	0.01354	0.00715	1.89	0.951
Midwest dummy	0.01037	0.00508	2.04	0.729
South dummy	0.00754	0.00527	1.43	0.530

PANEL D: Taxes; ln(real per capita income on RHS

R-squared: 0.426

Right-hand-side variable	Coefficient	Robust standard error	t-statistic	Elasticity
Gross taxes/value-added	0.52608	0.12935	4.07	1.804
ln(real per capita income)	−0.03585	0.01714	−2.09	−2.519
Northeast dummy	0.01365	0.00727	1.88	0.959
Midwest dummy	0.01011	0.00369	2.74	0.711
South dummy	0.00902	0.00319	2.83	0.634

PANEL E: Descriptive statistics

Variable	Mean	Std Dev	Min	p10	p25	p50	p75	p90	Max
Incentives/value-added	0.0156	0.0108	0.0009	0.0036	0.0069	0.0124	0.0239	0.0291	0.0423
Gross taxes/value-added	0.0488	0.0110	0.0277	0.0361	0.0436	0.0481	0.0556	0.0605	0.0847
Unemployment rate	0.053	0.009	0.030	0.039	0.049	0.054	0.059	0.063	0.069
ln(real per capita income)	10.650	0.112	10.471	10.526	10.566	10.657	10.697	10.791	10.997

NOTE: Elasticities calculated at weighted mean incentive rate across all states, which is 1.42 percent in 2015. Unit of observation is state, with 33 states in sample.
SOURCE: Author's calculations, as described in text.

Third, incentives are not predicted by current unemployment, but they are somewhat predicted by real per capita income. One interpretation of this is that incentives respond not to short-term economic conditions, but to economic conditions over the longer term. The magnitude implies that an area with real per capita income lower by 10 percent would have incentives higher by 22 to 25 percent.

Finally, overall, state incentives are not well predicted by these state characteristics, but rather are in many cases due to unexplained state factors. The overall R-squared in the "best" specification (with taxes and real per capita income) is about 0.43. This is far lower than the R-squared of over 0.90 for the industry regressions. Over half of the variation in incentives by state is unexplained by regional dummies, real per capita income, and state gross taxes. States with different political leaning seem to have considerable leeway in determining incentive levels.

For comparison, similar regressions were estimated for 1990. Consider the 1990 regression that includes per capita income and taxes.[27] (As was the case in the 2015 regressions, in the 1990 regressions that included unemployment, this variable was not close to being statistically significant in explaining incentives.) As we will see in a later section, 1990 incentive levels were much lower than in 2015. This difference in incentive levels between 1990 and 2015 plays a role in the discussion below interpreting the regression results.

In 1990, in contrast with 2015, the region of the country plays much less of a role in determining incentive levels (see Table 12). The regional dummies are statistically insignificant, and the point estimates of elasticities are smaller.

[27] The Commerce Department data on real per capita income only goes back to 2008. Therefore, the log of per capita income used in the 1990 regressions is the logarithm of nominal per capita income.

Table 12 State Incentives and State Characteristics, 2015 and 1990

PANEL A: 2015 Regression with unemployment

R-squared: 0.333

RHS variable	Coefficient	Robust standard error	t-statistic	Elasticity
Gross taxes/ value-added	0.48900	0.16500	2.96	1.677
Unemployment rate	0.12129	0.17757	0.68	0.455
Northeast dummy	0.00752	0.00753	1.00	0.528
Midwest dummy	0.00775	0.00422	1.84	0.545
South dummy	0.00651	0.00358	1.82	0.457

PANEL B: 1990 Regression with unemployment

R-squared: 0.246

RHS variable	Coefficient	Robust standard error	t-statistic	Elasticity
Gross taxes/ value-added	0.17215	0.09798	1.76	1.975
Unemployment rate	0.00453	0.18623	0.02	0.053
Northeast dummy	−0.00158	0.00465	−0.34	−0.344
Midwest dummy	0.00166	0.00375	0.44	0.361
South dummy	−0.00154	0.00225	−0.69	−0.336

PANEL C: 2015 Regression with ln(real per capita income)

R-squared: 0.426

RHS variable	Coefficient	Robust standard error	t-statistic	Elasticity
Gross taxes/ value-added	0.52608	0.12935	4.07	1.804
ln(per capita income)	−0.03585	0.01714	−2.09	−2.519
Northeast dummy	0.01365	0.00727	1.88	0.959
Midwest dummy	0.01011	0.00369	2.74	0.711
South dummy	0.00902	0.00319	2.83	0.634

PANEL D: 1990 Regression with ln(nominal per capita income)

R-squared: 0.303

RHS variable	Coefficient	Robust standard error	t-statistic	Elasticity
Gross taxes/ value-added	0.17757	0.08682	2.05	2.037
ln(per capita income)	−0.01188	0.00578	−2.05	−2.585
Northeast dummy	0.00098	0.00411	0.24	0.213
Midwest dummy	0.00154	0.00370	0.41	0.334
South dummy	−0.00189	0.00207	−0.91	−0.412

NOTE: Elasticities are calculated using weighted average of incentive to value-added ratio, which is 1.42% in 2015, and 0.46% in 1990.
SOURCE: Author's calculations.

In 1990, compared to 2015, the dollar effect of state and local gross business tax rates on incentives was lower. In 1990, for a $1.00 increase in gross business taxes, incentives on average increased by about $0.18. In 2015, this effect was about $0.53. However, the elasticities are similar in both years. Therefore, as incentive levels increased from 1990 to 2015, a similar *percentage* relationship between gross taxes and incentive was reflected in a higher dollar offset.

A similar pattern is shown for the response of incentives to changes in per capita income. The elasticity of response is similar in the two years: 10 percent lower per capita income is associated with a 25–26 percent increase in incentives. However, with the higher incentive levels in 2015 than in 1990, a similar elasticity means that a given difference across states in per capita income is associated with a larger dollar variation in incentives.

Overall, 1990, as with 2015, shows that most incentive variation across states is not well explained by regional dummies or state economic characteristics, or by gross business tax levels. Other unobserved characteristics of states, such as the political factors affecting policy choices, appear to shape the quite large interstate incentive variation.

Incentive and Gross Tax Variation over Time

Overall incentive and gross tax patterns

Table 13, and Figures 1 and 2, report how incentives vary by year. As a reminder, these national averages use fixed industry weights and state weights, so time trends are not due to changes in the mix of economic activity by industry or state. In addition, these national averages are for 31 export-base industries.

From 1990 to 2015, incentives almost tripled, increasing from 0.46 percent of private value-added of these 31 export-base industries to 1.42 percent. Gross taxes also declined, but

Table 13 National Time Trends in Incentives and Taxes, 1990–2015 (%)

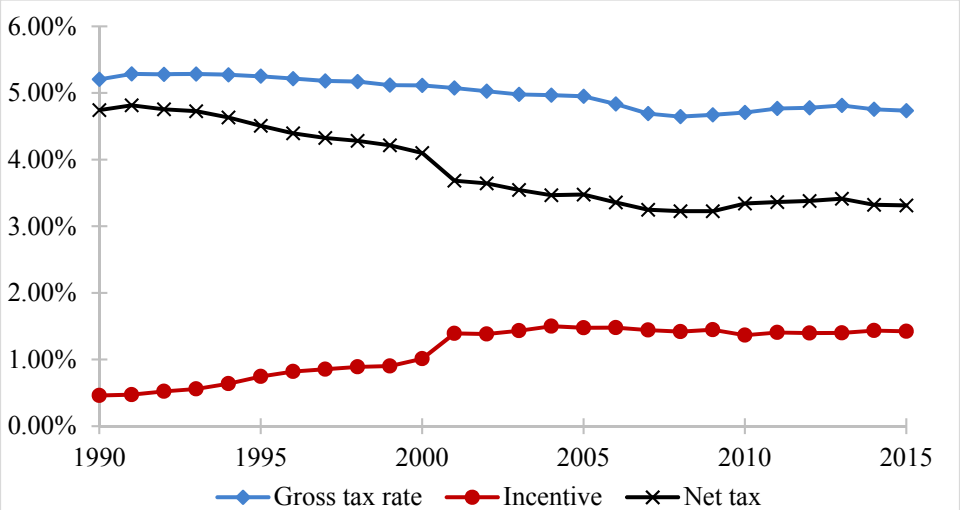
	Gross tax/ value-added	Incentive/ value-added	Net tax/ value-added	Incentive/gross tax
1990	5.20	0.46	4.74	8.8
1991	5.29	0.47	4.82	8.9
992	5.28	0.52	4.76	9.9
993	5.28	0.56	4.73	10.6
994	5.27	0.64	4.63	12.1
995	5.25	0.75	4.51	14.2
996	5.21	0.82	4.40	15.7
997	5.18	0.85	4.33	16.5
998	5.17	0.89	4.28	17.2
999	5.12	0.90	4.22	17.6
000	5.11	1.01	4.10	19.8
001	5.08	1.39	3.68	27.4
002	5.03	1.38	3.64	27.5
003	4.98	1.43	3.55	28.8
004	4.97	1.50	3.47	30.2
005	4.95	1.48	3.48	29.8
006	4.84	1.48	3.36	30.6
007	4.69	1.44	3.25	30.7
008	4.65	1.42	3.23	30.5
009	4.67	1.45	3.23	31.0
010	4.71	1.37	3.34	29.0
011	4.77	1.41	3.36	29.5
012	4.78	1.40	3.38	29.2
013	4.81	1.40	3.41	29.1
014	4.76	1.43	3.32	30.1
015	4.74	1.42	3.31	30.1

NOTE: Figures are for present value of taxes and incentives as percent of present value of value-added, and incentives as percent of gross taxes, for 31 export-base industries. National percent average is based on weighted average of all 33 states in sample using private sector GDP by state in 2014 as weights. State averages across industries based on 2011 value-added weights by industry. Present value calculated using 12% real discount rate.
SOURCE: Author's calculations.

much more modestly, declining from 5.20 percent of value-added to 4.74 percent. Net taxes declined by 1.43 percent of value-added, from 4.74 percent to 3.31 percent, a decline in net taxes of 30 percent. Out of this net tax reduction of 1.43 percent, over two-thirds (0.96 percent out of 1.43 percent) is due to increased incentives. Incentives went from offsetting 9 percent of gross taxes in 1990 to offsetting 30 percent of gross taxes in 2015.

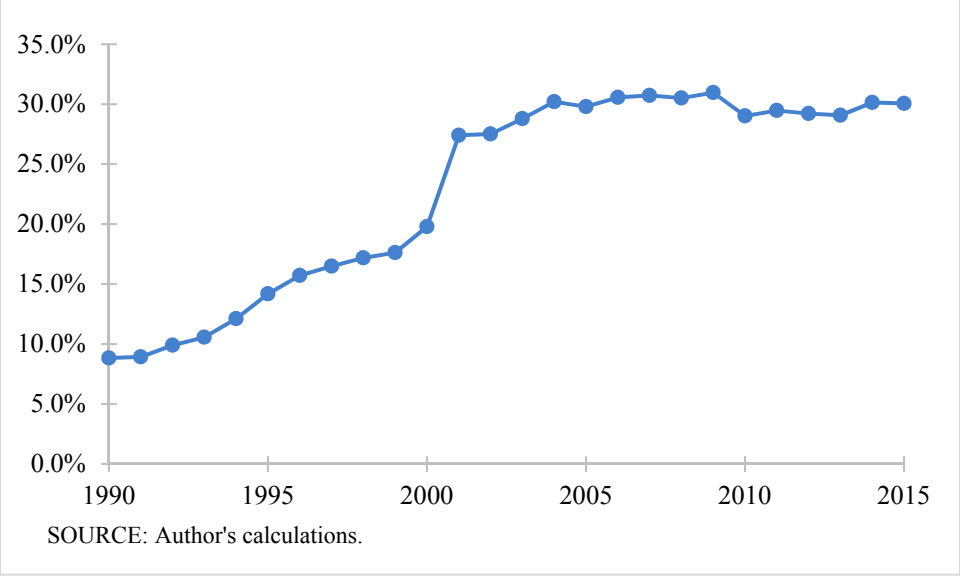
Within this 25-year period, the most rapid incentive increase was during the 1990s, when incentives more than doubled, increasing from 0.46 percent of value-added to 1.01 percent.

Figure 1 Trends over Time in Incentives and Taxes



SOURCE: Derived from Table 13.

Figure 2 Time Trends in Incentives as Percentage of Gross Taxes



SOURCE: Author's calculations.

There was then a huge one-time jump in incentives in 2001, increasing from 1.01 percent to 1.39 percent. Since 2001, incentives have not changed dramatically, only increasing very slightly, from 1.39 percent in 2001 to the 2015 level of 1.42 percent. For gross taxes, some slight declines occurred from the mid-1990s until 2007, with gross taxes not changing much since then.

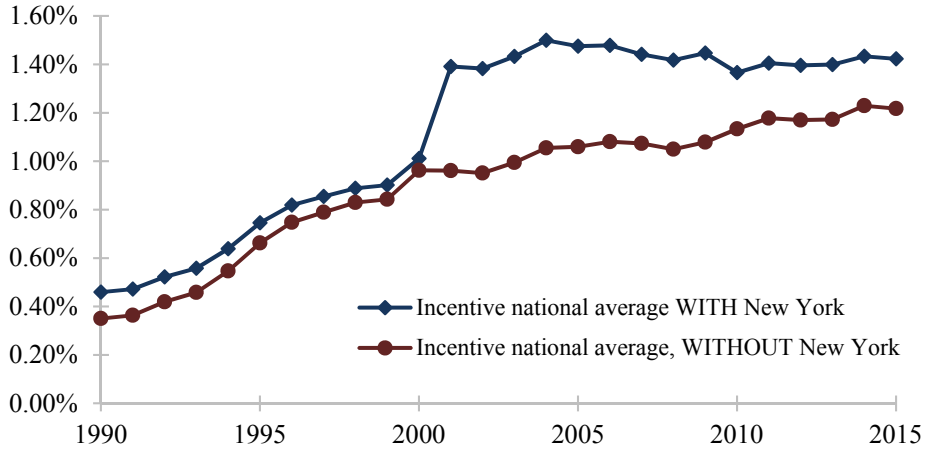
The 2000–2001 one-time jump in incentives is due to New York State. As shown in Table 14 and Figure 3, if one removes New York State from the national average, the 2000–2001 period incentive jump is nonexistent. Removing New York State also suggests that incentives continued to show some increase after 2000, but at a more modest rate than during the 1990s. The New York State jump in 2001 appears to be due to the Empire Zone program becoming statewide in its scope.

