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Designing Policies to Spur Economic Growth: How Regional Scientists Can Contribute to Future Policy Development and Evaluation

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**Designing Policies to Spur Economic Growth:
How Regional Scientists Can Contribute to Future Policy Development and Evaluation**

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Abstract

Policymakers at all levels of government try to design policies to promote economic growth. Many of these policies have a goal of attracting new businesses to an area, as new businesses are considered a key driver of local economic growth. An emerging literature suggests that such policies have heterogeneous effects on economic growth, both in terms of how the effect of the same policy may vary across locations as well as how different policies spur different types of growth. In this chapter, we discuss the insights provided by the existing literature on the effect of government policy on local economic growth. We pose questions that have not been fully answered, and for which the evidence is mixed, and discuss methodologies that future work should consider utilizing in order to answer these pressing issues. We also discuss the importance of data and the ideal types of data that should be collected and analyzed in the future. Evaluating the features and outcomes of policies will continue to be an important role for regional scientists over the next several decades, as government officials seek guidance when designing policy and allocating scarce resources.

I. Introduction

Policymakers at all levels of government design policies with a goal of increasing economic growth. Lawmakers frequently design programs aimed at attracting new businesses with the hope that these enterprises will drive future growth within their jurisdiction (Neumark et al., 2005). However, such policies often have heterogeneous effects and induce unintended outcomes. It is important to understand fully the direct and indirect impact of these policies on regional economic development. Researchers in regional science have the unique ability to aid policymakers in the proper design of local economic development policies so that they can achieve the desired goal. Regional science research can also hopefully provide guidance for future policies – helping to avoid some of the unintended consequences that may occur when designing policy.

In this chapter, we discuss the importance of research in the field of regional science as it pertains to policy evaluation. One aspect of policy evaluation and design that has been largely ignored in the past is the unintended consequences of local economic development policy on regional growth. Specifically, as most regional scientists are aware, local economic development comes at some cost, as there is not an infinite amount of land available (Roback, 1982). Policies are frequently designed to attract businesses of a specific type. Whether that goal is specifically stated, or if the policy is written in such a way that businesses of a specific type are more likely to be enticed by the policy, local jurisdictions still have a fixed amount of land available. Therefore, attracting businesses of one type frequently comes at the cost of businesses of another form. We start our discussion by highlighting the research that has been done examining these heterogeneous effects of local economic development policies on local economic development. Specifically, we look at the research thus far regarding the sorting across different types of

industries in response to different policies, as well as differences in sorting based on the size of the firm and the corporate structure of the firm. This literature on heterogeneous effects needs to be expanded;; not only do we need more individuals working on these issues but we also need more and better data on these types of differences in industries and firm structures.

Additionally, more work needs to be done to distinguish between the effects of these policies on attracting existing businesses from other areas versus helping to grow or start home-grown new entrepreneurial enterprises. While policymakers at the local level might not care if they are attracting businesses from other regions, state and federal policymakers might have issues if taxpayer funds are being used simply to redistribute businesses. Local entrepreneurs may also have stronger ties to the region and may be less likely to move once a program ends, increasing the impact to the economy of helping these businesses. Finally, not enough attention has been paid to examining how the effects of policies vary across regions. While, on average, programs may have benefits, the benefits of the programs may not be shared by all eligible areas.

Regional scientists, and almost all researchers in the social sciences, also frequently face issues with the availability and quality of data. Numerous quality data sets are compiled by the federal, state, and local government across the world. However, in times of tight budgets with decreasing revenues and always increasing costs, policymakers frequently look to save on costs by cutting the collection and maintenance of these data. Unfortunately, policymakers frequently do not fully understand the importance of data to research in the social sciences and effective program design, including economic development. Therefore, we discuss the importance of data availability both now and in the future to research in regional science. One area that needs to continue to improve is the availability of administrative data or data collected as part of program operations and record keeping. While survey data is readily available, due possibly to the

increase in cellular phones and constraints when contacting people on non-landline phones, there have been increasing issues with response rates and accurate reporting. At the same time, a challenge with administrative data is that it is frequently gathered with no consideration for its use to researchers. We discuss in detail below the pros and cons of each type of data, as well as the importance and possibility of combining the two.

