

The Economic Geography of Immigrant Diversity: Disparate Impacts and New Directions

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Abstract

Increasing immigrant diversity, both in the number of immigrants and the diversity of sending countries, is helping reshape the economic landscape in many countries, most notably in their urban regions. This paper provides a succinct introduction to the existing research on the economic effects, particularly productivity, of immigrant diversity, focusing on a recent wave of empirical work. It identifies outstanding questions in the research, offering several ways to push current lines of inquiry ahead and suggesting areas as yet underexplored. To motivate these new directions for geographers to pursue, it presents empirical results that raise more questions than they answer. In doing so, it sets the stage for future work that can generate a deeper understanding of the role of immigrant diversity in shaping economic welfare in cities.

Keywords: immigrants, diversity, productivity, spillovers, cities

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1 Introduction

Standing by the Statue of Liberty in 1965, U.S. President Johnson signed the *Immigration and Nationality Act*, also known as the Hart-Celler Act. In his remarks, Johnson insisted that “this bill that we will sign today is not a revolutionary bill. It does not affect the lives of millions. It will not reshape the structure of our daily lives, or really add importantly to either our wealth or our power.”¹ Despite Johnson’s words, the bill has come to be understood as a watershed in the structure of U.S. immigration. By abolishing a system of national quotas that privileged Northern and Western European immigrants, Hart-Celler enabled individuals from a much wider range of source countries to emigrate to the United States. To wit, in 1960, 75 percent of all foreign born persons in the U.S. originated from a European country, whereas today Europeans make up only 12 percent of that population, and immigrants are more representatively drawn from all world regions.² This great upswell in diversity is experienced most strongly in major metropolises like New York, Los Angeles, Miami and San Francisco, where the proportion of foreign born workers is as much as seven times the non-metropolitan average. Cities, in short, are where immigration and the resulting birthplace diversity are manifest (Wilson and Svajlenka, 2014). Thus, despite Johnson’s disavowal, Hart-Celler certainly did transform the lives of millions.

This article reviews evidence on how this dramatic growth in immigrant diversity might affect economic performance. Specifically, it examines recent efforts by geographers and economists to understand how workers and firms may perform differently, and perhaps better, when the cities in which they are embedded are composed of individuals from diverse backgrounds in terms of birthplace, ethnicity, or culture. Because diversity of this kind has increased not only in the United States, but in many high-wage economies, this article considers evidence from across the globe.

In the U.S., suggestive evidence of this link can be found in the positive correlation between metropolitan areas’ average wage level and their degree of immigrant diversity,

¹“President Lyndon B. Johnson’s Remarks at the Signing of the Immigration Bill at Liberty Island, New York, October 3, 1965.” Text available from the Lyndon Baines Johnson Presidential Library website: <http://www.lbjlibrary.org/lyndon-baines-johnson/timeline/lbj-on-immigration>. Accessed August 28, 2015.

²Figures for 1960 are authors’ calculations based on Gibson and Jung (2006), Table 4. Estimates for the latter period are authors’ estimates based on the American Community Survey 2009-2013 5-Year Estimates (Ruggles et al., 2010).

based on country of birth. As Figure 1 makes clear, high-wage cities are also highly diverse, a pattern also documented in a variety of other rich countries. Of course, a simple bivariate association could reflect many underlying relationships, but researchers have found it remains after accounting for a wide range of other drivers of worker productivity. This body of work finds evidence suggesting that immigrant diversity generates tangible economic benefits in cities.

Figure 1: U.S. Metropolitan Wages and Birthplace Fractionalization, 2011



Note: Data come from a 2011 1% public-use sample of the American Community Survey (Ruggles et al., 2010). Points on the scatter plot reflect actual metropolitan CBSA values for the log of wages and diversity measured using a fractionalization index; the solid line reflects the least squares fitted regression line. Fitted equation: $\text{Log}(\text{city average of annual wage and salary income}) = 10.43 + 0.569(\text{Birthplace Fractionalization})$; $R^2=0.22$

While reviews by Kemeny (2014), Nathan (2014) and Nijkamp et al. (2015) provide in-depth introductions to existing theory and empirical work, this is a fast-moving area of study. An array of recent empirical work has emerged that answers some questions raised in these reviews, but also directs attention to new issues. This paper responds to these developments, aiming to make two specific contributions. First, it provides a succinct, geography-focused introduction to this topic, designed to give readers a grasp of the key ideas. Second, by complementing a review of the latest findings with novel results of

our own, it offers a forward-looking research agenda. This agenda is organized around the identification of important gaps within the current quantitatively-focused approach. But it also reframes existing analyses and ask different questions in order to highlight possibilities further afield from the status quo. Our aim is to set the stage for further work to enrich our understanding of immigrant diversity in the economic welfare of regional economies.