Table 14 Incentive Trends, with and without New York

Year	Incentive national average as % of value-added	Incentive national average without New York
1990	0.46	0.35
1991	0.47	0.36
1992	0.52	0.42
1993	0.56	0.46
1994	0.64	0.55
1995	0.75	0.66
1996	0.82	0.75
1997	0.85	0.79
1998	0.89	0.83
1999	0.90	0.84
2000	1.01	0.96
2001	1.39	0.96
2002	1.38	0.95
2003	1.43	0.99
2004	1.50	1.06
2005	1.48	1.06
2006	1.48	1.08
2007	1.44	1.07
2008	1.42	1.05
2009	1.45	1.08
2010	1.37	1.13
2011	1.41	1.18
2012	1.40	1.17
2013	1.40	1.17
2014	1.43	1.23
2015	1.42	1.22

NOTE: Figures are for national average over all export-base industries, with and without New York, for present value of incentives as percent of present value of value-added. With New York figures are same as in Table 13.
SOURCE: Author's calculations.

Figure 3 Incentive Trends with and without New York, 1990–2015



NOTE: Incentive figures are for national average over all export-base industries as percentage of value-added. National average uses private-state GDP in 2014 as weights.
SOURCE: Derived from Table 14.

Incentive variation over time by state

In Table 15, the data are used to look more closely at variation over time in incentives for individual states. (As before, these incentives are the state average for the 31 export-base industries.) For the years 1990, 2000, 2001, 2007, and 2015, Table 15 reports average incentives as a percent of value-added for individual states. In addition to reporting the national weighted average for all states, the table reports the unweighted average, the median over all states, and the weighted incentive average omitting New York. An accompanying Table 16 highlights incentive changes across pairs of years, for 1990–2000, 2000–2001, 2001–2007, and 2007–2015.

In these tables, the overall pattern is still that the most rapid incentive increase was during the 1990s, from 1990 to 2000. Since 2001, there has been some increase by most measures, but at a rate of increase that is more modest.

From 1990 to 2000, 26 states showed an increase in incentives, and only 3 states showed a decrease. Over subsequent pairs of years, there is a more mixed picture of states increasing

Table 15 Incentives across States, Various Years (%)

	1990	2000	2001	2007	2015
U.S. incentive average (weighted)	0.46	1.01	1.39	1.44	1.42
Alabama	0.05	1.55	1.85	1.86	1.80
Arizona	0.00	0.38	0.52	0.52	1.06
California	0.30	0.63	0.63	0.48	0.47
Colorado	0.07	0.07	0.07	0.07	0.69
Connecticut	0.78	1.10	1.09	1.01	0.65
District of Columbia	0.00	2.25	2.14	1.90	1.67
Florida	0.00	1.02	1.01	1.01	1.23
Georgia	0.02	0.66	0.65	0.57	0.52
Illinois	0.36	1.17	1.18	1.04	1.35
Indiana	0.81	2.09	2.05	3.01	2.68
Iowa	0.64	2.45	2.43	2.51	2.62
Kentucky	0.11	2.67	2.67	2.33	2.34
Louisiana	0.86	3.01	3.01	3.19	3.33
Maryland	0.00	0.40	0.38	0.37	0.36
Massachusetts	0.06	0.49	0.49	0.49	0.53
Michigan	1.79	3.05	3.03	3.21	2.07
Minnesota	0.10	0.10	0.10	0.10	1.14
Missouri	0.00	0.32	0.35	1.55	0.79
Nebraska	2.07	1.84	2.10	2.66	2.54
Nevada	0.04	0.22	0.22	0.23	0.23
New Jersey	0.00	1.35	1.35	1.35	2.83
New Mexico	1.89	2.12	2.38	4.43	4.23
New York	1.58	1.51	5.79	5.20	3.53
North Carolina	0.01	0.36	0.36	1.12	0.93
Ohio	0.73	1.53	1.51	1.21	1.05
Oregon	0.13	0.13	0.13	0.13	0.70
Pennsylvania	0.05	1.63	1.36	1.41	1.55
South Carolina	0.30	2.06	2.06	2.38	2.39
Tennessee	0.05	0.24	0.24	0.22	2.91
Texas	0.78	0.74	0.77	1.32	1.24
Virginia	0.04	0.28	0.27	0.24	0.27
Washington	0.07	0.11	0.11	0.11	0.09
Wisconsin	0.13	0.13	0.13	0.13	1.52
U.S. incentive average (unweighted)	0.42	1.14	1.29	1.44	1.56
U.S. median incentive (unweighted)	0.10	1.02	1.01	1.12	1.24
U.S. weighted incentive average minus New York	0.35	0.96	0.96	1.07	1.22

NOTE: All figures are average present value of incentives as percent of present value of value-added, averaged over 31 export-base industries using value-added industry weights, but calculated for different geographic entities. The weighted U.S. average trends were previously reported in Table 13, and the weighted average minus New York were previously reported in Table 14.
SOURCE: Author's calculations.

versus decreasing incentives: 8 increasing versus 11 decreasing from 2000 to 2001, 13 increasing versus 11 decreasing from 2001 to 2007, and 15 increasing versus 17 decreasing from 2007 to 2015.

Table 16 Changes in Incentives by State, Various Prices of Years

	1990–2000	000– 2001	2001– 2007	2007–2015
U.S. incentive average (weighted)	0.55 38	0.05		−0.02
Alabama	1.50 30	0.01		−0.06
Arizona	0.38 15	0.00	0.54	
California	0.33 00		−0.15	−0.01
Colorado	0.00 00	0.00	0.62	
Connecticut	0.31	0.01	−0.07	−0.36
District of Columbia	2.25	0.11	−0.25	−0.23
Florida	1.02	0.01	0.00	0.22
Georgia	0.63	0.01	−0.07	−0.05
Illinois	0.81 01		−0.14	0.31
Indiana	1.27	0.03	0.95	−0.33
Iowa	1.81	0.02	0.08	0.11
Kentucky	2.57 00		−0.34	0.00
Louisiana	2.15 00	0.18	0.14	
Maryland	0.40	0.01	−0.02	−0.01
Massachusetts	0.43 00	0.00	0.04	
Michigan	1.26	0.01	0.17	−1.13
Minnesota	0.00 00	0.00	1.04	
Missouri	0.32 02	1.20		−0.76
Nebraska	−0.23 26	0.56		−0.12
Nevada	0.19 00	0.01	0.00	
New Jersey	1.35 00	0.00	1.48	
New Mexico	0.23 26	2.06		−0.20
New York	−0.06 28		−0.59	−1.68
North Carolina	0.34 00	0.76		−0.19
Ohio	0.80	0.02	−0.30	−0.16
Oregon	0.00 00	0.00	0.56	
Pennsylvania	1.58	0.27	0.05	0.15
South Carolina	1.76 00	0.32	0.01	
Tennessee	0.19 00		−0.02	2.69
Texas	−0.05 04	0.55		−0.08
Virginia	0.23	0.01	−0.03	0.03
Washington	0.04 00	0.00		−0.02
Wisconsin	0.00 00	0.00	1.39	
U.S. incentive average (unweighted)	0.72 15	0.15	0.12	
Median change by state	0.38 00	0.00	0.00	
U.S. incentive median (unweighted)	0.92	0.01	0.11	0.12
U.S. incentive average (weighted) minus New York	0.61 00	0.11	0.14	

NOTE: All state figures simply show changes in incentive, latter year minus former year, for the pair of years considered, as given in Table 15. Most of the "national" average changes show changes, latter year minus former year, for mean or median of state figures. The median change by state row shows median of state numbers in this table.
SOURCE: Author's calculations.

To get some picture of what states showed the largest increases or decreases, consider what states change incentives over some pairs of years by 0.5 percent of value-added or more, either up or down. From 1990 to 2000, such big increases of 0.5 percent or more occurred for Kentucky, DC, Louisiana, Iowa, South Carolina, Pennsylvania, Alabama, New Jersey, Indiana,

Michigan, Florida, Illinois, Ohio, and Georgia. The big increases were therefore mostly in the South and Midwest, but also included Pennsylvania and New Jersey. Decreases that were big did not occur in any states during this time period.

From 2000 to 2001, the only big change was the huge jump in incentives in New York State, from 1.51 percent of value-added to 5.79 percent.

From 2001 to 2007, big increases in incentives occurred in New Mexico, Missouri, Indiana, North Carolina, Nebraska, and Texas. This includes some Southern and Midwest states plus the Great Plains state of Nebraska and the southwestern state of New Mexico. Over this same time period, New York significantly reduced incentives, from 5.79 percent to 5.20 percent, although New York incentives remained high.

From 2007 to 2015, big incentive increases occurred in Tennessee, New Jersey, Wisconsin, Minnesota, Colorado, Oregon, and Arizona. What is noteworthy here is that some states that previously had very low incentives, such as Tennessee, Wisconsin, Minnesota, Colorado, and Oregon, began to use incentives at a much higher level. But over this same time period, big decreases in incentives occurred in New York, Michigan, and Missouri. The big decreases in New York were due to the demise of the Empire Zone program. In Michigan, Governor Rick Snyder jettisoned the expensive MEGA incentive program as part of a policy package that rolled back general business taxes. The Missouri decrease is due to the Quality Jobs program (a JCTC) being replaced with a less costly job creation tax credit, Missouri Works.

Overall, the big picture is that in the 1990s, incentives showed significant increases that were broadly spread across many states. Since the 1990s, big incentive increases have occurred in some states, including states that previously had not provided large incentives, but the size and

breadth of these incentive increases were less. In addition, during this latter time period, some states cut back their incentives, although only a few had incentive cutbacks that were large.

Gross tax variation over time by state

Table 17 shows gross tax levels for export-base industries by state, for the key years of 1990, 2000, 2001, 2007, and 2015. In addition, the table reports the national average in various ways: the average weighted by state private GDP (what was used above, and which is generally used in this report); the unweighted average across states; the median across states, and the weighted average minus New York State. A companion table, Table 18, shows the change for the various states between these years, that is for 1990–2000, 2000–2001, 2001–2007, and 2007–2015. This companion table also shows the change between years in the various measures of national averages.

From 1990 to 2000, for gross taxes, the national average measures show little overall trends. However, there are "big" changes (plus or minus 0.5 percent of value-added) in some states: big increases in gross taxes occurred in Texas, Florida, and Oregon; and big decreases occurred in Minnesota, Nebraska, Connecticut, Wisconsin, New Jersey, Georgia, Michigan, Colorado, New York, Massachusetts, and Iowa.

From 2000 to 2001, the national averages for gross taxes again showed little change. However, Pennsylvania gross taxes had a large decline.

From 2001 to 2007, the national averages for gross taxes show some overall decrease. Particularly big declines in gross taxes occurred in Illinois, Connecticut, Wisconsin, Virginia, New Jersey, Ohio, Arizona, Oregon, Florida, and Texas. Big increases in gross taxes occurred in Indiana, New Mexico, and South Carolina.

Table 17 Gross Tax Rates by State, as Percentage of Value-Added, Various Years

	1990	2000	2001	2007	2015
U.S. gross tax average (weighted)	5.20	5.11	5.08	4.69	4.74
Alabama	3.66	3.58	3.91	4.19	4.49
Arizona	6.66	6.78	6.54	5.75	5.21
California	4.36	4.27	4.29	3.93	4.38
Colorado	4.44	3.82	3.71	3.87	4.36
Connecticut	8.15	7.10	7.00	5.13	5.90
District of Columbia	6.50	6.37	6.25	5.93	5.69
Florida	4.76	5.30	5.53	4.76	4.68
Georgia	4.23	3.59	3.87	3.96	4.04
Illinois	6.10	5.92	5.88	4.01	5.46
Indiana	5.17	5.28	5.01	6.39	4.54
Iowa	6.08	5.50	5.45	5.66	6.11
Kentucky	3.56	3.56	3.56	3.34	3.51
Louisiana	6.28	6.20	6.02	6.01	5.26
Maryland	4.94	4.86	4.73	4.39	4.96
Massachusetts	5.34	4.74	4.81	4.38	4.65
Michigan	6.84	6.20	6.11	6.50	5.56
Minnesota	7.30	5.80	5.72	5.24	6.05
Missouri	4.79	4.82	4.80	4.80	4.84
Nebraska	5.72	4.40	4.88	5.12	4.81
Nevada	2.03	2.37	2.60	2.74	2.79
New Jersey	6.45	5.61	5.25	4.41	4.32
New Mexico	7.37	7.56	7.51	8.63	8.47
New York	6.23	5.62	5.64	5.28	4.65
North Carolina	3.51	3.65	3.62	4.10	3.61
Ohio	5.26	5.30	5.18	4.34	3.61
Oregon	3.11	3.63	3.68	2.90	3.99
Pennsylvania	5.91	6.36	5.67	5.68	5.65
South Carolina	4.63	4.75	4.63	5.70	5.85
Tennessee	4.88	5.03	5.13	5.41	6.31
Texas	4.88	5.67	5.70	5.15	5.03
Virginia	3.49	3.76	3.62	2.60	2.77
Washington	4.96	5.06	5.03	4.81	5.15
Wisconsin	6.43	5.43	5.44	4.31	4.41
U.S. gross tax average (unweighted)	5.27	5.09	5.05	4.83	4.88
U.S. gross tax median (unweighted)	5.17	5.28	5.13	4.80	4.81
U.S. gross tax average (weighted) minus New York	5.10	5.06	5.02	4.63	4.74

NOTE: These figures are averages for various states and years for the present value of gross taxes as a percent of the present value of value-added, averaged over 31 export-base industries. The state averages use value-added weights by industry. The national weighted average at top was previously shown in Table 13. The weighted average at bottom that omits New York was shown in Table 14. The other national averages are unweighted averages and medians across these 33 states.
SOURCE: Author's calculations.