Finally, we discuss the importance and evolution of policy evaluation methodologies in the field of regional science. When assessing policy, it is important that analysts credibly determine a causal effect of the policy or the causal effect of a hypothetical policy. However, the non-random nature of implementation of most policies creates challenges for policy analysis in the area of regional economic development. We have seen an emergence of experimental economics, where the laboratory environment allows for researchers to control for various factors that could bias estimates, but this type of research frequently faces concerns regarding external validity. Therefore, we have seen growth in research using quasi-experimental methodologies that attempt to reproduce the results that could be obtained from an experiment with observational data such as difference-in-differences, regression discontinuity, and instrumental variables. While these methods are improvements over simple ordinary least squares methods, there are still shortcomings and limitations to these types of analysis.

We conclude by discussing what we view as the future of regional policy analysis and the role of regional scientists in the development of policy. While in England, some researchers are working hand-in-hand with policymakers to set up policy evaluation programs, these efforts are woefully underemployed across the world. In the United States, there are times when the government does consult with regional scientists and economists to evaluate policy, but frequently this is done too late in the process. Therefore, it is important that we as regional

scientists work with policymakers, versus separately, in order to aid the design of optimal policy. To do so, there are several things that we must remember as researchers, which we will discuss in detail in our concluding section.

II. Heterogeneous Effects of Government Policies

Policymakers are interested in implementing policies that result in economic growth, especially in job creation. Some policies affect an entire country, while other programs are focused on specific local areas. Furthermore, some policies are enacted at the local or state level, while others are federal or national programs aimed at helping disadvantaged or struggling¹ areas. Policies can also either be people-based or place-based (Partridge et al., 2015). Policies that are people-based include those that encourage education and training, while policies that are place-based include infrastructure projects and projects to attract businesses to a specific region. Whether or not each type of policy is effective in supporting growth partially depends on whether or not the standard spatial equilibrium of regional economics holds. The idea behind the spatial equilibrium model is that when there is perfectly mobile labor, workers will move until utility is equalized across space (Roback, 1982). While the concept of a spatial equilibrium may seem logical, there are numerous studies questioning whether or not it actually exists due to incomplete models or persistent frictions that prevent the economy from reaching the spatial equilibrium (Bartik, 1991; Bartik, 1993; Kline and Moretti, 2013; Moretti, 2011). However, even if labor is not perfectly mobile, people-based policies can lead to increased mobility as the educated move to better opportunities; and these policies can leave struggling regions worse off.

¹ An area can be considered struggling for many reasons, typically criteria such as high poverty rates, low employment rates, or low income areas. Other criteria are used in the literature, such as areas with high levels of population loss or out-migration.

If a spatial equilibrium will not occur on its own, then many argue that place-based policies may be the best way to achieve locational equilibrium and help struggling regions (Partridge et al., 2015). Partridge et al. (2015) lay out three main considerations for place-based interventions 1) whether new jobs lead to employment of the local unemployed and reductions in poverty, 2) if new jobs are sustainable over the long term, and 3) if the long-term benefits outweigh the costs. Much of the previous research has focused on examining the employment and poverty effects. Very little research has considered the sustainability of new jobs and a full cost-benefit analysis of policies is much more difficult. These are gaps that future research could fill.

Job creation is frequently a goal of economic development policies because there is evidence that policies that support job growth lead to reductions in poverty and other positive outcomes for regions. Analysis of policies that focus on job growth have found that these policies are also effective at reducing poverty (Partridge and Rickman, 2007) and increasing labor force participation (Bartik, 1991). Bartik (1991) also found evidence of earnings gains for existing residents – with about half of the increase due to higher local employment rates and the other half due to moving up to higher paying occupations. However, his results also suggest that at least some of the new jobs are going to new residents. This research also found that these effects are similar across regions – and across areas with different underlying economic conditions. However, in more recent work, Bartik (2007) suggests that the benefits from a job creating policy will be higher if the policy addresses a market failure or if there is public infrastructure that is underutilized – such as in distressed areas that have lost population and employment. In other words, place-based policies that lead to a spatial equilibrium.