2 Immigrant Diversity and Economic Outcomes: What We Know So Far

2.1 Core Theory and Approaches

The main theory linking diversity and economic well-being comes from efforts to understand how heterogeneous teams may perform differently from homogeneous ones, a subject taken up in fields such as psychology, organizational studies, artificial intelligence, and economics. Theorists consider that diversity might generate both costs and benefits. Benefits flow from the idea that people from varied backgrounds bring with them different heuristics and perspectives, and that interactions among them permit a wider mapping of potential solutions to difficult problems (Aiken and Hage, 1971; Hong and Page, 2001). Populations composed of diverse workers ought to be more productive and innovative. Less optimistically, psychology’s ‘social identity theory’ predicts that diversity among team members encourages the development of subgroups based on identity (Tajfel, 1974). This ought to raise the costs of cooperation across sub-groups, spur rent-seeking behavior, and reduce productivity (Byrne, 1971; Bandiera et al., 2005).

Benefits and costs derived from diversity might not be confined to teams or organizations. Economic geographers consider that they may also operate at the metropolitan scale, an argument rooted in the broad contention that localized extra-firm interactions play a central role in the economy (e.g. Scott, 1988; Saxenian, 1996; Storper et al., 2015). By this logic, interactions among an urban population composed of individuals born in different places could produce spillovers that are, on balance, either negative, rooted in higher local transaction costs, or positive as a consequence of improved problem solving and innovation.

While the preceding discussion considers diversity’s influence on production, it can also shift possibilities for consumption. Diversity can make individuals better off as they enjoy access to a wider range of consumer choices, such as restaurants that serve cuisine from different cultures (Glaeser et al., 2001; Florida, 2002). Or, if individuals derive comfort from greater homogeneity, they may find diversity reduces their quality of life. To the extent that individuals value diversity, they may be willing to trade some portion of their nominal earnings for access either to greater consumption choices or greater homogeneity.

Motivated by the idea that diversity can act upon production and consumption, researchers have commonly employed a ‘spatial equilibrium’ approach (Glaeser and Gottlieb, 2009), interpreting models that predict the association between diversity and wages, and separately diversity and rents. Following this approach, positive relationships between local diversity and both wages and rents ought to signal that diversity acts to augment productivity. Meanwhile, Acemoglu and Angrist (2001) argue that information on nominal wages alone ought to be sufficient. Observing that producers of tradable goods face national, not local markets, they assert that rising average wages in economies containing businesses engaged in tradable activities must indicate actual increases in productivity; if wage growth did not reflect productivity, such producers would be forced to relocate to more affordable places to remain competitive.

Ottaviano and Peri (2006) is the seminal empirical paper in a spatial equilibrium approach. Using Decennial Census data for 1970 and 1990, they find a robust, significant, and positive relationship between diversity and both wages and rents. A proliferation of studies followed, examining the links between immigrant diversity and productivity in other countries and other time periods, and also considering effects on innovation, entrepreneurship, and international activity.³ The majority of studies at the regional scale find a positive and statistically significant relationship between diversity and productivity.

2.2 New Developments

Given differences in immigration policies, political economies, and the composition of migrants, repetition across countries is itself useful. However, follow-on studies have not

³Examples of such studies include Bellini et al. (2013) and Lee (2015). It is beyond the scope of this paper to catalog this literature exhaustively, but interested readers are directed to the review articles cited in the previous section.

simply replicated the seminal work. They have also sought to address several challenges inherent in the original approach. We briefly discuss the most important of these issues below.

