

Urban Immigrant Diversity and Inclusive Institutions

by

Abigail Cooke
University at Buffalo, SUNY

Thomas Kemeny
University of Southampton

CES 16-07

January, 2016

The research program of the Center for Economic Studies (CES) produces a wide range of economic analyses to improve the statistical programs of the U.S. Census Bureau. Many of these analyses take the form of CES research papers. The papers have not undergone the review accorded Census Bureau publications and no endorsement should be inferred. Any opinions and conclusions expressed herein are those of the author(s) and do not necessarily represent the views of the U.S. Census Bureau. All results have been reviewed to ensure that no confidential information is disclosed. Republication in whole or part must be cleared with the authors.

To obtain information about the series, see www.census.gov/ces or contact Fariha Kamal, Editor, Discussion Papers, U.S. Census Bureau, Center for Economic Studies 2K132B, 4600 Silver Hill Road, Washington, DC 20233, CES.Papers.List@census.gov. To subscribe to the series, please click [here](#).

Abstract

Recent evidence suggests that rising immigrant diversity in cities offers economic benefits, including improved innovation, entrepreneurship and productivity. One potentially important but underexplored dimension of this relationship is how local institutional context shapes the benefits firms and workers receive from the diversity in their midst. Theory suggests that institutions can make it less costly for diverse workers to transact, thereby catalyzing the latent benefits of heterogeneity. This paper tests the hypothesis that the effects of immigrant diversity on productivity will be stronger in locations featuring more “inclusive” institutions. It leverages comprehensive longitudinal linked employer-employee data for the U.S. and two distinct measures of inclusive institutions at the metropolitan area level: social capital and pro- or anti-immigrant ordinances. Findings confirm the importance of institutional context: in cities with low levels of inclusive institutions, the benefits of diversity are modest and in some cases statistically insignificant; in cities with high levels of inclusive institutions, the benefits of immigrant diversity are positive, significant, and substantial. Moreover, natives residing in cities that have enacted laws restricting immigrants enjoy no diversity spillovers whatsoever, while immigrants in these cities continue to receive a diversity bonus. These results confirm the economic significance of urban immigrant diversity, while suggesting the importance of local social and economic institutions.

*This work was produced while the authors were Special Sworn Status researchers at the U.S. Census Bureau's Center for Economic Studies. Any opinions and conclusions expressed herein are those of the authors and do not necessarily represent the views of the U.S. Census Bureau. All results have been reviewed to ensure that no confidential information is disclosed. We thank Bert Grider and Billy Wisniewski at the U.S. Census Bureau for help with disclosure avoidance review. This work has been supported by U.S. National Science Foundation grant BCS-1359768. The research uses data from the Census Bureau's Longitudinal Employer Household Dynamics Program, which was partially supported by the following National Science Foundation Grants SES-9978093, SES-0339191 and ITR-0427889; National Institute on Aging Grant AG018854; and grants from the Alfred P. Sloan Foundation.

1 Introduction

The United States attracts one in five international migrants, and these immigrants disproportionately choose to live in metropolitan areas. City-regions like New York, Los Angeles and Miami lie at one extreme of the resulting immigrant diversity, with more than one in three residents born abroad. ‘Super-diversity’ (Vertovec, 2007) of this kind is not just an American phenomenon; it is present in London, Hong Kong, and other global hubs. Nor is birthplace heterogeneity merely to be found among the world’s largest and most evidently cosmopolitan cities: a considerable and growing quantity of immigrant diversity is also in evidence among smaller metropolitan areas.

Theorists provide contrasting predictions regarding diversity’s economic implications. On one side, Jane Jacobs and other urbanists celebrate it (whether rooted in country of birth or some other source of heterogeneity), arguing that an economy premised on novelty and knowledge production demands agents who bring distinctive perspectives. Outside of urban-focused work, in such disciplines as psychology and sociology, this idea is echoed in the context of work teams and organizations. On the other side, many observers of diversity note that groups composed of highly heterogeneous agents may have trouble establishing common ground. Absent shared perspectives, agents are more likely to engage in rent-seeking behavior that ought to reduce economic performance.

Although these two narratives about diversity’s impacts generate contrasting predictions, they can be explained by a common set of mechanisms. One side identifies the economic value implicit in heterogeneity, rooted in the cross-pollination of ideas that interpersonal interaction engenders. The other notes that such interactions can be problematically costly. It follows that an ideal situation would be one in which heterogeneity is present, but where the costs of transacting are minimized. Across a range of disciplines, it is widely believed that institutions are the principal mechanism that regulate such costs. Per Douglas North (1991, p.97), institutions “are the humanly devised constraints that structure political, economic and social interaction. They consist of both informal constraints...and formal rules.”

The right institutions under conditions of diversity ought to be what Acemoglu and Robinson (2012) describe as “inclusive” – those that lower transaction costs among people born in different countries, such that the latent benefits of heterogeneity are catalyzed.

This paper tests the idea that the effects of urban immigrant diversity on productivity will depend on the inclusiveness of local institutions. To do so, it links longitudinal matched employer-employee data for the U.S. with measures of the inclusiveness of institutions in metropolitan areas. Worker-level data comes from a version of the U.S. Census Bureau’s confidential Longitudinal Employer-Household Dynamics (LEHD), covering nearly all employees in 29 states on a quarterly basis between 1991 and 2008. Two kinds of proxies for inclusive institutions are used: one that captures the strength of local bonding and bridging forms of social capital; and a second that describes pro- and anti-immigrant ordinances enacted by local governments. In distinctive ways, each sheds light on residents’ attitudes regarding those who differ from them. The ordinance measure is more specific, capturing laws that represent a formalization of residents’ attitudes about the presence of immigrants in their locality.

To estimate the moderating role of institutions on the relationship between immigrant diversity and productivity, we exploit two particular sources of variation: changes in diversity in cities and places of employment over time and differences among cities in their institutional character. We limit attention to work ‘spells’ in which individual workers remain in a single workplace and city for at least two years. This permits the estimation of fixed effects models whose chief virtue is their ability to absorb bias from stationary unobserved heterogeneity at multiple scales, and in so doing address concerns of bias from sorting and other selectivity issues present in prior work (Kemeny, 2014; Lewis and Peri, 2014; Combes et al., 2008). Our strategy is to identify the effects of diversity on productivity by observing how the wages of individual workers who are fixed in place and in their job respond to shifts in the diversity around them – both in their city as well as in their workplace. An addi-

tional source of variation comes from differences in the quality of cities' institutions – some will be strongly inclusive, while others will be much less so.

Across our two very different measures of institutions we find consistent evidence in support of our hypothesis. Workers living and working in cities that do not feature inclusive institutions receive only modest, and in some cases statistically insignificant wage gains from the rising diversity in their cities and workplaces. Meanwhile worker productivity in cities with inclusive institutions responds much more strongly to changes in metropolitan and workplace diversity. In short, the quality of local institutions strongly shapes the economic value of immigrant diversity. Exploring disparate impacts by nativity, we find, somewhat ironically, while natives in cities that have enacted anti-immigrant ordinances receive no diversity bonus, productivity among immigrant workers in such cities is still augmented, albeit less strongly, from rising diversity.

The remainder of the paper is structured as follows. Section 2 reviews relevant literature on the local economics of immigrant diversity. Sections 3 and 4 describe the empirical approach taken in this paper, and the data used. Section 5 presents results. Section 6 concludes.

2 Diversity, Productivity and Institutions: The Literature

Suppose that there are economic benefits rooted in human interaction under conditions of diversity. But interaction varies in its costliness, and, all else equal, transactions among individuals who share a common background are less costly than transactions among individuals who have no such shared background. Hence, when interacting with people who are different, both rewards and costs are higher.

This suite of ideas has been examined by a wide array of social scientists. Psychologists, management scholars and complexity researchers assert that behind people's demographic characteristics lie more deeply rooted differences in heuristics and perspectives (Nisbett et al., 1980; Clearwater et al., 1991; Thomas and Ely,

1996; Hong and Page, 2001, 2004). Heuristic diversity could improve problem solving, and therefore productivity by creating a wider map of possible solutions, as well as by fostering the cross-pollination of ideas, leading to novelty (Aiken and Hage, 1971). Agreeing that individual identity is bound up in one's background, some organization-focused theorists reach a very different conclusion: that team diversity makes the achievement of shared understanding difficult, which leads to a sub-optimal lack of cohesion and produces rent-seeking behavior (Byrne, 1971; Harrison and Klein, 2007). A longstanding tradition of empirical work has examined the association between team and organizational performance and various measures of diversity – mostly features like gender, age and educational background (Hoffman and Maier, 1961; Herring, 2009). Recent meta-analyses find only weak evidence that such forms of 'background' diversity shape organizational performance (Horwitz and Horwitz, 2007; Hülshager et al., 2009; Joshi and Roh, 2009). Interpreting this result is complex: among various possibilities, it could signify that studied forms of diversity are unrelated to performance, or that the benefits and costs inherent in diverse contexts cancel each other out, leaving diverse teams not any more or less effective than homogeneous ones.