From 2007 to 2015, the national averages for gross taxes again showed little trends. However, big decreases in gross taxes occurred in Indiana, Michigan, Louisiana, Ohio, New

Table 18 Change in State Gross Taxes, as Percentage of Value-Added, Various Pairs of Years

	1990–2000	2000–2001	2001–2007	2007–2015
U.S. gross tax average (weighted)	−0.09	−0.04	−0.39	0.04
Alabama	−0.08	0.33	0.27	0.31
Arizona	0.12	−0.24	−0.79	−0.54
California	−0.09	0.02	−0.36	0.45
Colorado	−0.62	−0.11	0.16	0.49
Connecticut	−1.05	−0.10	−1.87	0.78
District of Columbia	−0.13	−0.12	−0.32	−0.24
Florida	0.53	0.23	−0.77	−0.08
Georgia	−0.64	0.28	0.09	0.08
Illinois	−0.18	−0.04	−1.87	1.45
Indiana	0.11	−0.27	1.38	−1.85
Iowa	−0.57	−0.05	0.20	0.46
Kentucky	0.00	0.00	−0.22	0.17
Louisiana	−0.08	−0.17	−0.01	−0.76
Maryland	−0.08	−0.13	−0.34	0.57
Massachusetts	−0.60	0.07	−0.43	0.27
Michigan	−0.64	−0.10	0.39	−0.94
Minnesota	−1.49	−0.08	−0.48	0.80
Missouri	0.03	−0.02	0.00	0.04
Nebraska	−1.31	0.48	0.24	−0.31
Nevada	0.33	0.23	0.14	0.05
New Jersey	−0.84	−0.36	−0.85	−0.09
New Mexico	0.19	−0.06	1.12	−0.16
New York	−0.62	0.02	−0.36	−0.63
North Carolina	0.14	−0.03	0.48	−0.49
Ohio	0.04	−0.11	−0.84	−0.73
Oregon	0.53	0.05	−0.78	1.09
Pennsylvania	0.45	−0.69	0.01	−0.03
South Carolina	0.12	−0.12	1.07	0.15
Tennessee	0.14	0.11	0.28	0.90
Texas	0.79	0.03	−0.55	−0.12
Virginia	0.27	−0.13	−1.02	0.17
Washington	0.10	−0.03	−0.21	0.34
Wisconsin	−1.00	0.01	−1.13	0.10
U.S. gross tax average (unweighted)	−0.19	−0.03	−0.22	0.05
Median change	−0.08	−0.04	−0.22	0.08
U.S. gross tax median (unweighted)	0.11	−0.15	−0.34	0.01
U.S. gross tax average (weighted) minus New York	−0.04	−0.04	−0.39	0.11

NOTE: All state figures simply show changes in gross taxes, latter year minus former year, for the pair of years considered, as given in Table 17. Most of the "national" average changes show changes, latter year minus former year, for mean or median of state figures. The median change by state row shows median of state numbers in this table.
SOURCE: Author's calculations.

York, and Arizona. Big increases in gross taxes occurred in Illinois, Oregon, Tennessee, Minnesota, Connecticut, and Maryland.

If we compare the overall national trends in incentives and gross taxes, incentives clearly have shown much more movement than gross taxes. Particularly in the 1990s, incentives showed a major increase, while at the national average level, gross state and local business taxes have not changed dramatically. However, if one looks at the state level, the reasons for these differences are in part that gross business taxes show large changes up or down in the various states. Incentives, when they change, don't show large decreases over many states or time periods. In a state, when incentives decrease, they tend to so more modestly. From a political perspective, this may be due to it being politically difficult for states to make major cuts in their incentives. In contrast, for gross taxes, major components of business taxes include the sales tax on business inputs and property taxes. If either sales tax rates or property tax rates increase over some time period, both households and businesses paying these taxes will experience tax increases.

In looking at which individual states go up or down in gross taxes, there is no obvious geographic pattern. Presumably, the increases or decreases in individual states reflect specific political and economic dynamics that lead to changes in major state and local taxes.

For each state and each year, Appendix G presents tables that show the full pattern of incentives, gross taxes, and net taxes for each year for each state. From the appendix tables and figures, a reader can see the exact timing of changes in each state. In addition to the results for individual states, the main impression from the Appendix G figures and tables is that incentive regimes in states tend to show occasional abrupt shifts from one year to the next, with relatively little change otherwise. Gross taxes show abrupt shifts, but also show more change in-between abrupt shifts. This may reflect the relatively frequent changes in property tax rates.

Summarizing the Contribution of States, Industries, and Time to Incentive Variation

To summarize how incentives vary over states, industries, and time, the incentives data is analyzed using the statistical technique of analysis of variance. Specifically, the analysis uses as a dependent variable the present value of incentives, as a percent of the present value of value-added, for each state by industry by year cells. This means the number of observations to be explained is 33 states times 31 industries times 26 years, or 26,598 observations. The analysis of variance looks at how much of that variation across these cells is due to state effects, industry effects, year effects, as well as the binary combinations of effects: state by industry effects, state by year effects, and industry by year effects.

Table 19 presents the analysis of variance incentives (ANOVA) results. As the table reveals, by far the most variation is explained by state effects. The next biggest contributors to explaining incentive variation are state by industry effects and state by year effects. Industry effects and year effects by themselves are statistically significant contributors to explaining

Table 19 Analysis of Variance of Incentives/Value-Added for States, by Industries, by Year
Number of observations: 26,598
R-squared: 0.9494

Source of variation	Partial sum of square "explained" by set of variables	Degrees of freedom	Mean square	F-statistic
Total explained by model variables	5.56705	2,597	0.002144	173.57
Industry dummies	0.34289	30	0.01143	925.46
State dummies	3.10512	32	0.097035	7856.87
Year dummies	0.43332	25	0.017333	1403.42
State by industry	0.83752	960	0.000872	70.64
Industry by year	0.02048	750	0.000027	2.21
State by year	0.82773	800	0.001035	83.78
Residual (not explained by model)	0.29641	24,000	0.000012	
Total	5.86346	26,597	0.00022	

NOTE: This ANOVA attempts to explain the variance in incentives. The observations are on 31 export-base industries, in 33 states, for 26 years (1990–2015). Therefore, the variance to be explained has 26,598 cells as observations. The variable to be explained for each cell is the present value of incentives divided by the present value of value-added for that particular state/industry/year cell. This is "explained" by groups of dummies: dummies for industry, state, and year, and interactions between pairs of those dummies. The table reports how much of the variance is explained by each group of dummies, and also how that explained variance compares with the number of dummies in that grouping (the mean square), which leads in turn to an F-test for the significance of that group of dummies. All the dummy group F-tests lead to F-statistics which are highly significant.
SOURCE: Author's calculations.

industry variation, but they are not as important as the state-specific effects. Overall, the variation effects for different combinations of dummies explain about 95 percent of the overall variation in incentives.

The ANOVA results are quite consistent with the previously presented results, which separately looked at how incentives varied by industry, state, and year. Incentive variation is largely driven by state policy. State policy determines whether the state gets into the incentive game in a major way, which tends to persist over time and across industry. State policy also largely drives incentive variation across industries and over time. There are some commonalities across states in industry variation and time variation, but they are modest compared to what is due to the idiosyncratic policies of each state and how they change.

PATTERNS OF INCENTIVE POLICIES: HOW INCENTIVE DESIGN ALTERS INCENTIVE VALUE AND COSTS

This section considers incentive design. The design of incentives may differ in the timing of when incentives are provided over the life of the investment, by the emphasis placed on different types of incentives, and by specific provisions of incentives. The design chosen for incentives affects both the value of incentives for firms and the cost of incentives for taxpayers. Policy choices may significantly alter the relationship between incentives' value and costs.

Time Pattern of Incentive Provision

Incentives can be provided in year 1 of a business location decision or later on. Incentives provided earlier are significantly more valuable to firms, relative to their dollar cost. As mentioned, research suggests that in considering investment choices, business decision makers subject future dollar flows to a considerable discount. Some empirical work supports that such a

discount rate might be a 12 percent annual real discount rate (Poterba and Summers 1995). At such a discount rate, a dollar of incentives provided 5 years from now (year 6 of the investment) is worth only $0.57 today. A dollar of incentives provided 10 years from now (year 11 of the investment) is worth only $0.32 today. And a dollar of incentives provided 15 years from now is worth only $0.18 today.

The relative value of an incentive dollar today versus an incentive dollar in some future year, should be viewed differently by policymakers compared to business location decision makers. The research literature on public finance argues that in analyzing the benefits or costs of public policies, the real social discount rate should be 3 percent annually or less. (Bartik [2011] provides a review.) The argument essentially is that there is little reason to favor the present over the future, except the likelihood that the future will be wealthier, which reduces the relative social value of a future dollar. However, the discounting of the future due to the future being wealthier can be quantified, and it seems unlikely that this would lead to a real social discount rate of greater than 3 percent annually. At a 3 percent discount rate, a dollar of incentives provided 5 years from now is worth $0.86 today; 10 years from now, $0.74 today; 15 years from now, $0.64 today. From the perspective of a policymaker who has at least a minimally longer-term perspective, the cost of an incentive 15 years from now is over three times as great as it is from the perspective of a business decision maker focused on immediate profits ($0.64 versus $0.18). Table 20 presents the full set of comparisons of how dollar costs are viewed over different years of an investment, from a 12 percent discount perspective of a business-location decision maker versus the 3 percent discount rate perspective of an enlightened policymaker.

Another perspective is that of long-term costs. In the long term, after an incentive policy has been in place for many years (say, 40 or 50 years), the ongoing cost of the incentive program

Table 20 Relative Value of Future Dollar, Compared to Present Dollar, Two Different Discount Rates

Year of investment	12% discount rate	3% discount rate
1	1.000	1.000
2	0.893	0.971
3	0.797	0.943
4	0.712	0.915
5	0.636	0.888
6	0.567	0.863
7	0.507	0.837
8	0.452	0.813
9	0.404	0.789
10	0.361	0.766
11	0.322	0.744
12	0.287	0.722
13	0.257	0.701
14	0.229	0.681
15	0.205	0.661
16	0.183	0.642
17	0.163	0.623
18	0.146	0.605
19	0.130	0.587
20	0.116	0.570

NOTE: This is present value, as of year 1, of each future dollar rounded to third decimal. So, 0.116 at year 20 for 12% real discount rate means dollar provided in year 20 is worth 11.6¢ in year 1.
SOURCE: Author's calculations.

depends on the percentage of firms in different "age" categories, that is, by age since the initial investment. What percentage of firms falls into different age categories? There appears to be no direct evidence available on this topic. However, if one assumes a constant rate of growth of new investment, and a constant depreciation rate of that investment, one can get a simulated distribution of investment by age class. This is done in Table 21.[28] As this table shows, a substantial share of firms have been around for 20 years or more. From a truly long-term perspective, the incentives provided in different years should be weighted by these weights.[29] For

[28] This calculation assumes a growth rate of new investment at 2.62 percent annually, and annual depreciation of old investment at 2.71 percent annually. The former is equal to the average annual growth rate of real output nationally in the 31 export base industries from 1997 to 2013. The latter is equal to the BEA's figures for average structure depreciation in the 31 export-base industries. Structure depreciation is used because I assume when structures are built, demolished, and replaced corresponds to the age of an investment from the viewpoint of state and local economic developers handing out incentives.

[29] One could see this as the weights that should apply if a policymaker had a zero percent discount rate. In that case, all that matters in calculating incentive cost is the long-term steady state cost level.

Table 21 Relative Weight Placed on Incentives Provided in Each Year Since Initial Investment, Three Different Weighting Schemes

Year of investment	12% discount rate and implicit weights on incentives by year	3% discount rate and implicit weight on incentives by year	Age distribution weight on incentives by year
1	11.95	6.53	5.19
2	10.67	6.34	4.92
3	9.53	6.15	4.67
4	8.51	5.97	4.43
5	7.60	5.80	4.20
6	6.78	5.63	3.98
7	6.06	5.47	3.77
8	5.41	5.31	3.58
9	4.83	5.15	3.39
10	4.31	5.00	3.21
11	3.85	4.86	3.05
12	3.44	4.71	2.89
13	3.07	4.58	2.74
14	2.74	4.44	2.60
15	2.45	4.31	2.46
16	2.18	4.19	2.33
17	1.95	4.07	2.21
18	1.74	3.95	2.10
19	1.55	3.83	1.99
20 or more	1.39	3.72	36.29

NOTE: This table states how incentives provided in each year of investment are weighted in different weighting schemes to calculate overall cost or value of incentives. The weights are percentage weights, which sum to 100%.
SOURCE: Author's calculations.

comparison, the table also provides the implicit set of weights on each year's incentive offerings implied by the 12 percent and 3 percent discount rate formulations.[30]

What is the time pattern of incentives, by age of investment, overall in the United States, and how has that varied by state? As of 2015, in the average U.S. state, incentives are substantially front-loaded. This front-loading has increased over time, but front-loading is arguably not as great as it should be. And some states tend to provide very long-term incentives that probably do not have large payoffs in swaying business location decisions.

In 2015, as shown in Table 22 and Figure 4, incentives in the average U.S. state were significantly front-loaded. First-year incentives are more than double any other year, as a

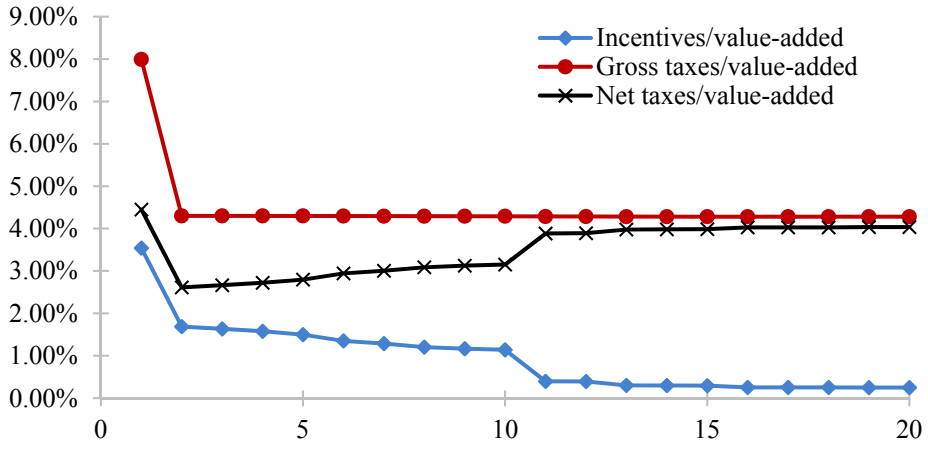
[30] The 12 percent and 3 percent formulations only put a modest weight on year 20 and beyond incentives because the incentive model used assumes zero incentives after year 20 of an investment, so no weight is placed on firms beyond year 20. In practice, in most states and years, the incentives provided at year 20 are quite small, so this assumption is close to accurate.