One challenge in accurately gauging the contribution of diversity to economic well-being is nonrandom worker selection, or sorting. It may be that higher quality workers sort into cities with higher diversity from uneven immigrant arrival patterns. If unaccounted for, such selection dynamics could lead researchers to wrongly ascribe an effect from diversity that is instead the manifestation of a geography of higher ability. Recent studies make use of longitudinal data to account for stationary but unobserved features of individuals, including their ability (e.g., Bakens et al., 2013; Longhi, 2013; Kemeny and Cooke, 2017a; Elias and Paradies, 2016). In the U.S. context, accounting for heterogeneity among individuals, workplaces, and cities appears to reduce the ‘effect’ of diversity described in Ottaviano and Peri (2006) by roughly half. Still, the relationship remains substantively and statistically significant, with Kemeny and Cooke (2017a) finding that a one standard deviation increase in urban immigrant diversity is associated with a six percent increase in the wages of the average worker.

The ability to observe changes over time also aids in identifying the relationship of interest, in that changes in diversity should precede changes in the productivity. Findings studies leveraging the time dimension are mixed, with little association detected in the Netherlands, the UK, or Australia (Bakens et al., 2013; Longhi, 2013; Elias and Paradies, 2016), but positive and both substantively and statistically significant links between diversity and productivity in Germany and the U.S. (Trax et al., 2015; Kemeny and Cooke, 2017a).

Responding to the indeterminacy of the scale at which diversity may operate in the economy, researchers have also recently bridged the gap between regional and workplace-focused studies. Trax et al. (2015) and Kemeny and Cooke (2017a) observe benefits from diversity at both scales. Somewhat surprisingly, in both studies the association between diversity and productivity is strongest at the metropolitan scale.⁴

Studies have also clarified whether diversity disparately affects workers with different

⁴See also closely related work on the multiscale relationship of diversity to innovation, with more mixed results (Østergaard and Timmermans, 2015; Brunow and Stockinger, 2015; Nathan, 2016).

education, skills, industry characteristics, and positions in the wage distribution (Nathan, 2011; Suedekum et al., 2014; Brunow and Nijkamp, 2016; Cooke and Kemeny, 2017; Kemeny and Cooke, 2017a).⁵ There is also work on the moderating role of social context and institutions in facilitating benefits from diversity (Kemeny, 2012; Kemeny and Cooke, 2017b). Finally, scholars are exploring different definitions and measures of diversity (Nijkamp and Poot, 2015).

2.3 Filling Gaps

This section highlights gaps in our understanding of the relationship of interest, while staying within the existing methodological traditions of this body of research. We identify several areas where knowledge could be improved, focusing on issues of causality, axes of differentiation, the role of assimilation, the speed of learning across difference, and alternative mechanisms.

Across all existing studies, the largest lingering question is whether the relationships observed are causal, with immigrant diversity independently generating higher wages and productivity. Scholars have approached this issue in several ways. First, researchers have accounted for an ever-widening range of confounding factors. Adding controls is not sufficient for causal identification, but it helps account for important alternative explanations. Second, most papers use instrumental variables techniques to help address threats to internal validity such as reverse causation and omitted variables, often using a shift-share measure in the style of Card (2001). In a wide range of studies, this approach yields support for a causal narrative flowing from diversity to wages. Third, studies explore lagged measures of diversity, positing that in a true causal relationship, changes in diversity should precede wage adjustments. These findings are decidedly mixed (c.f. Longhi, 2013; Elias and Paradies, 2016; Kemeny and Cooke, 2017a), though, we note that there is a lack of clear theoretical guidance on what an appropriate lag might be (a point to which we return in the following section). Fourth, and more conceptually, recent papers move closer to theorized mechanisms, by exploring how diversity relates differently for workers

⁵There is important related work on the impacts of *high-skill* immigrants on productivity, wages, employment and innovation, see Kerr (2013) and Lewis and Peri (2014) for detailed reviews. Again, there is closely related work with innovation as the outcome of interest (Parrotta et al., 2014; Ozgen et al., 2014; Brunow and Stockinger, 2015; Ozgen et al., 2015; Solheim and Fitjar, 2016).

engaged in activities differentiated by their task or skill content. Results from these efforts support hypothesized mechanisms: rewards from diversity are strongest among workers engaged in complex problem solving (Cooke and Kemeny, 2017), with spillovers flowing disproportionately from high-skill and high-wage workers (Suedekum et al., 2014; Kemeny and Cooke, 2017a). Although none of these approaches generates truly definitive answers on causality, together they offer a wealth of supportive evidence for an independent influence of diversity on productivity. In principle, experimental evidence would be ideal in maximizing internal validity questions of this kind, though these are not likely to be available. One unexplored way forward are quasi-experiments – for instance, it is in some ways surprising that no known papers have exploited policy shocks like the Hart-Celler Act in this manner.