Policymakers have various means for supporting job growth in specific regions and must decide which type of policies are most effective. Because previous research has suggested that

new businesses create jobs (Haltiwanger, et al., 2013), policymakers frequently create location-based incentive programs, such as taxes or subsidies, to attract businesses to a specific area. Existing academic research on the success of these place-based programs has found mixed results, with some research suggesting these programs have positive effects (Billings, 2008; Busso, Gregory, and Kline, 2013; Krupka and Noonan, 2009; Papke, 1994) while others suggesting that the policies have no effect (Boarnet and Bogart, 1996; Bondonio and Engbert, 2000; Bondonio and Greenbaum, 2007; Greenbaum and Engberg, 2004; Hanson, 2009; Neumark and Kolko, 2010). Neumark and Simpson (2014) provide a review of the existing literature on these place-based policies, and the current state of knowledge regarding these programs.

One important aspect of the evaluation of these policies that has not been fully explored is the reason that it appears there is no overall effect from these policies. Is it because these programs are creating distortions among different types of businesses? Are these programs leading to sorting across space of firms in different industries, sorting between different types of structures (corporations versus sole proprietorships), or are they simply causing more business turnover? Some recent research has begun to look at where these policies may be creating distortions.

The argument behind these possible differential effects across industries was formalized by Hanson and Rohlin (2011). In that paper, the authors develop a simple model to show how we would expect a differential impact across industries of a specific program, the Empowerment Zone (EZ) tax credit. The EZ program provides a tax credit to firms that locate in specific areas if they hire workers from that area to work in that area. Therefore, the EZ program can be considered a labor tax credit, as it reduces the cost of hiring workers with no effect on the cost of capital. The authors develop an estimate of the ratio of capital cost to total cost of production. This allows them to determine which industries are considered more capital intensive and which are more labor

intensive. As we can see in Table 1 below, taken from their paper, the industries that most would assume are more capital intensive, such as manufacturing and mining, have higher values of their ratio of capital cost to total cost of production than more labor intensive industries, such as retail and services. Given the focus on the EZ program, they demonstrate that we would expect the EZ program to attract more labor intensive businesses, such as retail, at the cost of more capital intensive businesses, such as manufacturing.

Table 1. Value of α Parameter by Industry at One-Digit SIC Level

Industry	SIC Codes	Value of α
Retail	52–59	.255
Services	70–89	.275
Construction	15–17	.293
Wholesale	50–51	.409
FIRE ^a	60–67	.477
Manufacturing	20–39	.532
Transportation	40–49	.656
Mining	10–14	.737
Agriculture	1–9	.813

Note: Alpha is calculated as the ratio of capital cost of production to total (labor and capital) cost of production.

^a FIRE stands for Finance, Insurance, and Real Estate firms.

Patrick (2015) applies a similar type of analysis using a measure of capital subsidies versus labor tax credits. Drawing upon the Incentives Environmental Index, which was constructed based on state constitutional provisions that limit and structure the ability of government entities to aid private enterprise, the author looks at how capital subsidies affect the capital-labor substitution in industries.² Findings indicate that increasing the number of capital subsidy tools that can be utilized by state and local governments causes a change in the local industry mix, particularly attracting more firms in capital intensive industries.

² For more information on the creation of the Incentives Environment Index, see Patrick (2014).

Other research has taken a similar approach to examine this type of sorting across industries from location-based tax policies. Freedman (2015) and Harger and Ross (2015) apply a similar type of analysis to the New Markets Tax Credit (NMTC) program, a program operated by the Community Development Investment Financial (CDFI) Fund. Unlike the EZ program, which intentionally or not, was effectively a labor tax credit and attracted labor-intensive businesses, the NMTC program attracted more firms in those industries that tended to receive the tax credit, including manufacturing and retail. Both papers find evidence that the NMTC program created a sorting across industries in eligible versus ineligible areas, consistent with the arguments put forth by Hanson and Rohlin (2011).