Table 22 Incentives and Taxes as Percentage of Value-Added, Years 1–20 of New Facility Investment, Investment Starting in 2015, National Average over All States and Export-Base Industries

Year of investment	Incentives/value-added	Gross taxes/value-added	Net taxes/value-added
1	3.54	7.99	4.45
2	1.69	4.30	2.61
3	1.64	4.30	2.66
4	1.58	4.30	2.72
5	1.50	4.30	2.80
6	1.35	4.30	2.94
7	1.29	4.29	3.01
8	1.21	4.29	3.09
9	1.17	4.29	3.13
10	1.14	4.29	3.15
11	0.40	4.28	3.88
12	0.39	4.28	3.89
13	0.30	4.28	3.98
14	0.30	4.28	3.98
15	0.30	4.28	3.99
16	0.25	4.28	4.03
17	0.25	4.28	4.03
18	0.25	4.28	4.03
19	0.25	4.28	4.03
20	0.25	4.28	4.03

NOTE: Figures are national average in 2015 over 33 states and 31 export-base industries. Figures show, for facility starting up in 2015, the ratio of incentives and taxes to value-added for each of the first 20 years of operation.
SOURCE: Author's calculations.

Figure 4 Incentives and Taxes for New Facility over First 20 Years of Operation



NOTE: Figures are national averages for 2015. Figures are percentage ratios to value-added for first 20 years of operation for facility starting up in 2015.
SOURCE: Derived from Table 22.

percentage of value-added. Incentives then gradually diminish through year 10 of the investment, then abruptly drop off, after which incentives again gradually diminish through year 20.

Compared to gross taxes, incentives are much more front-loaded. Gross taxes are mostly constant over the 20-year period, except for the first year. They are somewhat higher the first year due to sales taxes, which are front-loaded due to the extra sales tax implicitly imposed on construction materials for the new structures.

However, even though incentives are front-loaded, later years of the investment still involve substantial incentive costs. The simple sum of incentive costs over years 11–20 is almost as much as the first year's costs. The sum of incentives costs from years 6–20 is almost as much as the first five years of incentive costs, and more than the first year's incentive costs. Yet if firms use a 12 percent discount rate, the relative value of incentives provided in years 6, 11 or later are substantially discounted. This may create significant long-term fiscal challenges, without doing much to affect business location decisions. For example, it seems doubtful that the property tax abatement provided in year 11 will do much to drive business location decisions. Yet long-term property tax abatements may lead to future fiscal problems for local schools and governments.

The downside to front-loading incentives is the possibility that the business will take the money and run. That is, the incented business may receive significant sums of money in year 1, and then five years later, with different business management or different economic conditions, decide to close down the incented facility. One way to deal with this problem is to include clawback provisions in incentive agreements. Incentive clawbacks have been successfully implemented by some state and local government. Under such clawbacks, some portion of the initially provided incentive is required to be repaid if the incented business closes or significantly downsizes within some specified period of time.

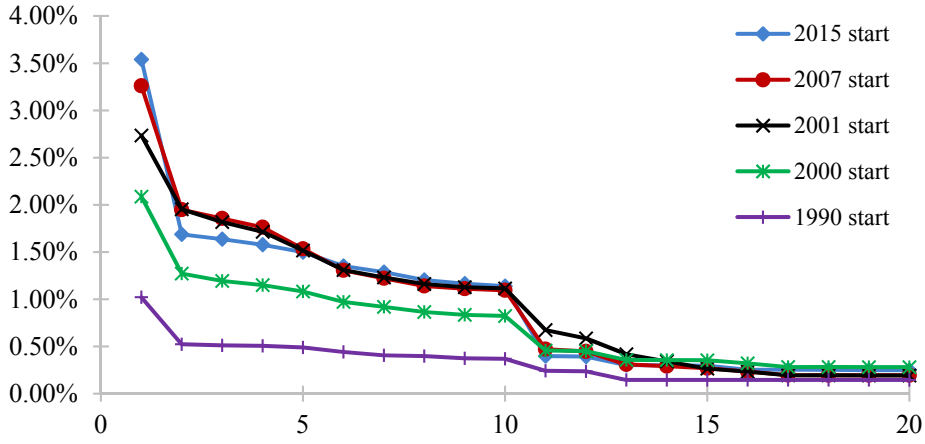
For the average state, over the time period from 1990 to 2015, incentives have become more front-loaded. In Table 23 and Figure 5, the time pattern of incentives is shown for five selected years. From 2001 to 2015, the increase in front-loading is mostly in increased incentives in the first year. From 1990 to 2001, the front-loading increased over the investment's first 10 years.

Table 23 Timing of Incentives over Years of Facility Operation, Five Selected Starting Years

Year of new facility operation	2015 start	2007 start	2001 start	2000 start	1990 start
1	3.54	3.26	2.73	2.09	1.02
2	1.69	1.95	1.95	1.27	0.52
3	1.64	1.86	1.82	1.19	0.51
4	1.58	1.76	1.72	1.15	0.51
5	1.50	1.53	1.52	1.08	0.49
6	1.35	1.31	1.31	0.97	0.44
7	1.29	1.22	1.23	0.92	0.41
8	1.21	1.14	1.16	0.86	0.40
9	1.17	1.11	1.13	0.84	0.37
10	1.14	1.09	1.11	0.82	0.37
11	0.40	0.47	0.67	0.46	0.24
12	0.39	0.45	0.59	0.45	0.24
13	0.30	0.31	0.42	0.36	0.15
14	0.30	0.29	0.34	0.36	0.15
15	0.30	0.27	0.27	0.35	0.15
16	0.25	0.24	0.23	0.32	0.15
17	0.25	0.20	0.19	0.28	0.15
18	0.25	0.20	0.19	0.28	0.15
19	0.25	0.20	0.19	0.28	0.15
20	0.25	0.20	0.19	0.28	0.15
Years 1–10	16.09	16.23	15.68	11.20	5.04
Years 2–10	12.55	12.97	12.95	9.12	4.02
Years 11–20	2.95	2.80	3.30	3.42	1.64
Years 6–20	9.10	8.68	9.24	7.84	3.63
Years 1–5	9.94	10.36	9.74	6.79	3.05

NOTE: Table shows average over 33 states and 31 export base industries of incentive to value-added ratio by year of facility operation (year 1 = first year of operation, etc.), for five different starting years. Figures at bottom are simple unweighted sums of these ratios.
SOURCE: Author's calculations.

Figure 5 Timing of Incentives over Years of Facility Operation, Five Selected Starting Years



NOTE: Numbers are national average as percentage of value-added for incentives, years 1–20 of new facility operation, for new facility starting up in five different years.
SOURCE: Derived from Table 23.

Another way to analyze trends from 1990 to 2015 in front-loading is to look at incentive trends under different weightings. In Table 24 and Figure 6, overall incentive costs are reported for each starting year of the investment, using different weightings of incentive costs for each of the first 20 years of the investment. Two weightings are based on 12 percent and 3 percent discount rates for incentives. A third weighting is a long-term cost weighting based on an assumed age distribution of export-base firms.[31] As seen in the tables and figures, there is the same overall pattern of an upward increase in average incentive costs over time, with this increase being faster in the 1990s than since 2001. However, the upward increase in incentives is highest when using a 12 percent discount rate, which places a great weight on the incentives in the first few years, and lowest when using a long-term cost weighting, which weights more heavily the incentives in year 20.

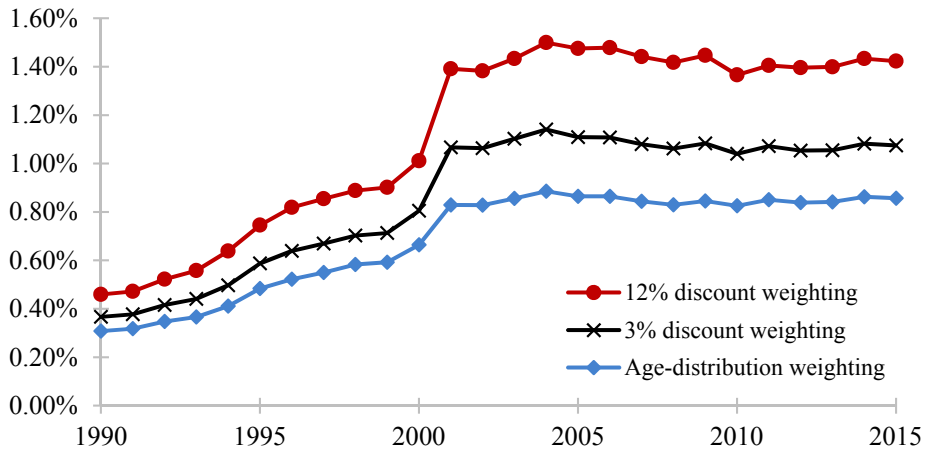
[31] For the purposes of this long-term cost weighting, the incentive cost in year 20 is assumed to continue indefinitely. As costs in year 20 are modest, changes in this assumption do not matter much. In any event, from a very long-term perspective, it perhaps is more accurate to say that incentive costs for older investments will continue to some extent rather than be zero.

Table 24 Average Ratio of Incentives to Value-Added; Three Different Weightings of Time Pattern of Incentives, Starting Years from 1990 to 2015

Starting year	Age-distribution weighting	12% discount rate weighting	3% discount rate weighting
1990	0.31	0.46	0.37
1991	0.32	0.47	0.38
1992	0.35	0.52	0.42
1993	0.37	0.56	0.44
1994	0.41	0.64	0.50
1995	0.48	0.75	0.59
1996	0.52	0.82	0.64
1997	0.55	0.85	0.67
1998	0.58	0.89	0.70
1999	0.59	0.90	0.71
2000	0.66	1.01	0.81
2001	0.83	1.39	1.07
2002	0.83	1.38	1.06
2003	0.86	1.43	1.10
2004	0.89	1.50	1.14
2005	0.86	1.48	1.11
2006	0.86	1.48	1.11
2007	0.84	1.44	1.08
2008	0.83	1.42	1.06
2009	0.85	1.45	1.08
2010	0.83	1.37	1.04
2011	0.85	1.41	1.07
2012	0.84	1.40	1.05
2013	0.84	1.40	1.06
2014	0.86	1.43	1.08
2015	0.86	1.42	1.07

NOTE: This shows the "average" ratio of incentives to value-added, over all years of facility operation, under the three different weightings of years defined by Table 21. Numbers are percentages of value-added.
SOURCE: Author's calculations.

Figure 6 Time Trend in Average Incentives Per Export-Base Industry, Using Three Different Weightings of Incentives in Various Years of Operation of a New Facility



NOTE: Figure is "average" national incentive to value-added ratio for different start years, with "average" using different weighting of the years of the facility's operation.
SOURCE: Author's calculations; derived from Table 24.

What about incentive front-loading versus back-loading by state? In Table 25, we compare states' time pattern of incentive provision by using the three different weighting systems (12 percent discount rate, 3 percent discount rate, long-term cost weighting using age distribution of firms). In the table, a ranking of states is done, based on how much larger the 12 percent weighting figure is than the 3 percent weighting figure. States that are higher ranked are

Table 25 States Sorted by Time Pattern of Incentive Front-Loading, Facility Start Year of 2015

State	Age-distribution weighting	3 discount weighting	12 discount weighting	Excess % of 12 over 3	Excess % of 12 over age-distribution weighting
Virginia	0.12	0.15	0.27	79.9	127.2
Missouri	0.37	0.48	0.79	66.6	115.3
Wisconsin	0.75	0.93	1.52	64.4	103.7
Oregon	0.37	0.44	0.70	59.1	87.0
Washington	0.05	0.06	0.09	55.9	80.7
Connecticut	0.33	0.43	0.65	53.0	99.0
Minnesota	0.58	0.75	1.14	52.8	95.7
Georgia	0.26	0.35	0.52	50.5	100.7
Texas	0.64	0.83	1.24	50.0	93.3
Iowa	1.38	1.78	2.62	47.1	90.2
Michigan	1.05	1.41	2.07	47.0	98.0
Nebraska	1.33	1.77	2.54	43.9	91.0
New York	1.87	2.54	3.53	38.8	88.2
Nevada	0.12	0.17	0.23	38.0	89.1
Arizona	0.66	0.78	1.06	36.3	60.9
Pennsylvania	0.86	1.15	1.55	35.7	81.7
Ohio	0.56	0.78	1.05	34.8	85.9
Kentucky	1.26	1.75	2.34	33.8	84.8
Louisiana	1.85	2.50	3.33	33.3	79.9
Indiana	1.55	2.01	2.68	33.1	72.1
District of Columbia	0.91	1.27	1.67	31.9	83.0
New Jersey	1.64	2.17	2.83	30.8	73.0
Massachusetts	0.37	0.41	0.53	28.7	41.2
New Mexico	3.01	3.31	4.23	27.8	40.6
Maryland	0.26	0.29	0.36	27.1	39.8
North Carolina	0.56	0.76	0.93	22.2	66.3
Colorado	0.40	0.58	0.69	20.0	72.4
Florida	0.99	1.07	1.23	15.4	24.7
South Carolina	1.84	2.08	2.39	14.9	30.4
Illinois	0.91	1.18	1.35	14.5	48.4
California	0.41	0.42	0.47	11.2	15.9
Alabama	1.48	1.62	1.80	11.0	21.8
Tennessee	2.74	2.79	2.91	4.4	6.1

NOTE: For each state, Table shows average incentives for all export-base industries, weighted over 20-year facility operation period using 3 different weightings, for start year of 2015. The table is sorted by excess of 12 percent weighting over 3 percent weighting, which puts more front-loaded states at top.
SOURCE: Author's calculations.

more front-loaded. As the table shows, some states' incentive systems are much more front-loaded than others. Highly front-loaded states (12 percent exceeds 3 percent by more than 55 percent) include Virginia, Missouri, Wisconsin, Oregon, and Washington. The least front-loaded states, which provide the highest ratios of long-term incentives to up-front incentives (12 percent exceeds 3 percent by less than 15 percent), include Tennessee, Alabama, California, Illinois, and South Carolina.

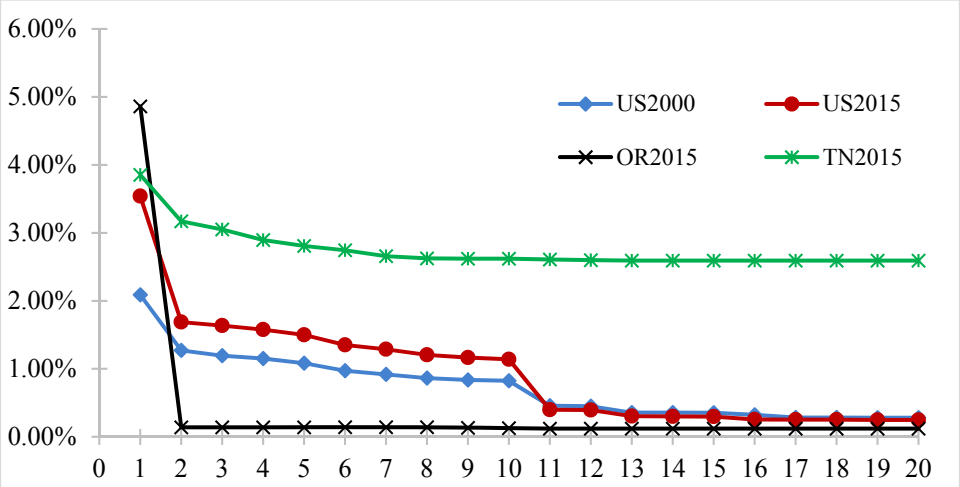
To get some picture of state variation in incentives, consider Oregon, a very front-loaded state, versus Tennessee, a state without much front-loading. For comparison, also consider the results for the average state in 2015 and 2000. As shown in Table 26 and Figure 7, Oregon in 2015 provided almost all its incentives in the first year of the investment. In contrast, Tennessee's incentives are fairly uniform over the first 20 years of an investment. Assuming firms heavily discount the future, Tennessee's incentives have a relatively high ratio of long-term costs to taxpayers compared to the value of incentives to business-location decision makers.