If there exists a truly independent effect of diversity on productivity, more work is needed to clarify the mechanisms through which it is generated. While most studies emphasize the ‘heuristic heterogeneity’ hypothesis, there remains the possibility that other mechanisms are at work, operating either as complements or substitutes. Nathan (2014) points to alternatives, including improved labor market matching and facilitating exports, international business, and serving diverse markets (Cox Jr, 2001). If people born in different countries embody skills that are relatively scarce in a host country, their entry into that country’s labor market might raise the quality with which people are matched to jobs. Immigrants’ international social networks represent another channel through which greater diversity could improve performance, either by reducing informal trade barriers (Rauch, 2001; Saxenian, 2006), or by connecting firms to foreign partners. Möhlmann and Bakens (2015) find supportive evidence, showing that diversity disproportionately helps exporting firms. Relatedly (though not directly measuring diversity), Solheim and Fitjar (2016) find that Norwegian firms with more foreign workers are more likely to innovate and engage in international partnerships. Still, more work is needed to disentangle potential mechanisms.

Beyond causal questions, despite progress on the scale (i.e. workplaces or regions) of spillovers, less has been done to understand the axes of differentiation that generate diversity. Country of birth or nationality are often used as the marker for each individual’s contribution to diversity. But a reliance on national origin runs the risk of either under-

or overestimating diversity. The use of birth country – often prompted largely by data availability – could miss important subnational regional differences (i.e. Vermonters versus Texans). Or, the choice of nations could miss regularities common within global regions (i.e. E.U or East Asia). Researchers have explored ideas like these by weighting countries on the basis of their geographical, genetic, cultural, or linguistic proximity (Trax et al., 2015; Alesina et al., 2016). Yet theory provides little guidance on which approaches might be most useful. And even if such procedures better capture heuristic differences, researchers face additional questions: Does greater distance contribute greater heuristic diversity? Or, is there a ‘goldilocks’ principle for ‘optimal’ diversity with disparate, but not too disparate, elements? At present these questions remain unanswered.

Additionally on this theme, it is not clear that one’s location of birth – whether town or region or country – is a major driver of regularities in individual heuristics. To what extent is there a Brazilian way of thinking? A large body of work in organizational sociology and cross-cultural psychology suggests that acculturation within a particular society is strongly associated with patterns of behavior in the workplace, heuristics, as well as organizational performance (Berry, 2002; Taras et al., 2010). And yet it stands to reason that a large number of other factors also matter. This does not negate nationally-focused studies, but it suggests the need for complementary work that explores other sources of heuristic heterogeneity. For decades, scholars of organizations have examined the role of gender, age, and educational diversity in work team performance, with little support emerging for a generalized effect (for reviews see Van Knippenberg and Schippers, 2007; Stahl et al., 2009; Dawson, 2012). But researchers might also consider approaches leveraging measures that get closer to heuristics themselves, perhaps in the manner of recent work on personality traits and innovation (Lee, 2017). Heuristics are often unobservable at scale, but to the extent that such latent concepts can be captured in ways that reduce measurement error (using structural equation modeling, for instance), researchers might more directly test the underlying mechanisms.

Gaps in our knowledge also exist around assimilation. If diversity augments productivity through interactions among people embodying different heuristics, does assimilation amplify these effects by easing communications difficulties that cultural differences may raise? Or when people assimilate, is their heuristic diversity diminished or eliminated,

thereby reducing the benefits of diversity? A variation on this question is: how long do the benefits of birthplace diversity last? Considering skill convergence between immigrants and natives, Borjas (1994b) suggests it could take several generations. Mohlmann and Bakens (2015) find that the impacts of ethnic diversity on the productivity of Dutch firms remain whether they measure diversity ‘strictly’ across first-generation immigrants, or ‘inclusively’ covering both first- and second generations. How might this vary for different immigrants across a variety of countries? For how many generations might ‘immigrants’ offer systematically different perspectives and heuristics?