Motivated by the mingling of people born in different countries present in urban areas, economic geographers and urban economists have recently engaged with theories about diversity and performance. Arguing that many important interactions – especially those for which there is a central role for creativity and complex problem solving – cohere at a scale that is external to individual teams and firms but internal to metropolitan areas, they explore whether evidence for diversity's public good qualities are clearest in metropolitan areas rather than in the workplace. According to this logic, interactions among a diverse urban populace ought to generate productivity benefits for city residents. Studies by economic geographers are also distinct from the organization-focused literature in that research on diversity in cities focuses on country of birth as the relevant source of heuristic heterogeneity.

At such higher spatial scales there is also some precedent for considering that

heterogeneity engenders economic costs. Because economies require interaction and coordination among diverse agents (North, 1990; Storper, 1995), highly fractionalized locations could generate negative externalities that might hinder development. This idea is supported by various kinds of evidence. Considering development in poor countries, economists find that ethnically fractionalized countries perform worse than similar countries that are more homogeneous (Alesina and Drazen, 1991; Easterly and Levine, 1997; Rodrik, 1999; Alesina and La Ferrara, 2005; Montalvo and Reynal-Querol, 2005). At the urban scale, evidence for the U.S. suggests that ethnically- and age-diverse locales spend less on productive public goods (Poterba, 1997; Goldin and Katz, 1999; Alesina et al., 1999; Pennant, 2005).

Motivated by these contrasting predictions, researchers have sought to measure the impacts of urban immigrant diversity on measures of productivity, innovation, entrepreneurship, and other performance indicators.¹ Across a range of country contexts and time periods, they have produced evidence suggesting that immigrant diversity augments worker and firm performance (Ottaviano and Peri, 2006; Bellini et al., 2013; Bakens et al., 2013; Suedekum et al., 2014; Kemeny, 2012; Nathan, 2011; Longhi, 2013; Alesina et al., 2013; Lee, 2014; Trax et al., 2015; Nathan, 2015; Kemeny and Cooke, 2015). Recent work in this field has sought to deal with confounding factors, including bias arising from the spatial sorting of workers based on unobservable characteristics (Bakens et al., 2013; Kemeny and Cooke, 2015; Trax et al., 2015). In the case of Trax et al. (2015) for Germany, and Kemeny and Cooke (2015) for the U.S., the association between immigrant diversity and productivity remains after accounting for sorting behavior, workplace factors and a variety of other potential sources of mismeasurement.

Still, if transacting across birthplaces involves both costs and potential benefits, it follows that, in contexts where such interactions can be conducted at a lower cost, diversity ought to produce larger spillovers. This could occur both because reduced transaction costs make a fixed quantity of interactions more efficient, and

¹For recent reviews of this literature, see Kemeny (2014) and Nathan (2014).

because they induce a larger quantity of individuals to transact. In either case, one might expect a given quantity of immigrant diversity to yield a larger payoff in a location where such costs were low. It is reasonable to expect that some component of these costs are idiosyncratic – internal to individuals, based on their preferences, and background. But, as historians, economists, and other social scientists have argued for decades, there are systematic factors that shape such interactions. Most famously, North (1991) argues that, in an economy involving a complex division of labor, significant territory, and agents who are not tied by kinship, the market requires coordination to overcome problems of agency and enforcement. Institutions are the system of formal and informal rules and norms facilitating this coordination, strengthening trust and reducing defection so as to enable interactions among a diverse and specialized population. Echoing this theme, Acemoglu and Robinson (2012) argue for the importance of “inclusive” institutions, especially as economies approach the technological frontier. Formal and informal institutions are inclusive when, in Robinson’s words, they “create the incentives and opportunities necessary to harness the energy, creativity and entrepreneurship in society” (2013, p.1). Applied more narrowly to issues of diversity, this suggests that inclusive institutions should be those that reduce the costs that people born in different countries face in interacting with each other. When such institutions are present, they should reduce the downside of cross-national interaction, and better enable the upside.

This moderating role for institutions is more than intuition: studies of the impacts of ethnic fractionalization in poor countries find that institutions like democratic governance and contract enforceability can play a decisive role in enabling economic development (Easterly and Levine, 2001; Collier, 2000).

Though the studies mentioned above and others like them operationalize institutions using measures of formal laws regulating issues like contracts and intellectual property, it is important to emphasize that theorists’ conception of institutions is expansive, equally featuring local informal norms and attitudes. This is especially important when studying the subnational scale, where within a larger national con-

text of formal laws, one might expect considerable local variation in informal institutions. Despite their informality, a great deal of theory and evidence point to the crucial role these play in shaping the nature of market transactions and thus local development trajectories (Storper, 1995; Rodríguez-Pose, 1999; Morgan, 2007; Storper et al., 2015).

Motivated by these arguments, this paper seeks to test the following hypothesis:

The effects of immigrant diversity on worker productivity should be stronger in locations that feature more inclusive institutions.

Only two known studies address closely related topics at a subnational scale. Alesina and La Ferrara (2005) measure the relationships between ethnic diversity and population growth in U.S. counties, with income levels as the mediating force, proxying for institutions. They find that poor, ethnically heterogeneous counties tend to experience declines in population, whereas in wealthy, diverse locales, this relationship is weaker, and in some models, it turns positive. The closest study to the current paper is Kemeny (2012), which uses U.S. metropolitan-level data on immigrant diversity, wages (as a proxy for productivity), and social capital, showing that the association between diversity and wages is considerably larger in cities that are endowed with higher levels of social capital. While suggestive, that paper does not account for a large range of potentially relevant but unobserved factors that distinguish locales, establishments, and individuals; moreover it is largely cross-sectional, and as such is less able to capture how diversity and wages co-move.

3 Empirical Approach

This section describes the approach taken to measuring the relationship between diversity and productivity. In relation to the literature described in the previous section, a number of features are especially important. First, our approach aims to account for a wide range of hard-to-observe characteristics of individuals, establishments and cities that can influence productivity. Second, it facilitates observation

of the co-movement of diversity and productivity over time. Third, it is able to distinguish between diversity impacts arising from the city scale and the workplace scale.

Using wages as a proxy for productivity, our aim is to measure how individual workers' wages respond to changes in the diversity that surrounds them. We focus attention on the work spells of 'stayers' – individuals that remain in a single workplace (and thus metropolitan area) for at least two years.² As these workers are fixed in place, variation comes from the panel structure of our data, and more specifically from the shifts around these workers in the birthplace composition of the cities in which they live, and the establishments in which they work. We estimate the following equation:

$$\ln(w)_{ipjt} = d_{jt}\beta + d_{pjt}\gamma + X'_{ipjt}\delta + E'_{pjt}\theta + C'_{jt} + \mu_{it} + \eta_t + \nu_{ipjt} \quad (1)$$

where, $\ln(w)$ represents the log annual wages of an individual worker i in establishment p located in metropolitan area j at time t ; d_{jt} , a key independent variable of interest, measures city-specific immigrant diversity; d_{pjt} measures diversity at the level of the establishment; X' represents time-varying measures of worker-specific characteristics; E' describes a vector of dynamic employer characteristics; and C' indicates time-varying characteristics of a worker's metropolitan area. The fixed effect, μ_{ipj} , represents a key feature of our approach. Because we analyze only 'stayers', it accounts for the effects of unobserved permanent characteristics of not just the individual workers themselves, but also the establishments where they work, and the regional economies in which they live. At the individual level, such pertinent stationary unobserved heterogeneity could be present as a consequence of differences in workers' innate ability, intelligence, or motivation. Material establishment-specific features could include deep-rooted differences in capital intensiveness or product quality. And at the level of metropolitan regions, differences in specialization, agglomeration, and other factors could be relevant, if hard to observe and relatively

²This strategy is adapted from Moretti (2004a) and Gibbons et al. (2013) who explore local spillovers from education, not diversity, and is closely related to approaches in Kemeny and Cooke (2015) and Trax et al. (2015).

non-dynamic. Returning to equation (1), η_t represents unobserved time-specific shocks that exert uniform impacts across all individuals, such as business cycles; and ν_{ipjt} is the standard error term. Applying the fixed effects estimator, equation (1) explores how an individual's productivity responds to changes in the level of immigrant diversity present in her metropolitan area, while it accounts for major sources of spurious correlation that might bias estimates of the impact of diversity on wages that rely only on observable features.