Harger, Ross, and Stephens (2015) expand upon this work on the NMTC and consider all programs that operate through the CDFI Fund. They also find consistent evidence of sorting across industries, but in addition are able to consider if this new business activity comes at the cost of existing businesses. The authors look at how the program affected firm deaths, and find no evidence that the program was simply creating more business turnover. This is also consistent with the work of Rohlin and Ross (2016), which considers the effect of bankruptcy law on business turnover and found that if anything more generous bankruptcy exemptions increase the number of existing businesses, likely because the more generous protections in bankruptcy encourage entrepreneurs to incur the risk of opening their own business.

Rohlin, Rosenthal, and Ross (2014) further consider how differences in policy may cause sorting of different types of business activity across state boundaries.³ In their research, the authors look at how differences in state tax policy affect the relative sorting of business activity across

³ Hanson and Rohlin (2013) also considered the spillover effects of government policy, focusing on the EZ program. Their results suggest that for the EZ program, there are spillovers present that typically more than offset any positive effect of the program on business activity.

state lines. While initially they find no overall effect of the policy, similar to previous studies discussed here, the results suggest this is because there is offsetting activity based on a variety of different state policies. First, the authors find that the presence of a reciprocal agreement, which determines if you pay income tax in the state where you work versus where you live, affects the sorting of different industries. In particular, more labor intensive industries are less sensitive to state income tax rates when individuals pay taxes based on where they live rather than if individuals pay personal income taxes in the state where they work. This is because, given the authors are looking close to the state border, it is easy for individuals to work in the high personal income tax state, but live across the border in the low personal income tax state. In addition, they find that corporations are more sensitive to the corporate income tax rates, while sole proprietorships are more sensitive to the personal income tax. This is not unsurprising, specifically given that corporations are more likely to be subject to the corporate income tax while sole proprietorships are more likely to be subject to the personal income tax.⁴

Early studies found little impact of state tax policy on business location decisions. However, an emerging literature is finding that while there may be no effect overall of these programs, these policies are creating sorting of different types of industries. As this research and knowledge continues to expand, and as the quality of data available improves, these issues should be considered further. While the industrial composition data has been studied more recently, additional work can be done in this area as well as expanding to other dimensions of business activity. In particular, more work can be done on the relationship regarding firm size and industrial structure.

⁴ Borchers, Deskins, and Ross (2016) also looked at the relationship between various types of state taxes and found that most of the impact of policy is on small businesses, versus larger establishments.

In addition to having differential effects on firms by industry or firm structure, a question that has been little explored is the impact of policies on local entrepreneurs. If new firms create jobs, this might suggest that policymakers should enact programs to support new entrepreneurs. In fact, a number of researchers have found a link between either small businesses or proprietors and job creation (Deller, 2010; Shrestha et al., 2007; Stephens and Partridge, 2011; Stephens et al., 2013; etc.) Shrestha et al. (2007) find that the strongest impact is in metropolitan areas. However, Stephens et al. (2014) show that even in struggling regions, like the Appalachian region of the United States, having more self-employed results in higher employment growth. This positive relationship holds even though data limitations sometimes make it necessary to use measures of entrepreneurship that include entrepreneurs of necessity who start businesses when there are no other opportunities – and thus are not likely to contribute to economic growth (Stephens and Partridge, 2011). Michelacci and Silva (2007) find that firms are larger and more capital intensive when owners are from the region. While location-based relocation packages are clearly going to outside firms, many of the programs (such as those run by the CDFI) could be used to help start existing businesses; and future research should examine this.

Additionally, there are a range of other programs at the national, state, and local level that aim to support the development of new businesses. Goetz et al. (2010) review the landscape and literature as it pertains to rural entrepreneurship programs. They note that many of the programs are small and appear to have little impact on new business development, while other programs, like those from the federal government, are disjointed. A major problem is that the focus of federal programs has been on inputs such as how many people were served, rather than outputs such as how many jobs were created. They conclude that entrepreneurship programs at all levels could benefit from more careful program evaluation – and we agree. A challenge is getting sufficient

and accurate data, but hopefully, as outlined in the data section below, this will become less of an issue in the future.