Table 26 Time Pattern of Incentives; Oregon and Tennessee in 2015, Compared to U.S. Average in 2015 and 2000

Year of facility operation	US2000	US2015	OR2015	TN2015
1	2.09	3.54	4.86	3.85
2	1.27	1.69	0.14	3.17
3	1.19	1.64	0.14	3.05
4	1.15	1.58	0.14	2.90
5	1.08	1.50	0.14	2.81
6	0.97	1.35	0.14	2.75
7	0.92	1.29	0.14	2.66
8	0.86	1.21	0.14	2.63
9	0.84	1.17	0.13	2.62
10	0.82	1.14	0.13	2.62
11	0.46	0.40	0.12	2.61
12	0.45	0.39	0.12	2.60
13	0.36	0.30	0.12	2.59
14	0.36	0.30	0.12	2.59
15	0.35	0.30	0.12	2.59
16	0.32	0.25	0.12	2.59
17	0.28	0.25	0.12	2.59
18	0.28	0.25	0.12	2.59
19	0.28	0.25	0.12	2.59
20	0.28	0.25	0.12	2.59

NOTE: Figures show incentives as a percent of value-added, for years 1–20 of operation of a new facility, for Oregon, Tennessee, and the U.S. average starting in 2015, and for the U.S. average starting in 2000.
SOURCE: Author's calculations.

Figure 7 Front-Loading versus Back-Loading of Incentives, Oregon and Tennessee versus U.S.



NOTE: Figure shows incentives as a percentage of value-added, over first 20 years of facility operation, four different incentive regimes.
SOURCE: Author's calculations; derived from Table 26.

Types of Incentives and Taxes

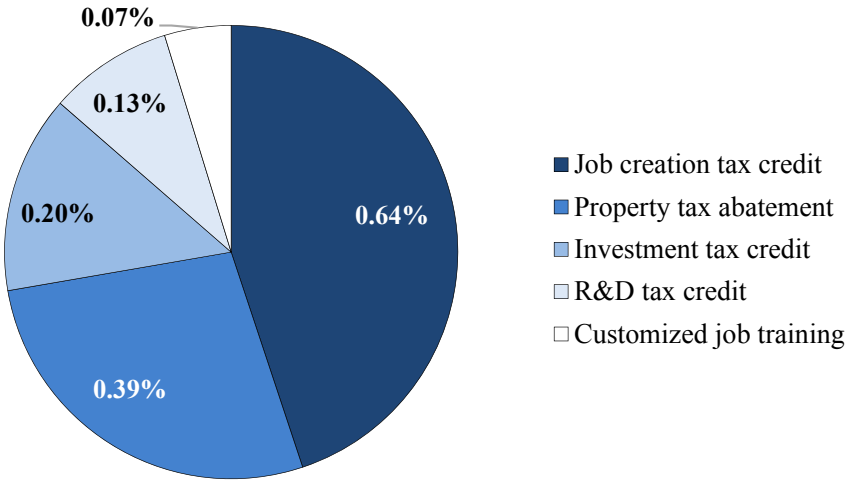
Another aspect of a state's policy design of incentives and taxes is what types of incentives and taxes are used. As shown in Table 27, of the total cost of incentives in the average state in 2015, the largest incentive type was JCTCs, which were almost half of total incentive costs (44.9 percent). Another quarter of incentive costs (27.4 percent) were due to property tax abatements. The remaining three incentive types (ITCs, R&D tax credits, customized job training) together constituted about one-quarter of incentive costs (Figure 8). Gross state and

Table 27 Types of Incentives, National Averages, 2015

Incentive type	Incentive/value-added	% of total
Total	1.42	100.0
Job creation tax credit	0.64	44.9
Property tax abatement	0.39	27.4
Investment tax credit	0.20	14.1
R&D tax credit	0.13	8.9
Customized job training	0.07	4.7

NOTE: Numbers show present value of each incentive type as percent of present value of value-added, averaged over 33 states and 31 export-base industries, for a facility start date of 2015.
SOURCE: Author's calculations.

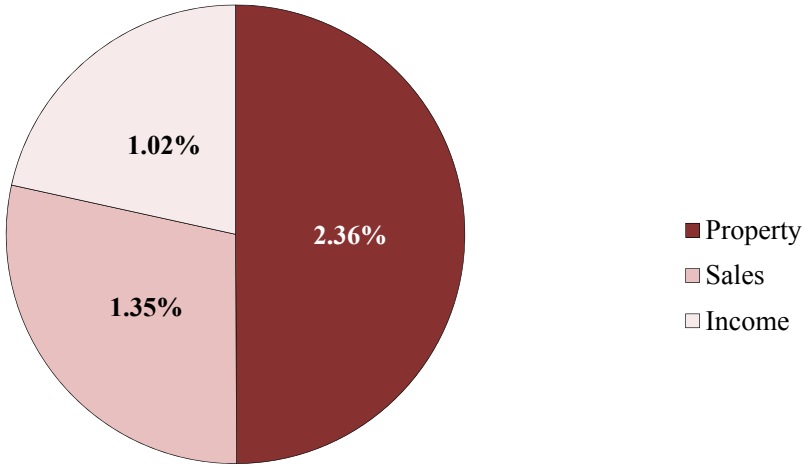
Figure 8 Breakdown of Incentive Types, National Average, 2015



NOTE: Pie shows share of total incentives. Percentages are present share of each incentive type as percentage of value-added.
SOURCE: Author's calculations; derived from Table 27.

local business taxes are about half property taxes (49.9 percent), a little over one-quarter sales taxes (28.5 percent), and a little under one-quarter corporate income tax (Figure 9 and Table 28).[32]

Figure 9 Breakdown of Types of State and Local Business Taxes, 2015



NOTE: Pie shows share of each type of gross tax in total taxes. Numbers are present value of gross taxes as percentage of value-added.
SOURCE: Author's calculations; derived from Table 28.

[32] As shown in Appendix E, this gross tax breakdown is similar to what is found the Ernst and Young analysis of Phillips et al. (2015).

Table 28 Type of State and Local Business Tax, Based on Gross Taxes, National Average over Export-Base Industries, 2015

Type of tax	Gross tax/value-added	% of total
Total	4.74	100.0
Property	2.36	49.9
Sales	1.35	28.5
Income	1.02	21.6

NOTE: Figures show present value of gross taxes of different types, as percent of present value of value-added, averaged over 33 states and 31 export-base industries, for a facility start date of 2015.
SOURCE: Author's calculations.

Across states in 2015, the types of incentives used showed large differences (Table 29). Although nationally JCTCs were most important, some states whose overall incentives were above the national average had little or no JCTCs: Alabama, DC, Iowa, Kentucky, and Pennsylvania. Property tax abatements were particularly important (greater than 1.30 percent of value-added versus the national average of 0.39 percent) in DC, Michigan, New Mexico, Pennsylvania, and Tennessee. Investment tax credits were particularly large (greater than 0.9 percent of value-added versus the national average of 0.20 percent) in Alabama, Kentucky, Nebraska, and South Carolina. R&D tax credits are usually not very large, but in some states with overall low incentives (less than 0.55 percent in overall incentives as percent of value-added), R&D tax credits were a large share of what incentives are provided: California, Maryland, Massachusetts. Customized job training is also usually not a very large incentive, but it was well above the national average (greater than 0.30 percent versus national average of 0.07 percent) in New Mexico, Iowa, and Missouri.

For gross taxes, state usage of different taxes was highly varied (Table 30). High-property-tax states (greater than 3.36 percent of value-added versus national average of 2.36 percent) included South Carolina, Michigan, and Tennessee. Low-property-tax states (less than 1.36 percent of value-added) included Virginia, Washington, Nevada, California, and Kentucky.

Table 29 Types of Incentives, 33 States, 2015, as Percent of Value-Added

Jurisdiction	Total	Job creation tax credit	Property tax abatement	Investment tax credit	R&D tax credit	Customized job training
National average, 2015	1.42	0.64	0.39	0.20	0.13	0.07
Alabama	1.80	0.00	0.61	1.14	0.00	0.05
Arizona	1.06	0.39	0.00	0.21	0.29	0.16
California	0.47	0.00	0.00	0.00	0.39	0.08
Colorado	0.69	0.62	0.00	0.00	0.00	0.07
Connecticut	0.65	0.00	0.36	0.20	0.10	0.00
District of Columbia	1.67	0.00	1.67	0.00	0.00	0.00
Florida	1.23	0.17	0.22	0.76	0.02	0.07
Georgia	0.52	0.41	0.00	0.00	0.09	0.02
Illinois	1.35	0.91	0.29	0.12	0.02	0.01
Indiana	2.68	1.19	0.63	0.66	0.17	0.02
Iowa	2.62	0.07	1.19	0.80	0.17	0.38
Kentucky	2.34	0.00	0.08	2.24	0.00	0.03
Louisiana	3.33	2.10	0.81	0.05	0.21	0.17
Maryland	0.36	0.10	0.00	0.00	0.27	0.00
Massachusetts	0.53	0.00	0.00	0.20	0.25	0.08
Michigan	2.07	0.52	1.33	0.00	0.00	0.22
Minnesota	1.14	0.73	0.00	0.31	0.07	0.04
Missouri	0.79	0.47	0.00	0.00	0.00	0.32
Nebraska	2.54	1.29	0.00	0.99	0.08	0.18
Nevada	0.23	0.00	0.19	0.00	0.00	0.04
New Jersey	2.83	2.44	0.00	0.10	0.27	0.02
New Mexico	4.23	1.64	1.70	0.16	0.25	0.48
New York	3.53	2.40	0.63	0.44	0.05	0.00
North Carolina	0.93	0.84	0.00	0.00	0.07	0.01
Ohio	1.05	0.54	0.49	0.00	0.02	0.00
Oregon	0.70	0.56	0.00	0.00	0.13	0.00
Pennsylvania	1.55	0.12	1.34	0.00	0.08	0.01
South Carolina	2.39	0.22	1.00	0.94	0.12	0.11
Tennessee	2.91	0.24	2.59	0.03	0.00	0.05
Texas	1.24	0.51	0.58	0.00	0.07	0.08
Virginia	0.27	0.23	0.00	0.00	0.00	0.04
Washington	0.09	0.00	0.00	0.02	0.00	0.07
Wisconsin	1.52	0.64	0.00	0.58	0.12	0.18

NOTE: Figures for each state are average over 31 export-base industries of present value of each incentive type as percent of present value of value-added, for a facility start date of 2015.
SOURCE: Author's calculations.

The sales tax was particularly high in New Mexico and Washington, both of which have business gross receipts taxes, which this database treats as sales taxes. The corporate income tax was particularly high in DC, and low in Ohio and Washington, which lack such taxes.

Over time, how has the use of different incentive types changed? As shown in Table 31, averaged across all states by far the biggest change is that JCTCs have gone from virtually nothing in 1990 to 45 percent of all incentives today, or from 0.01 percent of value-added to 0.64

Table 30 How States Differ in Types of State and Local Business Taxes

Jurisdiction	Total gross taxes/ value-added	Property tax	Sales tax	Corporate income tax
National average	4.74	2.36	1.35	1.02
Alabama	4.49	1.59	1.76	1.14
Arizona	5.21	3.04	1.25	0.92
California	4.38	1.33	1.48	1.57
Colorado	4.36	2.78	0.80	0.78
Connecticut	5.90	3.25	1.20	1.46
District of Columbia	5.69	2.21	1.44	2.05
Florida	4.68	2.18	1.48	1.01
Georgia	4.04	2.06	1.05	0.93
Illinois	5.46	2.83	1.03	1.61
Indiana	4.54	2.67	0.73	1.14
Iowa	6.11	3.28	1.07	1.76
Kentucky	3.51	1.34	1.02	1.16
Louisiana	5.26	2.74	1.32	1.20
Maryland	4.96	2.76	0.83	1.37
Massachusetts	4.65	2.64	0.66	1.35
Michigan	5.56	3.95	0.68	0.93
Minnesota	6.05	3.04	1.58	1.43
Missouri	4.84	3.00	0.84	0.99
Nebraska	4.81	2.41	1.21	1.19
Nevada	2.79	1.29	1.50	0.00
New Jersey	4.32	1.52	1.39	1.41
New Mexico	8.47	1.74	5.50	1.23
New York	4.65	2.61	1.47	0.57
North Carolina	3.61	1.47	1.19	0.95
Ohio	3.61	1.99	1.63	0.00
Oregon	3.99	2.67	0.00	1.31
Pennsylvania	5.65	2.74	1.33	1.58
South Carolina	5.85	4.13	0.97	0.74
Tennessee	6.31	3.46	1.61	1.24
Texas	5.03	3.20	1.52	0.30
Virginia	2.77	1.02	0.66	1.09
Washington	5.15	1.11	4.04	0.00
Wisconsin	4.41	2.63	0.89	0.89

NOTE: Figures are present value of state and local business taxes of various types, as percent of present value of value-added, after averaging across 31 export-base industries, for a facility start date of 2015, for various states.
SOURCE: Author's calculations.

percent of value-added. Of the 0.96 percentage point increase in overall incentives from 1990 to 2015 (from 0.46 percent to 1.42 percent), about 0.63 percent is due to increased JCTC usage, or about two-thirds of the total incentive increase. Many of these JCTCs are tied to payroll increases at incented firms, and are credits that can be taken against the firm's normal payroll tax withholdings on behalf of its workers, and hence are not subject to being limited by the firm's liabilities under the state's corporate income tax.