A remaining challenge in measuring the relationship of interest comes from recent work in urban economics on spatial equilibrium. Adherents of these models argue that, in a system of cities where firms and workers are relatively free to choose locations, estimates of equation (1) that demonstrate a positive and significant relationship between wages and diversity would be unable to distinguish between two interpretations: (a) that diversity generates spillovers that augment productivity, or (b) that workers consider diversity to be an unpleasant disamenity, and require higher pay to endure it. The standard remedy is to relate diversity not just to wages but also to rents, following an argument dating back to Rosen (1979) and Roback (1982). Higher wages *and* rents in response to diversity shocks would then be interpreted as confirming (a), whereas results indicating higher wages and lower rents corresponds to (b).

Our data does not permit us to observe workers' living arrangements. Nonetheless, we believe our chosen approach can shed light on diversity's potential productivity impacts. Responding narrowly to spatial equilibrium concerns, Moretti (2004a) and Acemoglu and Angrist (2001) point out that, in areas where firms sell goods and services beyond their immediate locality, higher nominal wages must indicate higher average worker productivity. While firms in nontradable activities may reference local prices, traded-goods firms face national prices. If they paid higher wages with no compensating productivity advantages, firms would be forced to relocate to locations offering some form of compensating differential – whether in the form of cheaper land or higher quality-of-life. Hence, detecting a positive relation-

ship between diversity and wages ought to indicate productivity benefits in regions containing tradable activities. More broadly, while worker mobility, land markets and consumption are clearly important and interlinked features of urban systems, it remains far from clear that these features relate in the specific ways that canonical spatial equilibrium models suggest. Strong questions have been raised about the sequencing of these models (Storper and Scott, 2009), as well as about the lack of evidence supporting their most basic prediction: a gradual movement toward utility equalization across cities in the US urban system (Kemeny and Storper, 2012). In short, it is far from clear that reality sufficiently conforms to this body of theory. Meanwhile, Combes et al. (2005) argue persuasively that, in the context of cities, rising worker productivity is expressed in higher wage levels.

To determine whether or not the relationship between immigrant diversity and productivity depends on the inclusiveness of local institutions, we estimate equation (1) separately for workers inhabiting cities that feature institutions that are more and less inclusive. The next section describes our data, analytical sample, and the construction of our measures of diversity and institutions.

4 Data

Our primary data source is the U.S. Census Bureau’s confidential Longitudinal Employer-Household Dynamics (LEHD) Infrastructure files, the sole source of matched employer-employee data for the United States. The LEHD program integrates administrative records from state-specific unemployment insurance (UI) programs with Census Bureau economic and demographic data, providing a nearly universal picture of jobs in the U.S. (McKinney and Vilhuber, 2011). The version of the data available for this study covers over 90 percent of all workers in 29 states, on a quarterly basis between 1991 and 2008.³

³States used in our project: AR, CA, CO, FL, GA, HI, IA, ID, IL, IN, LA, MD, ME, MT, NC, NJ, NM, NV, OK, OR, SC, TN, TX, UT, VA, VT, WA, WI, WV.

4.1 Analytical Sample

To estimate the relationship between a worker’s wages and the immigrant diversity present in their city and workplace, we must first assign workers to workplaces, and thereby to Metropolitan Core-Based Statistical Areas (CBSAs).⁴ This assignment serves a few purposes. It permits construction of diversity measures at each scale. It is also required to help determine which workers to include in the analytical sample.

Assigning workers to establishments in LEHD is a nontrivial task. For workers in jobs at single-unit firms – those with only one plant, outlet, or office – knowing the employer tells you the place of work, because there is only one possible location. However, for workers employed at multi-unit firms, knowing the employer cannot definitively reveal the place of work. About 30-40 percent of workers included in the LEHD data work at multi-unit firms (McKinney and Vilhuber, 2011). To address these challenges, LEHD includes a file that, for each person employed in a multi-unit firm, provides ten work-unit imputations. Imputations are based on the distance between workers’ homes and establishment locations, and the distribution of employment across the establishments within the multi-unit employer, leveraging non-imputed establishment–worker data available for the state of Minnesota to generalize to the remainder of states (McKinney and Vilhuber, 2011, see Chapter 9). Because work location structures much of the data processing necessary for our estimation strategy, using the multiple imputations is impractical. Instead, for each job in a multi-unit employer, we assign each worker to their most frequently imputed establishment, using random assignment in the case of ties.⁵

⁴CBSAs reflect economically-integrated urban regions. Throughout, we use the terms ‘city’, ‘metropolitan area’, and ‘region’ interchangeably.

⁵The quality of our city- and establishment-level diversity measures depends on assigning workers to the correct city in the state and the correct establishment within the employer. Looking across all jobs, the vast majority can only be assigned to a single city, either because they occur in single-unit employers or multi-unit employers where all the establishments are located in the same city. This raises our confidence that our diversity measures are based off workers who actually work in each city. With 30-40 percent of the workers in the LEHD data employed by multi-unit employers, if we got the assignment wrong in every case, our diversity measures would be meaningless. However, if we randomly assigned multi-unit workers to establishments, we estimate that we would get the city incorrect for less than 10% of workers. Using the most frequently multiply-imputed establishment, we estimate that the proportion of workers incorrectly assigned to a city to be much smaller than this upper bound. Furthermore, we have no reason to believe that there would be any non-random error related to birthplace that would systematically bias our diversity measures.

Having assigned all workers to establishments across time, we can then identify work spells upon which to estimate equation (1). For each worker in LEHD, we include a maximum of one work spell across our study period. We select the longest such spell, as long as it exceeds two years. Workers with no spells lasting at least two years are discarded.

We aggregate from quarters to years, and link workers to worker and workplace characteristics available as part of LEHD. Establishment features include location, total annual employment, and best NAICS industry. Worker characteristics include wages, country of birth, birth year, sex, and race. Following common practice, for the purpose of analysis we limit the age range of workers to be over 16 and less than 66 years old. In keeping with the literature, we also drop workers with extremely low wages, and restrict the sample to jobs at establishments with at least ten employees. We also drop workers from our analytical sample who are simultaneously employed in multiple jobs, so that we can clearly identify the source of any establishment-specific diversity effects.

4.2 Measuring Diversity

Researchers commonly measure birthplace diversity using the following index of ‘fractionalization’:

$$Fractionalization_j = 1 - \sum_{r=1}^R s_{rj}^2 \quad (2)$$

where s is the proportion of residents in city j who were born in country r ; and R is the number of different countries represented among residents of that city. The index nears zero as diversity decreases and its maximum value approaches one as heterogeneity increases; it is often described as measuring the probability that two randomly-drawn individuals in a location were born in different countries. This index has been used to capture a wide variety of categorical forms of diversity, including language, birthplace, race and ethnicity (see, for example, Taylor and Hudson, 1972; Easterly and Levine, 1997; Knack and Keefer, 1997; Ottaviano and Peri, 2006; Sparber, 2010). The pervasiveness of this measure in diversity research

is no doubt related to its simplicity, as well as its ability to capture both the breadth of countries from which individuals originate, as well as the sizes of these different country groups in a given location.

Because it is the most widely-used measure in the field, we estimate metropolitan as well as establishment-specific levels of diversity using the fractionalization index, using the universe of LEHD-coded worker birthplaces in a metropolitan area or work unit.⁶

Workers' birthplaces and locations in workplaces and thus metropolitan areas form the basic inputs into annual fractionalization indices. To calculate measures of diversity at the city level, we first narrow our list of CBSAs to those that do not cross state boundaries with states unavailable to our project. Thus, although jobs located in Newark, NJ are included in our raw data, we drop them because they are part of the CBSA for New York City that also includes jobs in New York State and Pennsylvania, to which we do not have access. We do include CBSAs straddling multiple states to which we do have access, such as Texarkana in Texas and Arkansas. Having assigned workers to establishments, we can also calculate the fractionalization measure for each establishment in each year. One crucial difference is that instead of weighting each person's contribution to birthplace diversity evenly (as we do in the city measures), we weight each person's contribution depending on how many quarters they work in a particular establishment. If they worked half the year in one establishment and half the year in another, then they count as half a person in the diversity measures of each establishment for that year. Our minimum employment threshold of 10 workers means that measures of establishment diversity are not uninformative.

⁶Kemeny and Cooke (2015) demonstrate that estimates of the relationship between diversity and wages are not strongly dependent on choosing the standard fractionalization measure, as against an entropy index or decompositions of the fractionalization measure in the manner of Alesina et al. (2013).