3 Suggestive New Evidence

Having identified some gaps in existing work, we now present some original evidence on how the association between diversity and wages varies for individuals with different demographic features and living in different kinds of metropolitan areas. From a more empirical starting point, we aim to open new lines of inquiry for future work.

Recent studies mainly document the relationship of interest for the ‘average’ worker, or for individuals at particular points in the distribution of wages or skills, while initial studies focused on narrow subsets of the population – notably in Ottaviano and Peri (2006), native-born white men between age 40 and 50. There are sound empirical and theoretical concerns that drive these decisions: Understanding the overall net effect is important, even if it smooths out illuminating heterogeneity. And a focus on native-born workers offers potential political value: if they benefit (or are hurt) from increased immigrant diversity, that greatly undercuts (or supports) some of the loudest voices currently pushing for severe limitations on immigration in the U.S., Australia, and many European countries. However, this focus places native-born workers, and especially white men, at the center, framing diversity as something he experiences and is affected by. As we will show, there are other stories to tell.

Of particular interest to geographers, diversity may influence productivity differently depending on local context. Prior work offers some suggestive evidence. For instance, Bakens et al. (2013) find city size shapes the association between cultural diversity and wages in Dutch cities; Nathan (2016) finds diversity operates differently in London as compared

with other English cities; Alesina and La Ferrara (2005), Kemeny (2012), and Kemeny and Cooke (2017b) find that local institutional features moderate diversity impacts in the U.S. A better understanding of which aspects of urban heterogeneity matter could illuminate the fundamental workings of this relationship and perhaps point to clearer policy implications.

3.1 Data and Empirical Approach

For the sake of space, we present the barest overview of our data and empirical approach here. We refer readers interested in the details to the online appendix.

We use matched employer-employee data from the U.S. Census Bureau’s LEHD program, covering over 160 metropolitan areas between 1991 and 2008. Results are generated on a sample of approximately 33 million workers, each of whom remain in a single job for at least two years. We identify the impact of diversity by observing how workers’ wages change in response to changes in the diversity in their workplace and metropolitan area. All models include fixed effects that capture unobserved stationary features of each worker, their workplace and their city. Year effects are also included that capture the effects of broader national economic cycles and other ‘general’ but dynamic features. Control variables include city and establishment employment and the share of city workers with four or more years of college education. Standard errors are clustered at the workplace level.

3.2 Results - demographic groups

In this section we explore how the relationship between diversity and productivity in U.S. cities varies according to workers’ demographics. Each row of Table 1 presents summary results of the two main variables of interest – metropolitan and workplace immigrant diversity – for a particular group. Full results are available in the online appendix.

For comparison, we present two baseline estimates that typify much of the extant work linking diversity and wages. The first describes the association between diversity and the wages of the average worker across our sample of metropolitan areas (first row). Coefficients on birthplace diversity at both scales are positive and significantly related to wages, suggesting that greater immigrant diversity relates to growth in productivity in the underlying population. As to the magnitude, the average worker in a city whose immigrant

Table 1: Summary Results for the Relationship between Immigrant Diversity and Productivity by Demographic Characteristics

	City Diversity	Workplace Diversity	Observations (millions)	Individuals (millions)
Baseline Estimates				
Full Analytical Sample	0.375***	0.073***	166.54	33.55
White Male Natives	0.502***	0.079***	59.02	11.34
By Gender				
Women	0.266***	0.055***	76.86	15.68
Men	0.471***	0.084***	89.68	17.87
By Nativity				
Foreign-born	0.599***	0.090***	25.75	5.35
Native-Born	0.303***	0.065***	140.79	28.20
By Census Race/Ethnicity Category				
Non-Hispanic White	0.484***	0.067***	114.80	22.37
Black	0.083	0.018**	16.29	3.62
Asian & Pacific Islander	0.457***	0.120***	8.55	1.84
Hispanic	0.238***	0.087***	17.84	3.94
Native American	0.393***	0.063***	0.48	0.11

Note: Standard errors in parentheses, corrected for clustering by establishment. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Full set of control variables (E' = establishment employment size; C' = metro labor force size and college share of labor force), as well as individual-establishment-city and year effects included in each model. In every model in this table, the R^2 is greater than or equal to 0.95. Counts of observations and individuals are rounded to the nearest 10,000 to ensure confidentiality. Following Clogg et al. (1995), we test the metro area coefficients across groups for statistically significant differences ($p < 0.05$): men and women are significantly different; native and foreign born are significantly different; blacks are significantly different from all other ethnoracial groups; Hispanics are significantly different from non-Hispanic whites; other pairings of ethnoracial groups are not significantly different from each other. Full model results available in an online appendix.