A final challenge for regional science research in the future is understanding the regional variation in the impact of policies to support job creation. Even if it appears that the average effect of a program may be to create jobs, the question remains whether it is really effective in all cases. To explore the heterogeneity in the drivers of job growth across the U.S., Partridge et al. (2008) use a geographically-weighted regression (GWR) approach. The use of GWR allows the researchers to examine how these drivers vary across regions. They find significant heterogeneity – suggesting that policymakers should be wary of estimates that provide a global average effect from a policy as that average may be masking some very different impacts across local areas. Deller et al. (2010), find evidence of differences in the impact of small businesses on economic growth – where the differences vary based on industry and region of the country. If federal programs, many of which have been the subject of recent program evaluation studies, affect different regions in different ways, it will be important to understand these differences. With advances in computing power, microdata availability, and new methodologies (as discussed below), this may be even more possible than in the past.

III. Issues Regarding Current and Future Data

Progress on empirical policy evaluation is aided by improvements in the data available to researchers and methodologies used for analysis. The recent proliferation of data, particularly microdata, and advances in policy evaluation methods provide opportunities to answer some of the important unresolved questions discussed earlier; yet, there are significant challenges that may hamper progress.

In order to answer important policy questions, economic development researchers need both microdata and aggregate data at fine levels of geography. Microdata allow researchers to investigate individual and firm level policy effects, potentially uncovering the mechanism through which the policy acts and/or policy-invariant parameters. However, microdata may miss important general equilibrium effects that are revealed through analyzing aggregate data at varying spatial scales. For example, microdata on establishments benefiting from a policy might reveal that recipients create more jobs than non-recipients, while analysis of the same policy using aggregate data indicates no job creation. As is the case with some of the programs discussed above, further investigation reveals these seemingly incongruent results arise from sorting of firms across industries and across different levels of geography. In this way, the full effects of the policy can only be understood using both microdata and aggregate data at varying spatial and sectoral scales.

There are more detailed micro data available to researchers today than ever before; and as more and more information is gathered electronically, this trend is likely to continue (Einav and Levin 2013; Varian 2014). In addition to transforming data obtained from traditional sources, the internet houses a wealth of data available for researchers to collect. Through “scraping” websites for data compiled for other purposes, researchers can collect detail on local prices, jobs, etc. (Edelman 2012). More detailed data allows economic development policy researchers to take advantage of new methods as well as apply existing methods previously underutilized because of data limitations. The sheer volume of the data may present a challenge in this environment, but shared computing resources and new database structures provide researchers with practical solutions to storage and computational limits (see Varian 2014 for an overview).

Data proliferation also generates situations in which the number of available predictors exceeds observations (high-dimensional data) and thus requires tools for variable selection (Belloni, Chernozhukov, and Hansen 2014; Varian 2014). Belloni, Chernozhukov, and Hansen (2014) demonstrate that these high-dimensional data methods substantially improve causal estimation of policy effects.

Although data are generally becoming more available, there are serious threats to the continued availability and quality of some data essential to economic development policy research. For example, many researchers in the U.S. were opposed to the removal of the long-form decennial census and its replacement with the annual American Communities Survey (ACS), as the ACS is not considered by many to have the same amount of information at small levels of geography. Similarly, in Canada there have been suggestions about making the census voluntary, raising obvious problems regarding selection and use of this important data set.