4.3 Measuring Inclusive Institutions

This paper assumes that there are regularities in the level of transaction costs in different cities, and that these regularities are a function of what Acemoglu and Robinson (2012) call ‘inclusive institutions’. We approach the challenge of trying to measure these institutions by triangulating from two highly distinctive indicators: social capital and locality-specific ordinances regulating the presence of immigrants.⁷

4.3.1 Social Capital

We seek to operationalize a widely accepted notion of social capital in which it describes “the norms and networks that enable people to act collectively” (Woolcock and Narayan, 2000, p.226). Putnam (2000) famously unpacks this idea into two categories: bonding, which captures such norms and networks within groups of similar individuals in a community; and bridging, which indicates these capacities among members of disparate groups. As Malecki (2012) argues, we can expect social capital to vary at the regional or metropolitan scale in ways that affect trajectories of economic development. In the context of this paper, our interest is in its potential moderating role: locations with stronger manifestations of social capital ought to better enable people born in different countries to act collectively at a lower cost, and in so doing, they will reap greater rewards from a given quantity of immigrant diversity.

Combining secondary data from various sources, we construct a composite indicator of social capital, adapting an approach proposed by Rupasingha and Goetz (2008). To capture aspects of bonding social capital, we use data from County

⁷We experimented with several additional potential measures of institutions, including (1) spending on local public goods, using population-weighted from the Census Bureau’s Historical Database on Individual Government Finances (INDFIN), (2) population-weighted measures of residential segregation for the year 2000, built from county-level indicators made available by the GeoDa Center, and (3) a series of measures built from public-use extracts of the Decennial census that capture the proportion of all married couples whose spouse was born in another country, or separately, came from a distinct racial or ethnic group. These indicators fell into disfavor for varying reasons. Intermarriage variables were extremely highly correlated with our diversity indicator (>0.9), to the point where it could not be thought of as a useful moderator. We explored but ultimately rejected the use of segregation measures, since they failed to capture a wide range of possible interactions around work rather than residence. The public finance spending measures were deemed too distant from the underlying concept of interest.

Business Patterns to count the number of various kinds of associations, including social, advocacy, business, professional, labor, and political organizations. To ensure comparability across cities of various size, these counts are scaled per ten thousand residents. We complement these with an analogous count measure of what Oldenburg (1989) describes as ‘third places’ (the home being the first, and workplace being the second) that can enable both bonding and bridging forms of social capital. Again relying on County Business Patterns, the third places we consider include speciality food shops, restaurants, cafés, bars, hair salons, corner stores, golf clubs, fitness centers, bowling alleys, and sports clubs. To describe civic participation, we use two pieces of information drawn from Rupasingha and Goetz (2008): county-level mail response rates for the 2005 American Community Survey; and county voter turnout for the 2004 presidential election.

We perform principal components factor analysis as a data reduction technique. The inputs cohere into a single factor with an eigenvalue of 2.36, explaining 59 percent of the overall variance. Prior to varimax rotation, the next largest factor has an eigenvalue of 0.67, and is not retained post hoc. Factor loadings, showing the correlation of each input variable and the resulting composite factor, are shown in Table 1. The table also shows that each of the inputs offer something distinct in the definition of the larger factor, though voter turnout is the least unique.

Table 1: Factor Loadings: Social Capital Indicator, 2007

Variable	Loading	Uniqueness
Associations	0.73	0.42
Third Places	0.76	0.46
Census Response Rates	0.73	0.46
Voter Turnout	0.84	0.29

Though it would be possible to build a measure of social capital that varies over time, we elect to build a single indicator, centered around the year 2007, on the basis that we expect social capital to be highly stable across time. We check this assumption by comparing a version of our index for 2007 to indicators built by

Table 2: Strongest and Weakest CBSAs According to their Levels of Social Capital

Highest Social Capital	Lowest Social Capital
Appleton, WI	McAllen-Edinburg-Mission, TX
Des Moines-West Des Moines, IA	Fayetteville, NC
Green Bay, WI	Lakeland-Winter Haven, FL
Billings, MT	Riverside-San Bernardino-Ontario, CA
Portland-South Portland-Biddeford, ME	Bakersfield-Delano, CA
Cedar Rapids, IA	Killeen-Temple-Fort Hood, TX
Milwaukee-Waukesha-West Allis, WI	El Paso, TX
Eugene-Springfield, OR	Houston-Sugar Land-Baytown, TX
Davenport-Moline-Rock Island, IA-IL	Fresno, CA
Trenton-Ewing, NJ	Beaumont-Port Arthur, TX

Authors' calculations as described in Section 4.3.1, based on underlying data drawn from County Business Patterns and other sources.

Rupasingha and Goetz for 1990, 2000 and 2005.⁸ Correlations between measures of social capital across time are extremely strong: the weakest relationship is between 2007 and 1990 (0.90); the strongest is between 2007 and 2005, with a coefficient of 0.94. In short, the evident intertemporal consistency validates our use of an indicator of metropolitan social capital measured at a single point in our study period.⁹

Table 2 shows the results of this variable construction for a selection of CBSAs scoring highest and lowest on social capital. A regional geography of high and low social capital appears emergent. The Midwest has strong representation among the highest social capital cities, with a few additional cities in the Northeast and Northwest. The South and West appear to house many of the cities with lower scores.

4.3.2 Pro- and Anti-Immigrant Ordinances

Our second measure of inclusive institutions makes use of data describing local government policies that either restrict or enable the behavior of immigrants in their

⁸To maximize comparability, for this exercise we construct a version of our index that directly mirrors Rupasingha and Goetz's measure, in which we include a narrower range of types of third places – however, the social capital measure we ultimately use in our analysis is very closely related.

⁹In fact, some researchers assert that American social capital is in decline (cf. Putnam, 2000; Rahn and Transue, 1998; Stolle and Hooghe, 2005). To the extent that this is indeed occurring, it is undoubtedly happening very slowly, and there is little to suggest it has proceeded idiosyncratically from one city to another.

communities. Since the middle of the 2000s, municipal governments in the U.S. have begun to enact laws that target immigrants, a shift that may be best understood as an outgrowth of grassroots responses to residents' perceptions of immigrants, and especially undocumented immigrants (Varsanyi, 2008; Walker and Leitner, 2011). Immigrant-penalizing laws include those seeking to punish employers who hire undocumented immigrants, ones that amend housing codes to restrict crowding, some that restrict the use of languages other than English, and still others that require immigration checks relating to events like arrests and new firm births (Rodriguez, 2008). Other locations have used legislation to more actively welcome immigrants, enacting 'sanctuary' laws that prohibit immigration checks or regulations that extend voting rights for immigrants in local elections (Walker and Leitner, 2011).

These ordinances are chiefly aimed at affecting the local presence of undocumented immigrants. Still, they ought to affect all foreign-born individuals, regardless of the status of their documentation, in that those who look and sound different will live in a context marked to varying degrees by real risks from police and other residents engaged in 'profiling.' Nonetheless, our primary interest is not in how these laws may or may not have a direct effect on individuals. Rather, we take them to be a barometer capturing community attitudes towards immigrants and those that are different. Another way to put this is to say that these ordinances reflect attitudes towards bridging, with a specific focus on bridging across individuals' country of birth.

We build metropolitan-specific ordinance measures starting from a bespoke national dataset assembled by Kyle Walker and Helga Leitner.¹⁰ These data are locality-specific, covering 369 individual ordinances enacted since 2005, when these laws began to emerge as a phenomenon. Ordinances emerge from both municipalities and counties, and cover those that are pro- as well as anti-immigrant. We aggregate to the metropolitan scale, weighting by population in the process. The resulting metropolitan indices have uneven coverage, with some CBSAs that have

¹⁰We are very grateful to these scholars for sharing their data with us. See Walker and Leitner (2011) for further details on the database.

laws covering only a very limited share of the total population. Other metropolitan areas contain a patchwork of places that variously offer pro- and anti-immigrant ordinances.

Seeking to maximize the signal to noise ratio, we classify CBSAs as being pro-immigrant only when more than 50 percent of their population is covered by pro-immigrant laws. We use the same threshold to classify cities as anti-immigrant. This means we ignore a host of cities that either have no ordinances at all, have some which cover modest proportions of total residents, or are subject to an inconclusive mix of pro- and anti-immigrant laws. Though this limits our sample, estimates of our relationship of interest are produced on a sample that numbers in the tens of millions of workers. For descriptive purposes, Table 3 reports the ten metropolitan areas that are most clearly pro- and anti-immigrant, based on the proportion of each region’s population unambiguously covered by ordinances of a certain character. The regional geography of the ordinance measure appears a little more mixed than the social capital measure. Cities with the widest coverage from pro-immigrant ordinances make up a diverse mix, including university towns (Madison); politically-liberal metropolises (San Jose), and smaller agricultural regions (Fresno). Locations with wide coverage from local anti-immigrant laws include larger ‘Sunbelt’ regions (Houston and Charlotte), as well as smaller cities in the ‘Rustbelt’ (Green Bay; Appleton).