Table 31 Types of Incentives Used, National Average, Different Start Years

Incentive type	1990 start	2000 start	2001 start	2007 start	2015 start
All incentives	0.46	1.01	1.39	1.44	1.42
Job creation tax credit	0.01	0.24	0.37	0.47	0.64
Property tax abatement	0.32	0.39	0.50	0.46	0.39
Investment tax credit	0.06	0.21	0.35	0.32	0.20
R&D tax credit	0.04	0.12	0.12	0.13	0.13
Customized job training	0.03	0.05	0.06	0.06	0.07

NOTE: These figures show present value of different types of incentives, as percent of present value of value-added, averaged over 33 states and 31 export-base industries, for five selected start years for a new facility.
SOURCE: Author's calculations.

Other incentives have also gone up over time. Property tax abatements were by far the most important incentive back in 1990. Abatements have grown some over time, but not as much as other incentives. Both ITCs and R&D tax credits have shown large proportional increases over time.

What have been the trends in state and local business taxes? As shown in Table 32, the trend has been toward somewhat lower gross property taxes and corporate income taxes, and somewhat higher sales taxes.[33]

Table 32 Types of State and Local Business Taxes, Various Years, 1990–2015, National Averages

Type of tax	1990	2000	2001	2007	2015
Overall state and local business taxes	5.20	5.11	5.08	4.69	4.74
Property tax	2.70	2.65	2.60	2.23	2.36
Sales tax on business inputs	1.16	1.17	1.18	1.22	1.35
Corporate income tax	1.34	1.30	1.29	1.24	1.02

NOTE: Table shows present value of gross taxes of different types, as percent of present value of value-added, averaged over 33 states and 31 export-base industries, for new facilities in various start years from 1990 to 2015.
SOURCE: Author's calculations.

EFFECTS OF POLICY CHANGES IN INCENTIVES AND TAXES

This section considers the effects of changing incentive and tax policies. Specifically, this section considers four types of policy changes: turning each incentive off, modifying certain

[33] As shown in Appendix E, these same tax trends are not found in the analyses done by Ernst and Young.

incentive rules, modifying certain tax rules often seen as motivated for economic development reasons, and turning off each type of tax. The effects analyzed are on average net taxes for export-base industries. The focus is on 2015 results for national averages, and on 2015 results for each of the 33 states.

Because the various incentive and taxes interact, turning off an incentive or tax will not necessarily have an impact identical to the dollars paid for that incentive or tax. For example, because many incentives are limited to corporate income tax liabilities, eliminating one incentive may allow other incentives to be more fully taken. Therefore, eliminating the first incentive will increase net taxes by less than that first incentive's costs. As a tax example, because property tax abatements are taken against the property tax and other incentives are taken against the corporate income tax, eliminating the property tax or the corporate income tax will reduce net taxes by less than the gross taxes paid, because the elimination of these taxes eliminates the opportunity to take some incentives.

At the national level, Table 33 summarizes the effects of each type of incentive or tax policy change on net taxes. The first set of results shows the effects of eliminating each type of incentive. The effect of eliminating each type of incentive on net taxes is compared to the national total incentive paid. As can be seen, although eliminating one incentive does have some slight offsets in its effects on increasing net taxes, due to other incentives increasing, such offsets are modest. For the various incentives, the increase in net taxes from eliminating each incentive is equal to 93 percent or more of the effect one would predict from simply looking at actual incentive payments. As shown in Appendix H, the same is true for almost all incentives in almost all states.

Table 33 Changes in Average Net State and Local Business Taxes Due to Various Incentive and Tax Policy Shifts

"Policy" Switch	Baseline	Change in net taxes as percent of value-added	Naïve prediction of change in net taxes	Ratio of actual net tax effect to naïve prediction
Baseline average gross tax rate, 2015, national average	4.74			
Baseline incentive national average, 2015	1.42			
Baseline average net tax rate, 2015, national average	3.31			
Eliminating property tax abatements		0.38	0.39	96.6
Eliminating customized job training		0.06	0.07	96.2
Eliminating ITC		0.19	0.20	93.1
Eliminating JCTC		0.63	0.64	98.6
Eliminating R&D credit		0.13	0.13	100.0
Eliminating incentive refundability		0.48		
Eliminating incentive carry-forwards		0.07		
Limiting incentive terms to one year		0.92	1.00	91.5
Adjust sales factor in apportionment to 33 in all states		0.16		
Impose throwback rule in all states		0.05		
Make property tax on noninventory personal property equal to real property tax		0.29		
Eliminate property tax		−1.90	−2.36	80.4
Eliminate sales tax		−1.32	−1.35	97.6
Eliminate corporate income tax		−0.72	−1.02	70.9

NOTE: Calculations show changes in present value of net state and local business taxes, after incentives, as percent of present value of value-added, averaged over 33 states and 31 export-base industries, due to various changes in incentive policy and tax policy.
SOURCE: Author's calculations.

The important implication of this analysis is that for almost all incentives in almost all states, their importance can be gauged simply by looking at incentive amounts paid. One does not have to do a complex analysis of offsets from other incentive and tax provisions. However, it was necessary to do the analysis in this database's simulation model to show that this is the case.

This also means that the previous analysis of the relative importance of different incentive types in different states does not need to be redone in terms of how important incentives are in terms of effects on each state's net taxes.

The next set of policies considers various changes to incentive design. The incentive design changes considered include:

- Eliminating refundability—if an incentive is to be paid, it must be offsetting some tax liability of the firm and cannot be paid to the firm in an amount that exceeds that tax liability.
- Eliminating carry-forwards of incentives—if an incentive is awarded in one year, but cannot be fully taken because of insufficient corporate income tax liabilities to offset, the awarded incentive that is not taken is prohibited from being carried forward into future tax years.
- Restricting all incentives to a one-year term—if some type of business activity in a year triggers the award of an incentive (job creation, investment, R&D), that incentive is only awarded in that year.

The last policy change, restricting all incentives to a one-year term, is not quite the same as requiring that all incentives be paid in the first year of the investment. For example, R&D tax credits are frequently awarded based on R&D activity in later years, so a one-year term would not prevent R&D tax credits in year 10 of the investment based on year 10 R&D spending. However, as Table 33 shows, the revenue impact of a one-term term is 92 percent of the revenue impact of simply requiring that all incentives be paid only in year one of the investment.

As shown in Table 33, restricting incentives to only a one-year term has a very large revenue impact. Such a change would increase net business taxes by 0.92 percent of value-added. This would reduce the costs of incentives by almost two-thirds (0.92 / 1.42 = 64.7 percent). Alternatively, this would result in an increase in net state and local business taxes from export-base firms of over one quarter (0.92 / 3.31 = 27.8 percent).

Another incentive reform with a large impact is eliminating refundability. This change, done by itself, would increase net taxes for export-base firms by 0.48 percent of value-added. The increase would reduce the cost of incentives by over one-third (0.48 / 1.42 = 33.8 percent).

In contrast, reducing carry-forwards have a more modest impact on national average net taxes. Eliminating carry-forwards would only increase net taxes by 0.07 percent. Although for some states and some taxes carry-forwards are important, it seems that in the entire nation, most firms in most cases are able to claim most incentives without using carry-forwards. The bottom line is that in the national sample, many of the costs of incentive programs stem from incentives that last longer than one year, and from incentives that are refundable.

What about at the state level? The effects of incentive terms, refundability, and carry-forwards at the state level, as of 2015, are shown in Table 34. Among the states, imposing a one-year term has particularly large effects on net business taxes on export-base businesses in New Mexico, Louisiana, New York, New Jersey, and Tennessee. Eliminating refundability has particularly large effects in New York, New Jersey, Louisiana, New Mexico, and Wisconsin. Eliminating carry-forwards has particularly large effects in Kentucky, South Carolina, Nebraska, and Indiana.

Some of these differences across states are quite large. For example, even though eliminating carry-forwards in the nation only increases average net business taxes by 0.07 percent of value-added, eliminating carry-forwards in Kentucky would increase net business taxes by 1.88 percent, which would reduce incentive costs by over four-fifths (1.88 divided by average Kentucky incentives of 2.34 percent = 80.3 percent). Therefore, how different reforms affect incentive costs is quite diverse across the states.

Table 34 Effects on Net Business Taxes in Different States of Selected Incentive Reforms

State	Baseline net tax rate	Effects on net taxes of: Eliminating refundability	Eliminating carry-forwards	Limiting incentives to one-year term
National	3.31	0.48	0.07	0.92
Alabama	2.69	0.00	0.00	1.49
Arizona	4.15	0.26	0.09	0.69
California	3.91	0.00	0.00	0.34
Colorado	3.67	0.00	0.14	0.47
Connecticut	5.25	−0.04	0.19	0.27
District of Columbia	4.03	0.00	0.00	1.28
Florida	3.45	0.00	0.02	0.97
Georgia	3.52	0.00	0.07	0.35
Illinois	4.11	0.00	0.15	0.92
Indiana	1.86	0.68	0.44	1.61
Iowa	3.49	0.05	0.11	1.50
Kentucky	1.17	0.00	1.88	0.06
Louisiana	1.92	1.43	0.00	2.57
Maryland	4.60	0.00	0.02	0.25
Massachusetts	4.12	0.07	0.06	0.22
Michigan	3.49	0.41	0.00	1.04
Minnesota	4.90	0.44	0.00	0.84
Missouri	4.04	0.08	0.00	0.35
Nebraska	2.26	0.08	0.60	1.10
Nevada	2.56	0.00	0.00	0.16
New Jersey	1.49	1.70	0.03	2.31
New Mexico	4.23	1.32	0.07	2.77
New York	1.12	2.46	0.00	2.53
North Carolina	2.68	0.75	0.00	0.79
Ohio	2.57	0.54	0.01	0.85
Oregon	3.29	0.43	0.00	0.12
Pennsylvania	4.10	0.08	0.00	1.10
South Carolina	3.46	0.00	0.88	1.18
Tennessee	3.40	0.00	0.17	2.16
Texas	3.79	0.48	0.00	0.54
Virginia	2.50	0.07	0.00	0.04
Washington	5.06	0.00	0.00	0.02
Wisconsin	2.88	1.12	0.00	0.27

NOTE: Table shows how different incentive reforms affect net tax rate: ratio of present value of net taxes after incentives, to present value of value-added, averaged over 31 export-base industries.
SOURCE: Author's calculations.

Next, the policy switches considered are changes in tax rules, which are often justified as ways to promote economic development. The policy switches we consider *reverse* these supposedly "pro-economic development" tax rules and would increase business taxes. We consider three such tax rule changes:

1. Reducing the sales tax factor in corporate income apportionment formulas to 33 percent for all states and industries (in some states, the sales factor is as high as 100 percent, which reduces taxes on export-base firms).
2. Reinstating throwback rules in corporate income apportionment formulas for all states, so that there is no "nowhere" corporate income that is not taxed by state corporate income taxes, which can occur in the many (not all) states where throwback rules are not imposed.
3. Making the property tax on noninventory personal property (e.g., machinery and equipment) equal to the property tax on real property, which increases business taxes in the many states where either all business personal property or business personal property in manufacturing is exempt from property taxes or taxed at a lower rate.

Going back to Table 33, these three tax rule changes have relatively modest effects in increasing net business taxes. In part, this reflects that for some states and industries, these tax rule changes are no change at all. However, in the overall national data, these changes are still significant relative to gross revenue collected from the specific taxes involved. For example, average gross taxes on export-base businesses paid in the corporate income tax are 1.02 percent of value-added. Over the entire sample of states, on average switching to a 33 percent sales tax factor would increase net taxes by 0.16 percent of value-added, which is about a one-sixth increase in corporate income tax collections. The elimination of throwback has a lesser effect at 0.05 percent of value-added, but this is still about 5 percent of gross corporate income tax collections. For property taxes, increasing noninventory personal property tax rates to match tax rates on real property would increase net taxes by 0.29 percent, which is about 12 percent of gross business property taxes at 2.36 percent of value-added.

When these tax rule changes are looked at by state, net tax effects are in some cases much higher (Table 35). Lowering the sales tax factor to 33 percent has above average effects (over twice average across all states in the model) in Pennsylvania, Iowa, Minnesota, and New Jersey. Restoring throwback rules has above-average effects in Pennsylvania, Minnesota, Iowa, New Jersey, Nebraska, Connecticut, Maryland, Massachusetts, and Michigan. Equalizing the property

Table 35 Effects on Net Business Taxes in Different States of Selected Tax Reforms

		Effects on net taxes of:		
State	Baseline net tax rate (%)	Modifying sales tax factor to 33 (%)	Imposing throwback rule (%)	Increasing personal property tax rate to real rate (%)
National	3.31	0.16	0.05	0.29
Alabama	2.69	0.00	0.00	0.00
Arizona	4.15	0.14	0.06	−0.22
California	3.91	0.26	0.00	0.00
Colorado	3.67	0.07	0.00	0.00
Connecticut	5.25	0.20	0.11	0.50
District of Columbia	4.03	0.08	0.00	−0.15
Florida	3.45	0.01	0.01	−0.03
Georgia	3.52	0.22	0.09	0.02
Illinois	4.11	0.13	0.00	0.73
Indiana	1.86	0.12	0.00	−0.04
Iowa	3.49	0.39	0.16	0.75
Kentucky	1.17	0.02	0.02	0.18
Louisiana	1.92	0.17	0.09	0.00
Maryland	4.60	0.19	0.10	0.32
Massachusetts	4.12	0.18	0.10	0.59
Michigan	3.49	0.24	0.10	0.21
Minnesota	4.90	0.37	0.16	1.10
Missouri	4.04	0.17	0.00	0.09
Nebraska	2.26	0.25	0.11	−0.04
Nevada	2.56	0.00	0.00	0.00
New Jersey	1.49	0.36	0.15	0.56
New Mexico	4.23	0.05	0.04	0.00
New York	1.12	0.15	0.06	1.02
North Carolina	2.68	0.05	0.05	0.00
Ohio	2.57	0.00	0.00	0.48
Oregon	3.29	0.23	0.00	0.00
Pennsylvania	4.10	0.41	0.17	0.99
South Carolina	3.46	0.13	0.06	−0.13
Tennessee	3.40	0.07	0.06	0.05
Texas	3.79	0.07	0.03	0.01
Virginia	2.50	0.15	0.08	0.19
Washington	5.06	0.00	0.00	−0.02
Wisconsin	2.88	0.15	0.00	0.64

NOTE: Table shows how different tax reforms affect net tax rate: ratio of present value of net taxes after incentives, to present value of value-added, averaged over 31 export-base industries.
SOURCE: Author's calculations.

tax rate on business noninventory personal property has above average effects in Minnesota, New York, Pennsylvania, Iowa, Illinois, Wisconsin, and Massachusetts.