Publicly available aggregate data at fine levels of geography is typically created through survey and administrative data programs at government agencies. Recently, government data programs have been targeted as a seemingly innocuous way to reduce government spending. Data programs facing budget cuts must make hard choices about which data to collect and what data to make available, sometimes leading to the elimination of state and local aggregate data programs. In addition to the replacement of the census long form, the 2013 U.S. Federal sequestration mandated budget cuts at the Bureau of Economic Analysis. The result of this was the elimination of the Local Area Personal Income (LAPI) program that provides annual county level data on economic activity by sector and income by source. As argued by Partridge, Goetz, and Kilkenny (2013) these data programs are necessary for the evaluation of local economic development (and other) policies. Fortunately, regional scientists and other public data users

successfully lobbied for the restoration of part of the LAPI, but other state and local data programs remained victims of budgetary cutbacks.

On the positive side, microdata have become more accessible through publicly available de-identified government survey datasets (such as the Current Population Survey), internet sources, and increased research access to confidential survey and administrative data. The latter is being aided by growth in the number of secured access locations, such as the Census Research Data Centers, and through on-line remote portals to restricted data, such as the Data Enclave through the Michigan Center on the Demography of the Aging. The same budgetary pressures discussed above threaten the resources supporting increased (public or secure) access. Cuts to survey programs like the American Community Survey and Economic Census have become a perennial topic for debate. This is particularly concerning given declining survey quality trends. Meyer et al. (2015) document a rise in three sources contributing to the decline in household survey quality – increased unit non-response, increased item non-response, and measurement error (inaccurate reporting) – in important datasets for regional policy analysis such as the Current Population Survey, American Community Survey, and Survey of Income and Program Participation. In particular, there is evidence of misreporting of self-employment income, earnings, type of college attended, transfer program participation, and other key variables for evaluating economic development policy. Such misreporting can lead to substantial bias in estimated policy effects, although there is little evidence on the extent of that bias for economic development policy estimates.

The decline in the quality of survey data coupled with the increase in access to administrative data will likely bolster the current trend towards administrative microdata research (and away from survey microdata) documented in Chetty (2012). However, as Meyer et

al (2015) note, administrative data are not collected with research in mind. These data therefore vary substantially in quality, accessibility, and coverage – making replication of results and generalizable conclusions more difficult. Administrative data also tend to collect a limited set of characteristics. Some of these limitations, however, may be overcome by linking survey and administrative data. There is an emerging literature utilizing linked survey and administrative data, but not yet any (of which we are aware) by regional scientists evaluating economic development policies.

Limited survey and administrative data on economic development incentives has significantly hampered evaluation of these policies. The above-referenced studies on Empowerment Zones and New Market Tax Credits employ federal data. Similar data is available for some state and local programs; however, comprehensive data on state and local government incentives continues to prove elusive (Patrick 2014; Thomas 2011; Buss 2001). Future research will benefit from recent developments in state and local government accounting standards requiring uniform reporting of economic development tax expenditures (tax abatements, credits, etc.) (Sharma and Davidoff 2015). The next step towards comprehensive administrative data is similar reporting requirements for non-tax incentives (cash, grants, land, low-interest financing, etc.), which research suggests comprise the bulk of state and local resources devoted to economic development (Patrick 2014, 2015; Bartik, Erickcek, and Eisinger 2003).

IV. Considerations of Methodologies Used in Regional Science

Regardless of data, the field now requires that researchers establish the extent to which their particular combination of data and methods: i) produces stylized facts from correlations and patterns; ii) highlights causal estimates of policy effects (and key parameters), and/or iii)

generates reliable out-of-sample predictions. The descriptive approach to empirical studies provides stylized facts without any causal or predictive claims. There is an increasing expectation that policy research go further by either convincingly attributing outcome changes to the policy, credibly predicting the change in outcomes from potential policy changes, or both. This is particularly difficult for economic development policy because, as discussed above, policies are not randomly implemented across locations and interact with locational attributes to produce heterogeneous effects.