In the service of highlighting the potential contrast between those living in regions with pro- and anti-immigrant institutions, in the analysis that follows, we estimate equation (1) separately for workers living in cities with pro- or anti-immigrant ordinances that cover at least 50 percent of the CBSA population.

4.4 Control Variables

As section 4.2 makes clear, LEHD is very rich in terms of capturing nearly the full breadth of the workforce in great temporal detail. But it is fairly thin in terms of describing a wide range of characteristics of those individuals and their workforces,

Table 3: Pro- and Anti-Immigrant Ordinances: Top Ten CBSA ranked according to the proportion of the population covered by ordinances

Widest Pro-Immigrant Coverage	Widest Anti-Immigrant Coverage
Madison, WI	Charlotte-Concord-Gastonia, NC-SC
Salem, OR	Palm Bay-Melbourne-Titusville, FL
Santa Rosa, CA	Green Bay, WI
Chicago-Naperville-Elgin, IL-IN-WI	Appleton, WI
El Paso, TX	Houston-The Woodlands-Sugar Land, TX
Albuquerque, NM	Fayetteville-Springdale-Rogers, AR-MO
San Jose-Sunnyvale-Santa Clara, CA	Tulsa, OK
Fresno, CA	Riverside-San Bernardino-Ontario, CA
Austin-Round Rock, TX	Burlington, NC
Santa Fe, NM	Harrisonburg, VA

Note: Authors' calculations as described in Section 4.3.2, based on data from Walker and Leitner (2011).

and our empirical strategy takes best advantage of both these strengths and weaknesses. Specifically, the inclusion of *individual x workplace x city* fixed effects means that unobserved factors at each of these levels – of which there could be many – will not introduce bias into our estimates of the relationship of interest, as long as those factors are stationary over time. We seek to include as many relevant time-varying control variables as possible. Using LEHD data, we include time-varying predictors, such as establishment size, described in terms of the number of employees, as well as a measure of overall city employment - capturing internal and external economies of scale, respectively. We also seek to control for local educational spillovers using an indicator of average educational attainment at the CBSA level. In measuring this, we avoid LEHD's individual-level imputed educational length indicator because we found that, when aggregated to the metropolitan level, imputed educational length was only weakly correlated with comparable a non-imputed public-use measure, derived from IPUMS (Ruggles et al., 2010). Instead, as in Moretti (2004b), we estimate the annual share of each CBSA's workforce holding at least a 4-year college degree, using 5% public-use IPUMS extracts from the 1990 and 2000 Decennial Censuses, as well as 1% samples from each year of the 2001–2008 ACS (Ruggles et al., 2010), interpolating the space between available years of data. Coverage in IPUMS reduces our sample of CBSAs from 232 to 163. The poor quality of the imputed LEHD edu-

cation data also means we can not include establishment-specific measures of human capital. A shock to the stock of human capital available to the workplace remains a potential source of bias in the results that follow.

4.5 Summary Statistics

Table 4 presents descriptive statistics for key variables in our analytical sample, as well as some static characteristics of the workforce, included as a means to compare the overall sample to the larger US working population. The dependent variable throughout our analysis is the log of an individual worker’s annual earnings, which in LEHD are drawn from Unemployment Insurance records. The average individual in our sample earns a little over \$35,000, and is 40 years old. Sixty-seven percent of the sample is white, 84 percent is native-born, and 47 percent is female. The average work spell in the sample lasts nearly 5 years.

Table 4: Summary Statistics on Full Analytical Sample

Variable	Mean	Standard Deviation
Individual Characteristics		
Log Annual Earnings	10.48	0.637
Age	40.32	11.67
White	0.667	0.471
U.S. Born	0.840	0.366
Female	0.467	0.499
Spell Duration	4.970	3.304
Establishment Characteristics		
Birthplace Fractionalization	0.220	0.207
Employment	63.01	278.39
Multi-Unit	0.349	0.477
City Characteristics		
Birthplace Fractionalization	0.180	0.129
College Share, All Workers	0.256	0.074
Employment (10,000s)	47.20	88.29
Individuals	33,550,000	
Establishments	1,193,000	
CBSAs	163	

All data displayed in this table is drawn from LEHD, except for city college share, which is built from public-use IPUMS data.

5 Results

This section presents estimates of the main relationship of interest: whether and how local institutions moderate the relationship between immigrant diversity and worker productivity. We predict changes in a worker’s wage as a function of changes in the diversity in their city and workplace. In all the estimates that follow, we cluster standard errors at the establishment level, on the assumption that workers’ wages will be more strongly conditioned by sharing a common workplace than by simple co-presence within a particular metropolitan area. The main contrast to be drawn is between workers who live in cities that have strongly inclusive institutions, and those that live in cities lacking in such institutional features. Nonetheless, for comparison purposes, in the first column of Table 5 we present estimates for all workers in our analytical sample. In keeping with other studies, results indicate that city diversity is positively and significantly related to wages. The other city-level covariates show expected signs, showing evidence of externalities arising from human capital and scale. At the establishment level, diversity is positively related to wages, at a one percent level of significance. The coefficient on establishment diversity is considerably smaller than that estimated for city immigrant diversity. Workplace employment is also positive and significant, suggesting the presence of internal economies of scale.

Columns 2 and 3 use our measure of social capital to differentiate the institutional contexts in which workers are placed. Workers in column 2 are those living in cities that fall within the lowest tercile of social capital. Those in column 3 live in cities in the highest tercile of social capital – we characterize these as operating in contexts that feature strongly inclusive institutions. Our main interest is the potential contrast between coefficients on our measure of urban immigrant diversity across these two groups. Though the estimated coefficient for city diversity is positive and significantly related to wages in both columns, the association appears quite different in each case. The coefficient on metropolitan immigrant diversity in cities in the highest tercile of social capital is seven times as high as for workers in cities

Table 5: Fixed Effects Estimates of Relationship between Immigrant Diversity and Log Annual Wages by Two Measures of Inclusive Institutions

	Full	Social Capital		Immigrant Ordinances	
	Sample (1)	Low (2)	High (3)	Anti (4)	Pro (5)
City-Level Measures					
Birthplace Fractionalization	0.375*** (0.065)	0.168** (0.066)	0.969*** (0.298)	0.099 (0.098)	1.314*** (0.129)
College Share	0.162*** (0.040)	-0.522*** (0.062)	0.093 (0.103)	-0.260*** (0.062)	0.065 (0.099)
Employment	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	-0.000*** (0.000)
Establishment-Level Measures					
Birthplace Fractionalization	0.073*** (0.007)	0.051*** (0.006)	0.086*** (0.024)	0.069*** (0.007)	0.087*** (0.014)
Employment	0.000* (0.000)	0.000 (0.000)	0.000* (0.000)	0.000 (0.000)	0.000*** (0.000)
Observations (millions)	166.5	73.67	29.70	41.05	22.67
Individuals (millions)	33.5	15.28	5.48	8.19	4.44

Note: Standard errors in parentheses, corrected for clustering by establishment. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Estimated equation is (1). Year effects included in each model. Overall observation counts are rounded to the nearest 10,000 to ensure confidentiality.

in the lowest. Interestingly, the links between establishment diversity and wages are similarly moderated by broader institutional context, though at the workplace scale differences are more muted: the coefficient in low social capital cities is 60 percent of that in high social capital contexts.

Our initial hypothesis suggests a sensible interpretation: Social capital acts to lower the costs of transacting among people born in different countries, thereby enabling the latent benefits of heterogeneity. Interestingly, and in line with Kemeny (2012), workers in each kind of institutional context benefit from the diversity in their midst, but workers in cities featuring strong bonding and bridging social capital benefit much more.¹¹ Interpreting our main coefficients of interest, for the estimates

¹¹Our measures of institutions capture a phenomenon that is distinct from city size. Running models only on workers inhabiting cities above a threshold of one million residents, we found that, for workers in low social capital cities, the coefficient on city diversity is positive but not statistically significant at a 10 percent level, while the city diversity coefficient for workers in cities with high levels of social capital was very large and statistically significant at a one percent level.

produced over the entire analytical sample (column 1), a one standard deviation increase in urban immigrant diversity is associated with nearly a 6 percent increase in wages. For workers residing in locations in the lowest tercile of social capital, a similar increase in urban immigrant diversity is linked to a 2.4 percent increase in wages, whereas for those in the highest tercile of social capital, it is associated with a 21 percent wage increase. This contrast is striking, suggesting the substantive importance of inclusive institutions in moderating local diversity spillovers.