A final set of policy changes considers simply eliminating particular taxes. Going back to Table 33, the bottom of the table shows the effects over our national sample of 33 states of eliminating either the property tax, the sales tax on business inputs, or the corporate income tax.

While these particular tax changes may not be politically realistic as plausible policy changes, these tax simulations do allow some gauge of the extent to which these taxes are in practice offset by incentives. For the sales tax, there is little offset. As shown in Table 33, eliminating the sales tax reduces net business taxes by 1.32 percent, which is over 97 percent of actual sales tax revenue paid. But the property tax and corporate income tax are in practice considerably offset by various incentives. In the case of the property tax, eliminating the tax would reduce net taxes by 1.90 percent of value-added. This reduction in net taxes is 80.4 percent of gross property tax revenue from export-base businesses. Thus, overall, about one-fifth of property taxes are offset by abatements or other credits. For the corporate income tax, eliminating the tax would reduce net business taxes for export-base industries by 0.72 percent of value-added. This reduction in net taxes is 70.9 percent of gross corporate tax revenue of 1.02 percent of value-added. Thus, almost 30 percent of state gross corporate income tax revenue from export-base industries ends up being offset by various incentives.

A state analysis reveals considerable differences across states in incentive offsets for property taxes and corporate income taxes, but not for income taxes. As shown in Table 36, in almost all states, the net reduction in net taxes due to eliminating the sales tax on business inputs is very close to the actual tax collections from the business sales tax. But for business property taxes and corporate income taxes, there are some states with more extreme offsets. In the case of

Table 36 Effects on Net Business Taxes in Different States of Eliminating Some Main Business Taxes: Actual Effects Compared to Nominal Revenue Collected

		Property tax			Sales tax			Corporate income tax		
State	Baseline net tax rate	Effect on net taxes of eliminating tax, including all interactions with incentives and other taxes	Gross tax revenue from tax	Ratio of absolute net tax effect to gross tax revenue	Effect on net taxes of eliminating tax, including all interactions with incentives and other taxes	Gross tax revenue from tax	Ratio of absolute net tax effect to gross tax revenue	Effect on net taxes of eliminating tax, including all interactions with incentives and other taxes	Gross tax revenue from tax	Ratio of absolute net tax effect to gross tax revenue
National	3.31	−1.90	2.36	80.4	−1.32	1.35	97.6	−0.72	1.02	70.9
Alabama	2.69	−0.97	1.59	61.4	−1.76	1.76	100.0	0.00	1.14	0.0
Arizona	4.15	−2.94	3.04	96.7	−1.22	1.25	97.9	−0.38	0.92	41.6
California	3.91	−1.24	1.33	93.3	−1.42	1.48	96.2	−1.18	1.57	75.2
Colorado	3.67	−2.73	2.78	98.2	−0.79	0.80	99.4	−0.16	0.78	20.2
Connecticut	5.25	−2.70	3.25	83.1	−1.14	1.20	94.9	−1.16	1.46	79.8
District of Columbia	4.03	−0.49	2.21	22.2	−1.35	1.44	93.9	−2.05	2.05	100.0
Florida	3.45	−1.94	2.18	89.0	−1.47	1.48	99.3	−0.23	1.01	23.2
Georgia	3.52	−1.98	2.06	96.3	−1.03	1.05	97.6	−0.52	0.93	55.3
Illinois	4.11	−2.45	2.83	86.7	−1.01	1.03	98.0	−0.61	1.61	37.9
Indiana	1.86	−1.98	2.67	74.3	−0.72	0.73	98.4	−0.30	1.14	26.8
Iowa	3.49	−1.98	3.28	60.3	−1.02	1.07	95.7	−0.89	1.76	50.4
Kentucky	1.17	−1.25	1.34	93.1	−1.01	1.02	99.3	−0.30	1.16	26.4
Louisiana	1.92	−1.82	2.74	66.5	−1.27	1.32	96.1	−1.20	1.20	100.0
Maryland	4.60	−2.58	2.76	93.4	−0.79	0.83	95.6	−1.01	1.37	73.5
Massachusetts	4.12	−2.48	2.64	93.9	−0.63	0.66	96.4	−1.05	1.35	77.5
Michigan	3.49	−2.51	3.95	63.6	−0.66	0.68	97.5	−0.93	0.93	100.0
Minnesota	4.90	−2.82	3.04	93.0	−1.51	1.58	95.6	−1.36	1.43	95.3
Missouri	4.04	−2.86	3.00	95.3	−0.82	0.84	97.6	−0.99	0.99	100.0
Nebraska	2.26	−2.32	2.41	96.0	−1.17	1.21	96.8	−0.73	1.19	61.3
Nevada	2.56	−1.10	1.29	85.0	−1.50	1.50	100.0	0.00	0.00	
New Jersey	1.49	−1.43	1.52	93.7	−1.33	1.39	95.2	−1.04	1.41	73.9
New Mexico	4.23	−0.03	1.74	1.8	−5.21	5.50	94.7	−1.20	1.23	97.8
New York	1.12	−1.91	2.61	73.1	−1.43	1.47	97.0	−0.57	0.57	100.0
North Carolina	2.68	−1.40	1.47	95.7	−1.16	1.19	97.7	−0.88	0.95	92.5
Ohio	2.57	−1.50	1.99	75.6	−1.63	1.63	100.0	0.00	0.00	
Oregon	3.29	−2.51	2.67	94.0	0.00	0.00		−1.18	1.31	89.7
Pennsylvania	4.10	−1.30	2.74	47.4	−1.27	1.33	94.8	−1.51	1.58	95.7
South Carolina	3.46	−3.06	4.13	74.0	−0.96	0.97	98.5	−0.33	0.74	44.9
Tennessee	3.40	−0.82	3.46	23.8	−1.55	1.61	96.2	−0.97	1.24	78.4
Texas	3.79	−2.62	3.20	82.0	−1.52	1.52	100.0	−0.23	0.30	76.2
Virginia	2.50	−0.97	1.02	95.1	−0.64	0.66	97.2	−1.03	1.09	94.5
Washington	5.06	−1.09	1.11	98.3	−4.04	4.04	100.0	0.00	0.00	
Wisconsin	2.88	−2.50	2.63	95.1	−0.85	0.89	96.2	−0.77	0.89	86.2

NOTE: Table shows how elimination of different business taxes affects net tax rate: ratio of present value of net taxes after incentives, to present value of value-added, averaged over 31 export-base industries. This is compared with present value of gross tax revenue collected from that tax, divided by present value of value-added, averaged over 31 export-base industries. The ratio of the absolute value of the net tax effect to gross tax revenue is expressed in percentage terms.
SOURCE: Author's calculations.

New Mexico's business property tax, for export-base businesses that receive incentives, over 98 percent of the property tax is offset. To put it another way, eliminating the business property tax on firms receiving incentives in New Mexico has almost no effect on net taxes because it eliminates a number of credits tied to the tax. In Tennessee, DC, and Pennsylvania, export-base firms receiving incentives have over half of their property tax payments offset by incentives. For the corporate income tax, export-base firms receiving incentives have all the corporate income tax offset in Alabama. Over half the corporate income tax burden is offset by incentives, for firms receiving incentives, in Colorado, Florida, Kentucky, Indiana, Illinois, Arizona, and South Carolina.

As a further analysis of all four types of incentive and tax policy changes, a comparison is done between two perspectives of their effects on net business costs: 1) the already-analyzed effects at a 12 percent discount rate, the perspective of a short-term oriented business location decision maker; and 2) the effects at a 3 percent discount rate, the perspective of a policymaker with a recommended more modest discounting of future cash flows. After doing these calculations, the ratio of these two measures is computed, specifically, the cost change at a 3 percent discount rate as a percentage of the cost change from the business perspective. How dowe interpret this ratio? For policies that raise business net tax revenues, the higher the ratio, the greater the value of the change in savings to policymakers relative to the losses perceived by business-location decision makers. In other words, for such policies, a higher ratio makes the policy reform more attractive from the narrow perspective of how much money it saves relative to its presumed effects on location decisions if location decisions are driven only by the timing of taxes and incentives. For policies that reduce net business tax revenue, the higher the ratio, the

greater the loss as perceived by policymakers compared to the policy effect on business-location decision makers. A higher ratio is one that has high costs relative to its location effects.

Table 37 presents these calculations. To help clarify ideas, consider the proposals to eliminate or modify various incentives or tax laws in ways that would raise revenue (all the policies except abolishing the property tax, the sales tax, or the income tax). The policy with the lowest ratio of the 3 percent policymaker gain to the 12 percent business loss is eliminating customized job training. This is because the policy provides incentives up front, which affects net costs from the perspective of business decision makers by a lot compared to its ongoing costs to policymakers. In contrast, the policy with the largest ratio of the 3 percent policymaker gain to the 12 percent business loss is reducing the sales factor in formula apportionment to 33 percent. This policy has relative high policymaker savings compared to its costs from the perspective of business because it affects costs relatively uniformly over the life of the

Table 37 Average National Effects of Various Incentive Reforms and Tax Changes, Evaluated from Business Short-Term Perspective versus Policymaker Long-Term Perspective

	Value at:		
Baseline taxes and policy alternatives	12% discount rate	3% discount rate	Ratio of value at 3% discount rate to value at 12%
Baseline average net tax rate, 2015, national average	3.31	3.46	104.4
Baseline average incentive rate, 2015	1.42	1.07	75.5
Effect on net taxes of:			
Eliminating property tax abatements	0.38	0.30	78.6
Eliminating customized job training	0.06	0.04	54.5
Eliminating investment tax credits	0.19	0.14	74.7
Eliminating job creation tax credits	0.63	0.46	72.4
Eliminating R&D tax credits	0.13	0.12	97.0
Eliminating incentive refundability	0.48	0.33	69.6
Eliminating incentive carry-forwards	0.07	0.06	87.2
Limiting incentives to one-year term	0.92	0.78	85.2
Sales tax factor in all states of 33	0.16	0.17	102.5
Throwback rule in all states	0.05	0.05	101.9
Personal property tax rate increased to match real rate	0.29	0.29	101.4
Eliminating property taxes	−1.90	−1.98	104.0
Eliminating sales taxes on business inputs	−1.32	−1.12	84.9
Eliminating state corporate income taxes	−0.72	−0.76	104.4

NOTE: Table shows effects at various discount rates of various incentive and tax policy changes on ratio of present value of net taxes to present value of value-added, averaged over 33 states and 31 export-base industries, based on tax and incentive rules in place in 2015.
SOURCE: Author's calculations.

investment. These cost savings for policymakers in the later years of the investment have a relatively high value to policymakers compared to the effect of these later years' changes on perceived costs of business-location decision makers.

For the tax changes that cost net tax revenues, the abolition of each of the three major business taxes, the highest ratio is for abolishing the corporate income tax, and the lowest ratio is for abolishing the sales tax. This means that abolishing the corporate income tax would have relatively large costs in lost revenues for policymakers relative to its savings for business-location decision makers. This is because the corporate income tax is collected relatively evenly over the life of the investment. The sales tax has a lower ratio, because it does have larger up-front costs, which increases the value of abolishing this tax to businesses compared to its cost in lost revenue to policymakers. We could also reverse these two policy changes, and imagine imposing an income tax or sales tax where none had been imposed before. In this case, imposing the income tax would cause a relatively large gain in the value of tax revenue gains for policymakers compared to its perceived cost to business decision makers. Imposing the sales tax would cause a relatively smaller gain to policymakers relative to its costs to businesses.

The general pattern here is that if we wanted to raise net business tax revenue, methods that raise overall corporate income taxes and property taxes uniformly over the life of the investment tend to have relatively large revenue gains as perceived by policymakers compared to their costs for business-location decision makers. Cutting incentives has smaller ratios of policymaker gains to business losses because incentives tend to be more up-front. The ratio is smaller when the incentive design is more up front.

This should not imply that we want to simply adopt the business tax and incentive policy that emphasizes the most long-run revenue raising relative to the short-run business cost savings.

As mentioned above, there are many other elements of good incentive design, including how much the incentive is tied to the creation of good jobs. But what this does point out is that the strategy of cutting incentives, if it leads to offsets by cutting general business taxes, will actually tend to have a higher ratio of costs to the general taxpayer to its savings for businesses.

PRELIMINARY ESTIMATES OF DETERMINANTS AND EFFECTS OF INCENTIVES

This section pools the data across states and years to get some preliminary estimates of the determinants and effects of incentives. The prior results in this report just look at data for one year, rather than pooling data. Pooling data gives more statistical power. However, these initial pooled results are preliminary because they do not include many control variables, which might alter the results. In addition, none of the estimates make any attempt to control for the potential endogeneity of state incentives and taxes.

State-Level Determinants of Incentives over Time

The first models consider how incentives are related to the logarithm of nominal state per capita income, with and without controls for state business taxes. The observations are on state-year cells, from 1990 to 2015 for 33 states. The dependent variable is the average state incentive level for export-base industries, as a proportion of value-added. The right-hand variables in one specification are the lagged state incentive level for export-base industries, and the natural logarithm of state per capita income. The second specification adds state business taxes for export-base industries as a percentage of value-added. Both specifications also include a complete set of state fixed effects and year fixed effects. Therefore, these models control for any fixed national trends or changes in incentives, as well as for idiosyncratic state features that might permanently alter incentives.

The results of this estimation are shown in Table 38. The models in the table suggest that the major effect on a state's incentives is due to its lagged incentives. Incentives have a great deal of persistence over time, which presumably reflects the inertia of state incentive policy.

An increase in state taxes has some short-run effect in increasing state incentives, by about $0.066 for every $1.00 increase in state business taxes. Based on the previous results, this probably in part reflects the mechanical effects of state business taxes on incentives: higher taxes automatically increase incentives due to incentives being designed to be higher if state taxes are higher. Because of the influence of lagged incentives, the implied long-run effect of an increase in state taxes on incentives is about five times as much, or a $0.34 increase for a $1.00 increase in state and local business taxes [0.34 = 0.066 / (1 − 0.806)].

Per capita income has statistically insignificant effects on incentives, with or without controlling for state business taxes. However, the estimates are quite imprecise and cannot rule out income effects that might be considered large. For example, in the incentive model without taxes, the 95 percent confidence interval for long-run effects extends up to an elasticity of about −4.4. In the model with taxes, the 95 percent confidence extends up to its most negative value at a long-run value of about −3.4. In other words, it appears that there is quite a variable response, if any, of state incentive choices to changes in state per capita income, once one controls for lagged incentives and state fixed effects.