In recent years, causal and predictive research has been categorized as following either the structural or the experimental approach. Rust (2015) describes the structural approach as “. . . empirical work that takes theory seriously . . .” (p. 821), whereas work following the experimental approach avoids tight integration of theory and focuses instead on causal inference with few assumptions. Angrist and Pischke (2010) proclaimed a credibility revolution in empirical work associated with the experimental emphasis on quality research design. Although there are significant supporters, not all empiricists agree. A series of articles published alongside Angrist and Pischke (2010) – Keane (2010), Leamer (2010), Nevo and Whinston (2010), and Stock (2010) – summarize the relative merits and drawback of the structural and experimental approaches. In general, the greatest strength of the experimental approach is the focus on credibly exogenous sources of identifying variation. On the other hand, experimental results may have limited external validity, provide little basis for out-of-sample predictions, and therefore cannot be used to analyze potential effects of policies not-yet-implemented. The latter is the primary benefit of structural work; whereas identification may be more problematic in structural models.

In a 2010 assessment of research in regional economics, Thomas J. Holmes suggests that most work in the field follows the descriptive approach (Holmes 2010). He also notes that the experimental approach is gaining traction, but very little work using the structural approach outside of the line of research overlapping with public finance on empirical sorting models. This is particularly true for economic development policy research in the field. Since Holmes' writing, economic development policy evaluation has increasingly employed experimentalist methods. Although economic development policy is not generally the subject of randomized controlled trials (RCTs) and lab experiments, there is a mature literature on experimental methods using natural experiments, quasi-experiments, difference-in-differences, matching, instrumental variables, discontinuity designs, etc. These empirical strategies now appear more frequently in the literature. For example, the cross state-border double-differencing methodology in Rohlin, Rosenthal, and Ross (2014) carefully compares changes in similar locations that credibly serve as the alternatives from which a particular business owner is choosing – a twenty-mile wedge at state borders. The design removes time-invariant unobservables specific to the business owners' location choice set to obtain a causal estimate of tax policies. We expect future research will continue to employ these types of methods, with increased scrutiny of identification strategies.

Leamer expressed concern that the discourse on experimental methods was leading researchers to “. . . apply push-button methodologies without sufficient thought regarding their applicability and shortcomings . . .” (Leamer 2010). Addressing this concern requires that researchers think deeply about the identifying assumptions for their empirical strategy (e.g., institutional settings for natural experiments, the exogeneity case for instrumental variables, etc.). Blundell and Costas (2009) and Imbens and Wooldridge (2009) provide practical guidance

and outline the identifying assumptions for the most commonly employed experimental strategies in policy analysis. Even within a quasi-experimental framework, violations of key identifying assumptions can lead to drastically different policy effect estimates.

As an example, Patrick (2016) compares the local economic development effects of successfully attracting a large new manufacturing plant obtained from two quasi-experimental empirical strategies: difference-in-differences estimation combined with either a natural experiment (in which counterfactuals are revealed in a magazine) or geographically-proximate matching control by design. The two identification strategies yield different estimates of the effects of large plants on economic activity and fiscal surplus. Patrick (2016) presents distributional and placebo tests indicating that the natural experiment results may be driven by systematic differences in counterfactual county outcomes, while the geographically-proximate matching strategy does not appear to suffer from this threat to identification. These tests therefore suggest geographically-proximate matching as the preferred strategy, which is line with recent findings that combining the difference-in-differences estimator with methods for carefully pre-processing data produce results closer to those from an ideal experiment (Ferraro and Miranda 2014). The placebo test exercise in Patrick (2016) is line with the more recent trend of requiring sensitivity analysis and falsification tests for experimental studies. We expect this to become standard practice for future economic development policy studies employing these methods.

While experimental methods may generate credible estimates of policy effects, empirical work without theory as a source of hypotheses and specification guide “. . . results in unnecessary limits on what we can learn, and cripples our ability to do counterfactual policy forecasting and analysis. . . ” (Rust 2015, p. 821). Keane (2010) illustrates this issue with an

example from the labor literature that uses the experimental approach to document large improvements in student outcomes from reductions in class size. He argues that this is not a *ceteris paribus* effect and that because “. . . we don’t have estimates of the structural parameters of the cognitive ability production function, or the decision rules that parents and schools use to determine other inputs, we cannot determine if reduced class size would be a more cost effective way to improve student achievement than, say, higher teacher salaries or better nutrition and health care in utero (p.49).”