The fourth and fifth columns of results in Table 5 present estimates in which we capture differences in institutions using our measures of local ordinances that restrict or empower immigrants. Column 4 presents estimates on the sample of workers residing in cities where at least 50 percent of the population is covered by anti-immigrant ordinances. The coefficient on city-level immigrant diversity is statistically insignificant. The coefficient on workplace diversity is positive and significant, with a coefficient that falls between that found in the overall sample and that found for workers in the lowest tercile of cities in terms of social capital. Column 5 shows results for workers in cities with at least 50 percent of the population covered by pro-immigrant ordinances. The coefficient for city level diversity is positive and significant, and very large. The workplace diversity measure is positive and significant, and almost identical as that found for workers in cities featuring high levels of social capital. These results are thereby broadly consistent with those found using the social capital indicator. Spillovers from workplace diversity are larger in cities that have enacted significant pro-immigrant ordinances than those with anti-immigrant laws. City level effects are also differentiated, but more strongly than for the measure of social capital: in anti-immigrant cities, we find no evidence of overall diversity spillovers, whereas the average worker in pro-immigrant ordinance cities receive a large reward from rising diversity. Together, operationalizing institutions with measures of social capital and immigrant-focused ordinances, we find broad support for the hypothesis that inclusive institutions lower the cost of transacting across country of birth, and in so doing moderate the relationship between diversity

and productivity.

Next we unpack the relationship of interest by nativity. That is, we estimate how native- and foreign-born workers may be differently rewarded from the diversity in their midst on the basis of the institutions present in their local environment. It seems most plausible to expect variation of this kind for our ordinance measure: although pro- and especially anti-immigrant ordinances may reflect the attitudes of certain constituencies in the native-born population, there is little reason to expect that they extend to immigrants themselves. Though they may reside in a hostile environment, immigrants may not share this hostility to others, and may indeed face quite low barriers to cross-cultural interaction.¹² Table 6 explores this idea, estimating equation (1) in pro- and anti-immigrant ordinance cities separately for native and foreign-born workers. The first and second columns of results present estimates for cities with strong coverage from anti-immigrant ordinances. Foreign-born workers in these anti-immigrant locales still receive considerable wage benefits from rising immigrant diversity in their midst. Interestingly, we detect no significant relationship between diversity and wages for natives in these cities. Workplace diversity benefits also vary by nativity. In this case, natives still receive benefits from rising workplace immigrant diversity, though they are smaller than those enjoyed by their foreign-born co-workers.

The rightmost columns of Table 6 estimate the relationship of interest for immigrants and natives residing in cities with pro-immigrant ordinances. The coefficient on birthplace diversity for foreign-born workers in these cities is large, positive and significant at a one percent level. For natives in these cities it is also positive, significant, and large, though smaller than for immigrants. The coefficients on the measure of workplace immigrant diversity are also positive and significant, and larger for foreign-born than for natives. As well as comparing within city-types, it is interesting to consider how natives and foreigners fare with respect to diversity depending on where they live. Though foreigners in general may face lower costs

¹²Indeed, one might assume that the act of migration itself indicates a certain openness to difference

Table 6: Fixed Effects Estimates of Relationship between Immigrant Diversity and Log Annual Wages by Immigrant Ordinances and Nativity

	Anti-Immigrant		Pro-Immigrant	
	Foreign (1)	Native (2)	Foreign (3)	Native (4)
City-Level Measures				
Birthplace Fractionalization	0.880*** (0.143)	-0.101 (0.103)	1.701*** (0.169)	1.189*** (0.133)
College Share	-0.516*** (0.116)	-0.216*** (0.062)	0.101 (0.169)	0.065 (0.094)
Employment	0.000** (0.000)	0.000*** (0.000)	-0.000*** (0.000)	-0.000* (0.000)
Establishment-Level Measures				
Birthplace Fractionalization	0.087*** (0.009)	0.053*** (0.008)	0.115*** (0.018)	0.078*** (0.014)
Employment	0.000 (0.000)	0.000 (0.000)	0.000*** (0.000)	0.000*** (0.000)
Observations (millions)	8.65	32.39	3.98	18.69
Individuals (millions)	1.70	6.49	0.81	3.64

Note: Standard errors in parentheses, corrected for clustering by establishment. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Estimated equation is (1). Year effects included in each model. Overall observation counts are rounded to the nearest 10,000 to ensure confidentiality.

to transacting across culture, they receive considerably higher rewards from rising diversity in cities that feature pro-immigrant ordinances. We take this as further confirmation that institutions shape diversity's productivity impacts.

5.1 Robustness Checks

Although our estimation approach accounts for a breadth of static unobserved factors, as well as systemwide dynamics like business cycles, estimates of equation (1) remain vulnerable to shocks to individuals, workplaces and cities that affect wages. To the extent that such idiosyncratic shocks are correlated with shifts in diversity, we may be attributing to diversity an effect that resides instead with these factors. For instance, workplaces that experience a rise in diversity may simultaneously invest in machinery that makes workers more productive. Without indicators to capture such investments, our estimates of the role of diversity in generating spillovers may

be biased. The use of instrumental variables is no panacea, though with plausibly exogenous and sufficiently strong instruments, it may help raise confidence that the relationship between diversity and wages is or is not causal. With this in mind, we generate Generalized Method of Moments fixed effects (GMM FE) estimates of the relationship of interest for workers in the lowest and highest terciles of social capital. Results are presented in the first two columns of Table 7. These results are produced using ‘internal’ rather than external instruments, a decision which is motivated by the absence of suitable variables, particularly at the establishment scale.¹³ We tested the exclusion restriction on a broad range of lags before finding a combination of lags that did not emerge as significant predictors of the outcomes of interest, but which also permitted overidentification. We ultimately settled on three and four year lags for city diversity, and a two year lag for establishment diversity. The Kleibergen-Paap F -statistic, appropriate given no assumption of i.i.d. errors, shows these instruments not to be weak, while results from the Hansen- J test indicate joint exogeneity.

As before, our primary interest is in the contrast between the coefficients on metropolitan immigrant diversity on the basis of the strength of local social capital. For those workers in the top tercile of social capital (column 1), the coefficient on metropolitan immigrant diversity is very large, positive and significant at a 1 percent level. In column 2, we report that urban immigrant diversity is unrelated to wages across the sample of workers in the lowest tercile of local social capital. These results broadly conform to the uninstrumented results, in terms of showing strong differentiation in the benefits from diversity in favor of cities that feature inclusive institutions. However they differ in indicating no benefits for workers in cities with the weakest social capital. Surprisingly, the relationship between workplace diversity and wages differs in the GMM estimates. In low social capital cities, rising

¹³We experimented with several external instruments for city immigrant diversity, including a longitudinal version of the shift-share ‘predicted diversity’ instrument that is widely used in studies of immigration and immigrant diversity (see, for instance, Card, 2001; Ottaviano and Peri, 2006; Kemeny, 2012), as well as an annual measure capturing the presence of refugees in metropolitan areas, using information drawn from The Department of State’s Refugee Processing Center. Neither of these instruments passed tests of instrument under- and overidentification.

Table 7: Robustness Checks: GMM FE IV and Social Capital by Nativity

	GMM FE IV				Low Social Capital		High Social Capital	
	High Social Capital (1)	Low Social Capital (2)	Foreign-Born (3)	Native-Born (4)	Foreign-Born (5)	Native-Born (6)		
City-Level Measures								
Birthplace Fractionalization	0.001 (0.122)	1.979** (0.896)	0.259*** (0.085)	0.080 (0.072)	1.407*** (0.314)	0.901*** (0.294)		
College Share	-0.165** (0.067)	0.258 (0.190)	-0.366*** (0.095)	-0.513*** (0.064)	-0.234 (0.177)	0.139 (0.100)		
Employment	0.000* (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000*** (0.000)	0.000 (0.000)	0.000*** (0.000)		
Establishment-Level Measures								
Birthplace Fractionalization	0.092*** (0.031)	-0.634 (0.396)	0.070*** (0.007)	0.040*** (0.006)	0.101*** (0.024)	0.082*** (0.025)		
Employment	0.000* (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000** (0.000)	0.000* (0.000)		
Observations (millions)	22.27	8.42	14.4	59.26	3.68	26.02		
Individuals (millions)	4.66	1.56	3.03	12.25	0.73	4.76		
Kleibergen-Paap first-stage F	1732	76						
Hansen J	2.18	0.001						
Hansen J p -value	0.14	0.98						

Note: Standard errors in parentheses, corrected for clustering by establishment. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Estimated equation is (1). Year effects included in each model. Overall observation counts are rounded to the nearest 10,000 to ensure confidentiality.

workplace diversity is positive and significantly associated with wages, whereas it is insignificant in high social capital cities. We are cautious in our interpretation of these findings, in that we recognize that our internal instruments, though they satisfy basic assumptions, are less plausibly sources of exogenous variation. Moreover, the use of lags entail considerable loss of observations. Nonetheless, we take their support for a city diversity effect, and for variation by institutions, to offer additional support for our main hypothesis of interest.