State-Level Effects of Incentives and Taxes on GDP Growth over Time

Another pooled analysis considers the effects of incentives and taxes on state GDP growth. The observations are again on state-year cells. Thirty-three states are included; however, the years covered only go from 1998 to 2014, as these are the only years with real state GDP information. The dependent variable is the natural logarithm of the level of state real GDP in a

Table 38 Panel-Data Estimates, Using Pooled State by Year Data, of Determinants of State Incentives

PANEL A: No tax variable

R-squared: 0.9381

	Coef.	Robust SE	t-stat
One-year lag of dependent variable, the ratio of incentives to value-added	0.8217	0.0240	34.18
ln(nominal per capita income)	−0.002195	0.003414	−0.64

PANEL B: Gross taxes included

R-squared: 0.9387

	Coef.	Robust SE	t-stat
One-year lag of dependent variable, the ratio of incentives to value-added	0.8061	0.0223	36.07
ln(nominal per capita income)	0.000076	0.003824	0.02
Gross tax/value-added ratio	0.06609	0.03181	2.08

PANEL C: Descriptive statistics

Variable	N	Mean	Std Dev	Min	p10	p25	p50	p75	p90	Max
Gross taxes/value-added	858	0.0504	0.01184	0.02034	0.03562	0.04283	0.04984	0.05803	0.06395	0.08700
Incentives/value-added	858	0.0117	0.01126	0.00000	0.00068	0.00239	0.00814	0.01867	0.02673	0.06046
Net taxes/value-added	858	0.0387	0.01307	−0.00152	0.02363	0.03057	0.03784	0.04701	0.05483	0.07368
ln(nominal per capita income)	858	10.357	0.316	9.625	9.914	10.119	10.385	10.582	10.765	11.177

NOTE: The number of observations is equal to 825, which equals the number of states (33) times the number of years available when one lag is needed (25, with dependent variable observations from 1991 to 2015). The dependent variable is each state/year cell's value for the average across all 31 export-base industries of the ratio of the present value of incentives to the present value of value-added, using a 12% discount rate. All regressions include full sets of both year dummies and state dummies, which are not reported in the table.

SOURCE: Author's calculations.

particular year. The right-hand-side variables include the one-year lag of state real GDP to allow for persistence in state GDP and thereby lagged adjustment. One specification includes as the main independent variable of interest net state and local business taxes on export-base industries, after incentives, in that state/year cell, as a proportion of value-added in these industries. The other specification separates net state and local business taxes into its two components: incentives as a proportion of value-added and gross taxes as a proportion of value-added. All specifications include a complete set of dummies for state fixed effects and year fixed effects. Hence, all estimates are looking at deviations from national trends or shocks, and are looking for deviations from permanent state effects on GDP.

This analysis's results are shown in Table 39. In both models, state GDP shows a great deal of persistence, implying significant lags in adjustment. The lagged adjustment is similar to what is found in some of the past regional literature on state growth determinants, for example, Helms (1985).

The effects of net taxes, gross taxes, and incentives are always statistically insignificant. Furthermore, the effects are precise enough to suggest that the maximum possible effects of incentives on increasing growth, and of gross and net taxes in reducing growth, are toward the lower end of the range of estimates in the previous literature. The previous literature finds effects of incentives and taxes on state and local growth that imply that a 1 percent reduction in costs asa percent of value-added increases long-run business activity by between 2 and 12 percent, with a mean value of about 4 percent. In the net tax specification, the most negative effects at one extreme of the confidence interval is that a 1 percent reduction in net taxes as a percent of value-added would increase long-run state GDP by about 4.4 percent. The long-run effect implied by

Table 39 Predicting State Gross State Product with Incentives and Taxes

PANEL A: Net tax specification

R-squared: 0.9994

	Coef.	Robust SE	t-stat
One-year lag in dependent variable, ln(Gross State Product)	0.8901	0.0293	30.35
Net tax/value-added	−0.062	0.204	−0.30

PANEL B: Net Tax replaced by two components: gross tax, incentives

R-squared: 0.9994

	Coef.	Robust SE	t-stat
One-year lag in dependent variable, ln(Gross State Product)	0.8899	0.0293	30.35
Gross tax/value-added	0.033	0.316	0.11
Incentives/value-added	0.132	0.136	0.98

PANEL C: Descriptive statistics

Variable	N	Mean	Std Dev	Min	p10	p25	p50	p75	p90	Max
Gross tax/value-added	594	0.0495	0.0112	0.0234	0.0359	0.0420	0.0496	0.0565	0.0611	0.0870
Incentives/value-added	594	0.0136	0.0118	0.0004	0.0013	0.0037	0.0110	0.0210	0.0289	0.0605
Net tax/value-added	594	0.0359	0.0117	−0.0015	0.0233	0.0294	0.0357	0.0431	0.0513	0.0672
ln(real GSP)	594	12.404	0.771	10.665	11.433	11.891	12.335	12.830	13.391	14.428

NOTE: The observations are on state-year cells, for 561 observations from 33 states by 17 years (1998–2014), as the real Gross State Product data were available 1997–2014, and the model includes one lag. The dependent variable is the natural logarithm of Gross State Product in a particular state and year. The right-hand-side variables include a complete set of state and year dummies.
SOURCE: Author's calculations.

the point estimate is substantially lower, with a 1 percent reduction in net taxes increasing long-run state GDP by 0.6 percent.

The specification that separates net taxes into gross taxes and incentives reaches roughly similar results. For incentives, the confidence interval implies that a 1 percentage point increase in incentives as a percent of value-added (a very large increase indeed compared to mean incentives of 1.42 percent of GDP in 2015) would have a maximum positive effect of inducing a long-run increase in state GDP of 3.7 percent. The point estimate implies that a 1 percentage point increase in incentives would yield a long-run increase in GDP of only 1.2 percent.

For gross taxes, the uncertainty is somewhat greater. The point estimate suggests that reductions in gross taxes would reduce GDP. The implied long-run effect is that a reduction in gross taxes of 1 percentage point as a percent of value-added would reduce long-run GDP by 0.3 percent. However, the confidence interval implies that a 1 percentage point reduction in gross taxes as a percent of value-added might have a maximum positive effect of increasing state GDP by 5.5 percent. But even this wide confidence interval rules out some of the greater effects of state and local business taxes found in the previous research literature.

State-Industry Level Analysis of Effects of Industry-Specific Incentives and Taxes over Time

The state analysis could be argued to be biased by unobserved state-year effects. (The analysis already controls for state effects that are fixed over time, and year effects that are uniform nationally.) For example, if states that are lower in business taxes or higher in incentives tend to have lower public services, then the above estimates will not represent the effects of taxes or incentives holding public services constant. One would expect the analysis to be biased toward finding less-positive effects on GDP of increased incentives or lower business taxes than would be the case if public services were controlled for. As another example, states obviously

endogenously choose a business tax and incentive regime. If states with lower growth prospects tend to choose lower business taxes and higher incentives, then this correlation would bias estimates toward finding lower positive effects of incentives and lower negative effects of taxes on growth. The previous analysis does not suggest strong responsiveness of incentives to state economic conditions, but perhaps incentives and taxes respond to perceived future growth trends.

One way to control for state-year fixed effects is to focus on value-added for individual industries. This focuses on deviations of industry performance in a given state and year from the overall state/year trend. Therefore, this final preliminary analysis examines how industry-specific value-added in export-base industries responds to industry-specific state and local business taxes and incentives.

The unit of observation in this analysis is an industry by state by year cell. The observations are on the 31 export-base industries, by each of the 33 states in the model, for each of the years from 1998 to 2013 for which we have data. The dependent variable is the natural logarithm of real value-added for an industry in a given state and year. To allow for persistence in an industry's activity in a state over time, and lagged adjustment of the industry to changes, one right-hand-side variable is the lagged dependent variable: last year's log of real value-added in that industry in that state. In one specification, the main independent policy variable of interest is net state and local business taxes in that industry/state/year as a proportion of industry value-added. The other specification separates net business taxes into its two components of incentives and gross business taxes. All specifications include a full set of dummy variables that control for fixed effects for states, years, and industries, and also for state by industry, industry by year, and state by year. Therefore, the estimated effects of net business taxes, incentives, or gross taxes in the model represent the effects of differentials of each industry's taxes or incentives from the

overall average for that state and year, on the industry's relative performance in that state and year, compared to the overall average performance of the 31 industries in that state and year.

Table 40 shows the results from this analysis. Industry value-added at the state level shows considerable persistence; however, this persistence is somewhat lower than for overall Gross State Product. This makes sense, as one would expect more rapid adjustment of an individual industry than an overall state economy.

The net tax, incentive, and gross tax variables are all statistically insignificant. Furthermore, the confidence intervals are such that the possible effects of increasing incentives, or reducing taxes, are constrained toward the lower end of the previous research literature. If anything, these constraints point to even lower positive effects of incentive increases or tax cuts than indicated by the overall state analysis.

In the net tax specification, the maximum negative long-run effect of state taxes consistent with the confidence interval for this variable is −1.9. That is, at most, a 1 percent reduction in net taxes in a particular industry and state, relative to other industries in that state, will increase the relative performance of that industry relative to other industries in the state by no more than 1.9 percent. In the incentives and gross tax specification, the maximum positive effects of incentives consistent with the confidence interval for this variable is that a 1 percentage point increase in this industry's incentives, relative to other state industries, will increase the industry's long-run relative output by 1.3 percent. For gross taxes, the confidence interval implies a maximum long-run effect of a 1 percentage point gross tax reduction for this industry, relative to other industries in the state, of increasing the long-run relative output of this industry by 3.1 percent.

Table 40 Predicting Real Industry Value-Added by State and Year with Industry Tax and Incentive Variables, and Controls for State by Year Dummies

PANEL A: Net tax specification

R-squared: 0.9956

	Coef.	Robust SE	t-stat
One-year lag in dependent variable, ln(real value-added in an industry/state/year)	0.7226	0.0148	48.90
Net tax/value-added	0.030	0.277	0.11

PANEL B: Substituting incentive and gross tax for net tax

R-squared: 0.9956

	Coef.	Robust SE	t-stat
One-year lag in dependent variable, ln(real value-added in an industry/state/year)	0.7226	0.0148	48.94
Incentive/value-added	−0.250	0.305	−0.82
Gross tax/value-added	−0.130	0.364	−0.36

PANEL C: Descriptive statistics

Variable	N	Mean	Std Dev	Min	p10	p25	p50	p75	p90	Max
Net tax/value-added	16,279	0.0371	0.0235	−0.0277	0.0136	0.0223	0.0328	0.0471	0.0668	0.1813
Gross tax/value-added	16,279	0.0526	0.0248	0.0070	0.0279	0.0353	0.0463	0.0632	0.0864	0.1839
Incentive/value-added	16,279	0.0155	0.0158	0.0000	0.0010	0.0033	0.0110	0.0227	0.0371	0.1716
ln(real value-added in an industry/state/year)	16,279	7.646	1.870	0.693	5.252	6.480	7.659	8.909	10.070	12.980

NOTE: Observations are on state by industry by year cells. The dependent variable is the natural logarithm of real value-added for a particular industry in a particular state and year. The number of observations is 16,279. This is slightly less than implied by multiplying 33 states by 31 export-base industries by 16 years, because for a few cells, industry is zero or missing. The number of years is equal to 16, as the real value-added data by industry and state and year were only available when these regressions were estimated from 1997 to 2013, and one lag in industry value-added in the state was included. All regressions include a complete set of dummies for states, years, industries, industries by state, industries by year, and state by year. The incentive and tax variables are all industry-specific figures for that particular state and year. The standard errors are robust to clustering by state, and heteroscedasticity.
SOURCE: Author's calculations.

Therefore, the industry by state analysis does not support the belief that unobserved state-year effects cause us to understate the possible positive effects of incentives and negative effects of state business taxes. The industry specific analysis, with controls for unobserved state/year effects, suggests somewhat lower possible effects of incentives and taxes on business output.

Summary

This analysis is preliminary in that it does not control for many other possible influences on either business output or state incentives. For example, the analysis of how incentives and taxes affect business output does not control for wage rates. It is possible that correlations between such uncontrolled-for variables and state business taxes and incentives could bias the current estimates.

However, the current estimates suggest that most likely there are not huge effects of either state economic conditions on incentives, or of incentives on state business output. The correlations estimated here may be biased estimates of causal effects, but unless the biases are large, the true causal effects are unlikely to be huge.

CONCLUSION

The preliminary work describing this database already leads to some important and surprising new conclusions about incentives. The existing research on incentives is that in some cases they can affect business location decisions, but that in many cases they are excessively costly and may not have the promised effects. The new research suggests that much of this consensus is justified. On the other hand, some signs show that there is some improvement toward reining in incentives so that they are less costly and targeted in a more effective manner.

But this improvement is limited. In other words, the glass is partly full and partly empty, but more empty than full.

On the positive side, the rate of growth of incentives has slowed down. Furthermore, incentives have become somewhat more targeted on high-wage industries, and on industries that will create more jobs. Incentives have also become more front-loaded, which should help increase their business location impact relative to their long-run fiscal costs.

But on the negative side, these trends are quite limited. Although the rate of growth of incentives has slowed down, it is still more likely that states will significantly increase rather than decrease incentives. New states have entered more vigorously into the incentive competition. Incentives are still far too broadly provided to many firms that do not pay high wages, do not provide many jobs, and are unlikely to have research spinoffs. Too many incentives excessively sacrifice the long-term tax base of state and local economies. Too many incentives are refundable and without real budget limits. States devote relatively few resources to incentives that are services, such as customized job training. Based on past research, such services may be more cost-effective than cash in encouraging local job growth.

The current analysis of this database has only scratched the service. Other research that could be done using this database includes the following topics:

- Much more detailed empirical analysis of the effects of incentives and taxes on industry growth trends. Better controls for other determinants of growth trends could be included. Models could focus on whether different incentive types or designs are more conducive for growth.
- Much more detailed empirical analysis on the determinants of incentives. This would include additional state characteristics, such as the partisan makeup of state

government. In addition, the analysis could get beyond the determinants of overall incentive levels to analyze the determinants of different types of incentives or different timing of incentives.

- All the analysis so far has looked at state averages; the city data should also be analyzed.
- As outlined throughout the report, there are a number of possible improvements to this database that might be considered.

The intent is for this database to be a public database, accessible to both researchers and policymakers. The database will be processed so it is available in a user-friendly and transparent manner. Some consideration also will be given as to how to incorporate user input and improvements into the database.[34]

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[34] As discussed in Appendix I, the current database has been cross-checked with the same calculations being done in both STATA and Excel. This increases the odds that the assumed logic of the tax and incentive laws is faithfully represented by the programming logic and rules. However, there is always the possibility of remaining error, as well as possible misinterpretations of program rules and laws. User feedback may reduce such errors over time.

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