Structural empirical studies, on the other hand, set out to model such decision rules and uncover structural parameters in a way that allows researchers to use past changes to predict responses to other not-yet-observed changes (Nevo and Whinston 2010). Holmes’ observation of very little structural work in regional studies remains true. There are some household sorting and migration studies that provide an exception, but virtually no economic development policy structural work outside of input-output modeling. As Nevo and Whinston point out, structural analysis does not obviate the need for credible inference. Building upon the experimental work that provides credible sources of identification, we suggest that there is an underexplored opportunity for structural work on economic development policy in regional science. This could be particularly fruitful for predicting policy responses in the context of firm sorting behavior described above.

In general, we agree with Rust (2015) that there is an unnecessary divide between structural and experimental work on policy evaluation. Future empirical economic development policy evaluation would benefit from more theory in studies using the experimental approach and more structural work incorporating the identification insights from experimental work. Using theory to generate hypotheses will allow regional scientists to use experimental methods to

distinguish between competing theories and uncover the mechanisms driving changes in economic development outcomes resulting from different policies. The studies by Hanson and Rohlin (2011), Rohlin, Rosenthal, and Ross (2014), and Patrick (2015) represent a step in this direction. Using experimental identification in structural models of firm responses to policy will allow analysts to investigate and compare not-yet-implemented policy alternatives. Bridging the gap between theory and identification represents a meaningful avenue for empirical progress on the unresolved questions in economic development policy research outlined herein.

V. Conclusions and Recommendations for the Future

Regional scientists bring a unique set of skills to the analysis of public policies, enabling researchers to provide recommendations and guidance for policymakers on how to effectively design future regional development policies. However, it is important that researchers and policymakers work together – and do so early in the process. It is also important to acknowledge the limitations and sometimes unintended consequences of good intentions. Finally, in order for regional scientists to conduct thorough, careful analyses, we must make sure they have the necessary resources – especially the right data.

We have discussed how policies can have unintended consequences, for example, attracting one industry at the cost of another or attracting small businesses at the cost of larger establishments. This should not be too surprising since such sorting of businesses is firmly grounded in economic theory. However, more work needs to be done to carefully separate out the mechanisms of these effects. Furthermore, policymakers need to be cognizant and aware of these possibly negative spillovers of well-intended policy. Land will always be limited to some degree, therefore attracting businesses of one type will always come at some cost that must be known and

understood. At the same time, because of the interaction between policies and the other differences between regions, even policies that are effective in some places will not be effective everywhere.

Policymakers have a lot to learn from regional scientists and other social scientists about the economic development effects of policy. However, in order for researchers to provide a proper analysis, one thing they will always need is quality data. The quality and amount of microdata has exploded as computing power and the internet has grown, but we must make sure that these data are maintained. As mentioned earlier, the shift from the long form in the decennial census to the American Community Survey may have helped to save money, but may have come at a cost to researchers that relied on the high quality census data that came out every ten years. In addition, all parties need to find ways to ensure that the quality of survey data does not continue to decline. No matter how good and readily available administrative data has become, we will still always have a desire to answer questions that require us to ask individuals and firms for a response through a survey.

Finally, researchers need to continue to develop quality methodologies to answer important questions about the impact of policy on local development. While randomized control trials are unlikely to occur in all situations, policymakers and regional scientists may be able to work together in some situations to conduct small scale social experiments, with the hope that enough information can be gained from these exercises that some degree of evaluation can be conducted. While there will always be concerns regarding external validity of such efforts, that does not mean insights cannot be gained from such endeavors.

Over the last 50 years, we have made great strides in the field of regional science. As we move forward into the next 50 years, one goal of researchers in the field should be to provide more guidance and insights regarding the effect of policy on local economic growth. We discussed in

this chapter the current state of this research, and what we view as being some of the key areas that future analysis should consider. We also stressed the importance of continuing to have quality data, as well as continuing to improve our methodologies. Hopefully over the next 50 years, regional scientists will become one of the key sources of information for all levels of government regarding how to design effective policies that will promote local economic development.

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