As a further robustness check, we explore whether our nativity-specific results shown in Table 6 also extend to our measure of social capital. Columns 3 and 4 present estimates for foreign- and native-born, respectively, in cities in the lowest tercile of social capital. Mirroring the pattern shown for the ordinance measures, foreign-born workers continue to receive wage benefits from urban diversity in cities with low social capital, whereas for natives there is no significant association between rising metropolitan birthplace diversity and wages. In cities with high levels of social capital (columns 5 and 6), both native and foreign-born workers enjoy considerably large urban diversity spillovers, significant at a one percent level. Though, consistent with earlier findings and the supposition that immigrants face lower cross-national transaction costs, benefits for the same increment of diversity are larger for foreign born workers than for natives. Workplace diversity also appears to be mediated by social capital, with both natives and immigrants enjoying greater benefits from rising establishment diversity in cities that feature high levels of social capital as opposed to cities in the lowest tercile of social capital. And again, consistent with results above, workplace diversity effects are larger for foreign-born workers than for natives.

6 Conclusion

This paper starts from the premise that the presence of birthplace-induced heterogeneity in cities offers potential benefits, in the form of productivity-augmenting spillovers. Seeking to understand why those benefits may vary, and why in some

cases diversity may reduce rather than enhance productivity, it considers that any such benefits flow from interpersonal interactions, and that such transactions can vary in cost. Since institutions are recognized as the primary mechanism regulating these costs, we hypothesize that where institutions are inclusive, they ought to reduce the costs of interacting across birthplaces, and thereby raise productivity most strongly.

To test this hypothesis, we combine longitudinal matched employer-employee data for the U.S. with two measures of the inclusiveness of institutions in U.S. metropolitan areas: one that captures local bonding and bridging forms of social capital, and an indicator that describes pro- and anti-immigrant ordinances enacted by local governments. We adopt an econometric approach that offers a few key benefits. First, it accounts for a wide variety of potential selectivity issues, controlling for stationary unobserved heterogeneity among individuals, work establishments and cities. Second, it accounts not just for the role of diversity at the urban scale, but also at the scale of workplaces. Third, it is longitudinal, permitting observation of how diversity and wages co-move.

Our results confirm our initial hypothesis. The wages of workers who live in cities marked by strong social capital or regulated by pro-immigrant ordinances respond much more strongly to changes in immigrant diversity in their urban context. The average worker inhabiting a city in the lowest tercile of social capital receives a 2.4 percent increase in wages in response to a one standard deviation increase in metropolitan immigrant diversity. The average worker in a city in the highest tercile of social capital enjoys a 21 percent wage increase in response to a similar increase in diversity. Using our ordinance measure to indicate inclusive institutions, we detect no significant association between urban immigrant diversity and wages for the average worker in a city with strong coverage from local anti-immigrant ordinances. By contrast, their counterpart in a metropolitan area that has enacted pro-immigrant laws receives a 36 percent wage increase.

To put these numbers in context, consider both that such changes in diversity

do not happen overnight, and that they depend on initial conditions. Smaller, more homogeneous cities can increase their measured diversity with more modest influxes of immigrants than large metro areas. For instance, using public-use data from IPUMS (Ruggles et al., 2010), we observe that Jacksonville, North Carolina, a city with roughly 70,000 residents, experienced a 0.13 increase in diversity (equivalent to one standard deviation in the LEHD data) between 1990 and 2011, while it added nearly 30,000 people, and while the share of its workers born abroad grew from 3.8 percent to almost 6.9 percent, and the number of countries of origin represented increased from 25 to 66. Diversity in Miami also increased by a standard deviation, while its population grew by more than two million, and the foreign-born share of its workforce increased from 39.2 percent to 46.3 percent, while the number of countries of origin represented among immigrants increased from 130 to 149. Some metropolitan areas, such as Durham-Chapel Hill, increased their diversity by roughly two standard deviations between 1990 and 2011. The average growth in diversity between 1990 and 2011 among the 285 cities in our IPUMS sample was approximately half of one standard deviation.¹⁴ Hence, although there is considerable variation across cities, growing diversity represents not only a statistically significant contributor to wages, but especially in cities with inclusive institutions, it is a substantively important driver of rising wages over our study period.

We also find evidence to suggest that natives and immigrants experience the moderating role of institutions differently. Broadly, foreign-born workers are more highly rewarded from rising diversity, confirming our hypothesis that they are more open to interacting with those from different backgrounds. Interestingly, and somewhat ironically, it appears that the workers who are most hurt from anti-immigrant ordinances belong to the very category of workers who are most likely to have supported them: natives. We find no evidence of an association between diversity and productivity for natives in cities with weakly inclusive institutions. Immigrants enjoy

¹⁴Confidentiality concerns require us to use public data here, as we cannot disclose information at a level of geography below three combined states. However, calculations of diversity indices using IPUMS are broadly comparable to those produced using LEHD.

spillovers from immigrant diversity in cities of all kinds, but the rewards are considerably stronger in cities that have higher levels of social capital or pro-immigrant ordinances.

Our findings show that institutions – those “humanly devised constraints that structure political, economic and social interaction” (North, 1991) – do indeed play an important role in shaping the conditions in which diversity acts as a local productivity-enhancing public good. In a broader context in which American cities are becoming increasingly immigrant-diverse, the present paper suggests that policymakers have an incentive to find ways to lower the costs that workers born in different countries face in interacting with one another. Indeed, in cities that feature strongly inclusive institutions, growing immigrant diversity offers concrete benefits to both natives and immigrants alike.

References

- Acemoglu, D. and Angrist, J. (2001). How large are human-capital externalities? evidence from compulsory-schooling laws. In *NBER Macroeconomics Annual 2000, Volume 15*, pages 9–74. MIT Press.
- Acemoglu, D. and Robinson, J. (2012). *Why Nations Fail: Origins of Power, Poverty and Prosperity*. Crown Publishers (Random House).
- Aiken, M. and Hage, J. (1971). The organic organization and innovation. *Sociology*, 5(1):63–82.
- Alesina, A., Baqir, R., and Easterly, W. (1999). Public Goods and Ethnic Divisions. *Quarterly Journal of Economics*, 114(4):1243–1284.
- Alesina, A. and Drazen, A. (1991). Why are stabilizations delayed? *The American Economic Review*, 81(5):1170–1188.
- Alesina, A., Harnoss, J., and Rapoport, H. (2013). Birthplace diversity and economic prosperity. Technical report, National Bureau of Economic Research.
- Alesina, A. and La Ferrara, E. (2005). Ethnic diversity and economic performance. *Journal of Economic Literature*, 43(3):762–800.
- Bakens, J., Mulder, P., and Nijkamp, P. (2013). Economic impacts of cultural diversity in the Netherlands: Productivity, utility and sorting. *Journal of Regional Science*, 53(1):8–36.
- Bellini, E., Ottaviano, G., Pinelli, D., and Prarolo, G. (2013). Cultural diversity and economic performance: Evidence from European regions. In Crescenzi, R. and Percoco, M., editors, *Geography, institutions and regional economic performance*, pages 121–142. Springer-Verlag.
- Byrne, D. E. (1971). *The attraction paradigm*. Academic Press.
- Card, D. (2001). Immigrant inflows, native outflows, and the local labor market impacts of higher immigration. *Journal of Labor Economics*, 19(1):22–64.
- Clearwater, S., Huberman, B., and Hogg, T. (1991). Cooperative solution of constraint satisfaction problems. *Science*, 254(5035):1181–1183.
- Collier, P. (2000). Ethnicity, politics and economic performance. *Economics & Politics*, 12(3):225–245.
- Combes, P., Duranton, G., and Gobillon, L. (2008). Spatial wage disparities: Sorting matters! *Journal of Urban Economics*, 63(2):723–742.
- Combes, P., Duranton, G., and Overman, H. (2005). Agglomeration and the adjustment of the spatial economy. *Papers in Regional Science*, 84(3):311–349.
- Easterly, W. and Levine, R. (1997). Africa’s growth tragedy: Policies and ethnic divisions. *Quarterly Journal of Economics*, 112(4):1203–1250.

- Easterly, W. and Levine, R. (2001). What have we learned from a decade of empirical research on growth? it's not factor accumulation: Stylized facts and growth models. *The World Bank Economic Review*, 15(2):177–219.
- Gibbons, S., Silva, O., and Weinhardt, F. (2013). Everybody needs good neighbours? evidence from students' outcomes in England. *The Economic Journal*, 123(571):831–874.
- Goldin, C. and Katz, L. (1999). Human capital and social capital: The rise of secondary schooling in America, 1910-1940. *Journal of Interdisciplinary History*, 29(4):683–723.
- Harrison, D. A. and Klein, K. J. (2007). What's the difference? diversity constructs as separation, variety, or disparity in organizations. *Academy of Management Review*, 32(4):1199–1228.
- Herring, C. (2009). Does diversity pay?: Race, gender, and the business case for diversity. *American Sociological Review*, 74(2):208.
- Hoffman, L. and Maier, N. (1961). Quality and acceptance of problem solutions by members of homogeneous and heterogeneous groups. *Journal of Abnormal and Social Psychology*, 62(2):401–407.
- Hong, L. and Page, S. (2001). Problem solving by heterogeneous agents. *Journal of Economic Theory*, 97(1):123–163.
- Hong, L. and Page, S. (2004). Groups of diverse problem solvers can outperform groups of high-ability problem solvers. *Proceedings of the National Academy of Sciences of the United States of America*, 101(46):16385–16389.
- Horwitz, S. K. and Horwitz, I. B. (2007). The effects of team diversity on team outcomes: A meta-analytic review of team demography. *Journal of Management*, 33(6):987–1015.
- Hülshager, U. R., Anderson, N., and Salgado, J. F. (2009). Team-level predictors of innovation at work: a comprehensive meta-analysis spanning three decades of research. *Journal of Applied Psychology*, 94(5):1128.
- Joshi, A. and Roh, H. (2009). The role of context in work team diversity research: A meta-analytic review. *Academy of Management Journal*, 52(3):599–627.
- Kemeny, T. (2012). Cultural diversity, institutions, and urban economic performance. *Environment and Planning A*, 44(9):2134–2152.
- Kemeny, T. (2014). Immigrant diversity and economic performance in cities. *International Regional Science Review*, doi: 10.1177/0160017614541695.
- Kemeny, T. and Cooke, A. (2015). Spillovers from immigrant diversity in cities. Working Papers 15-37, Center for Economic Studies, U.S. Census Bureau.
- Kemeny, T. and Storper, M. (2012). The sources of urban development: Wages, housing and amenity gaps across american cities. *Journal of Regional Science*, 52(1):85–108.

- Knack, S. and Keefer, P. (1997). Does Social Capital Have An Economic Payoff? A Cross-Country Investigation. *Quarterly Journal of Economics*, 112(4):1251–1288.
- Lee, N. (2014). Migrant and ethnic diversity, cities and innovation: Firm effects or city effects? *Journal of Economic Geography*.
- Lewis, E. and Peri, G. (2014). Immigration and the economy of cities and regions. National Bureau of Economic Research Working Paper 20428.
- Longhi, S. (2013). Impact of cultural diversity on wages, evidence from panel data. *Regional Science and Urban Economics*, 43(5):797–807.
- Malecki, E. J. (2012). Regional social capital: why it matters. *Regional Studies*, 46(8):1023–1039.
- McKinney, K. and Vilhuber, L. (2011). LEHD data documentation LEHD-OVERVIEW-S2008-rev1. U.S. Census Bureau Center for Economic Studies Working Paper 11-43.
- Montalvo, J. G. and Reynal-Querol, M. (2005). Ethnic diversity and economic development. *Journal of Development Economics*, 76(2):293 – 323.
- Moretti, E. (2004a). Estimating the social return to higher education: evidence from longitudinal and repeated cross-sectional data. *Journal of Econometrics*, 121(1-2):175–212.
- Moretti, E. (2004b). Human capital externalities in cities. *Handbook of regional and urban economics*, 4:2243–2291.
- Morgan, K. (2007). The learning region: institutions, innovation and regional renewal. *Regional studies*, 41(S1):S147–S159.
- Nathan, M. (2011). The long term impacts of migration in British cities: Diversity, wages, employment and prices. LSE Spatial Economics Research Centre (SERC) Discussion Paper 67.
- Nathan, M. (2014). The wider economic impacts of high-skilled migrants: a survey of the literature for receiving countries. *IZA Journal of Migration*, 3(1):4.
- Nathan, M. (2015). Ethnic diversity and business performance and location: Which firms? which cities? Mimeo.
- Nisbett, R., Ross, L., et al. (1980). *Human inference: Strategies and shortcomings of social judgment*. Prentice-Hall Englewood Cliffs, NJ.
- North, D. C. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge University Press.
- North, D. C. (1991). Institutions. *The Journal of Economic Perspectives*, 5(1):97–112.
- Oldenburg, R. (1989). *The Great Good Place: Café, Coffee Shops, Community Centers, Beauty Parlors, General Stores, Bars, Hangouts, and How They Get You through the Day*. Paragon House Publishers.

- Ottaviano, G. and Peri, G. (2006). The economic value of cultural diversity: Evidence from US cities. *Journal of Economic Geography*, 6(1):9.
- Pennant, R. (2005). Diversity, trust and community participation in England. Technical report, Home Office Research Development and Statistics Directorate Paper.
- Poterba, J. (1997). Demographic structure and the political economy of public education. *Journal of Policy Analysis and Management*, 16(1):48–66.
- Putnam, R. (2000). *Bowling alone: The collapse and revival of American community*. Simon and Schuster.
- Rahn, W. and Transue, J. (1998). Social trust and value change: The decline of social capital in American youth, 1976–1995. *Political Psychology*, 19(3):545–565.
- Roback, J. (1982). Wages, rents, and the quality of life. *The Journal of Political Economy*, 90(6).
- Robinson, J. (2013). Why regions fail: The Mexican case. Mimeo.
- Rodriguez, C. M. (2008). The significance of the local in immigration regulation. *Michigan Law Review*, pages 567–642.
- Rodríguez-Pose, A. (1999). Innovation prone and innovation averse societies: Economic performance in europe. *Growth and change*, 30(1):75–105.
- Rodrik, D. (1999). Where did all the growth go? External shocks, social conflict, and growth collapses. *Journal of Economic Growth*, 4(4):385–412.
- Rosen, S. (1979). Wage-based indexes of urban quality of life. *Current issues in urban economics*, 3.
- Ruggles, S., Alexander, J., Genadek, K., Goeken, R., Schroeder, M., and M., S. (2010). Integrated public use microdata series: Version 5.0. Technical report, Minneapolis, MN: Minnesota Population Center.
- Rupasingha, A. and Goetz, S. (2008). US County-Level Social Capital Data, 1990–2005. The Northeast Regional Center for Rural Development.
- Sparber, C. (2010). Racial diversity and aggregate productivity in US industries: 1980–2000. *Southern Economic Journal*, 75(3):829.
- Stolle, D. and Hooghe, M. (2005). Inaccurate, exceptional, one-sided or irrelevant? The debate about the alleged decline of social capital and civic engagement in Western societies. *British Journal of Political Science*, 35(01):149–167.
- Storper, M. (1995). The resurgence of regional economies, ten years later the region as a nexus of untraded interdependencies. *European urban and regional studies*, 2(3):191–221.
- Storper, M., Kemeny, T., Makarem, N., and Osman, T. (2015). *The Rise and Fall of Urban Economies: Lessons from San Francisco and Los Angeles*. Stanford University Press.

- Storper, M. and Scott, A. (2009). Rethinking human capital, creativity and urban growth. *Journal of Economic Geography*, 9(2):147.
- Suedekum, J., Wolf, K., and Blien, U. (2014). Cultural diversity and local labour markets. *Regional Studies*, 48(1):173–191.
- Taylor, C. and Hudson, M. (1972). *World Handbook of Political and Social Indicators*. Yale University Press.
- Thomas, D. and Ely, R. (1996). Making differences matter. *Harvard Business Review*, 74(5):79–90.
- Trax, M., Brunow, S., and Suedekum, J. (2015). Cultural diversity and plant-level productivity. *Regional Science and Urban Economics*, 53:85–96.
- Varsanyi, M. W. (2008). Immigration policing through the backdoor: City ordinances, the” right to the city,” and the exclusion of undocumented day laborers. *Urban Geography*, 29(1):29–52.
- Vertovec, S. (2007). Super-diversity and its implications. *Ethnic and racial studies*, 30(6):1024–1054.
- Walker, K. E. and Leitner, H. (2011). The variegated landscape of local immigration policies in the united states. *Urban geography*, 32(2):156–178.
- Woolcock, M. and Narayan, D. (2000). Social capital: Implications for development theory, research, and policy. *The world bank research observer*, 15(2):225–249.