diversity grew by an average amount over the study period would experience approximately a three percent increase in wages. Next, mimicking the target of labor economists' studies of immigration and the seminal contribution by Ottaviano and Peri (2006), we present estimates for white, native-born men. Metropolitan and workplace birthplace diversity are similarly positively and significantly related to these workers' wages, with a larger coefficient at the city scale as compared with that obtained from the entire analytical sample.

The next panel of the table explores differential impacts by gender. Across both men and women, diversity is positively and significantly associated with wages. However, at each scale, the size of the association is considerably larger for men than for women, indicating that men reap higher rewards from immigrant diversity in their workplaces and cities. To compare coefficients across subsamples, we calculate z -scores as described in

Clogg et al. (1995).⁶ This procedure suggests the difference in coefficients for men and women is statistically significant.

Next we consider variation by nativity. Native- and foreign-born workers are each rewarded by rising diversity at both scales. However, differences in the size of the coefficients suggest that immigrants receive greater benefits from both metropolitan and workplace diversity, a distinction that z -scores indicate is statistically significant.⁷

The last panel considers how diversity impacts vary by race and ethnicity.⁸ Urban immigrant diversity is positively and significantly related to wages for each group, except blacks. Z -scores indicate that differences across racial and ethnic groups are not statistically significant, with two exceptions: blacks and Hispanics. As the table indicates, blacks receive no detectable spillovers from immigrant diversity at the city scale. Hispanics do receive spillovers, but they are smaller than for other groups, excepting blacks.

Summarizing Table 1, city and workplace immigrant diversity are each positively and significantly associated with wages not just for the average worker, but for also for men and women; native- and foreign-born; and across a series of race/ethnicity categories. Black workers represent a notable exception to this pattern, in that we detect no diversity spillovers for them at the city scale, and only very weak ones in workplaces. A second observation is that, within a general finding of positive externalities from diversity, we detect variation in the magnitude of the relationship: larger for men than women; larger for foreign-born than native-born workers; and apparently weakest among Hispanics.

3.3 Results - metropolitan area groups

In this section we explore how impacts vary for individuals living in different kinds of cities. Specifically, Table 2 presents estimates for workers living in larger and smaller cities, and separately, across more and less diverse cities.⁹

⁶ $z = \frac{(\hat{\beta}_{m1} - \hat{\beta}_{m2})}{\sqrt{s_{m1}^2(\hat{\beta}_{m1}) + s_{m2}^2(\hat{\beta}_{m2})}}$, where s is the standard error for a given estimated coefficient $\hat{\beta}$ and m_n indicates the specific regression models being compared. The null hypothesis tested is that there are no differences between the coefficients in the pair of models, against an alternative that one coefficient is larger than another, indicating a one-tailed test.

⁷Note that this is the opposite from what Elias and Paradies (2016) find in the Australian context, where native-born Australians have a much larger positive coefficient than foreign-born workers.

⁸LEHD collapses Census race and Hispanic categories down to seven categories, excluded from our analysis are “unknown” and “other.”

⁹Diversity levels are split by terciles of metropolitan immigrant diversity in 2008. We use the last year of our data because states enter the LEHD data in different years, such that 2008 contains the fullest

Table 2: Summary Results for the Relationship between Immigrant Diversity and Productivity by City Size and Diversity Level

	City Diversity	Workplace Diversity	Observations (millions)	Individuals (millions)
By City Size				
Large Cities	0.466***	0.075***	113.78	22.85
Smaller Cities	0.044	0.047***	52.76	10.69
By Level of City Immigrant Diversity				
Least Diverse Cities	0.260***	0.018**	53.67	10.98
Moderately Diverse Cities	0.467***	0.057***	57.10	11.54
Most Diverse Cities	0.265***	0.074***	55.77	11.03

Note: Standard errors in parentheses, corrected for clustering by establishment. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Estimated equation is (1). Full set of control variables (E' = establishment employment size; C' = metro labor force size and college share of labor force), as well as individual-establishment-city and year effects included in each model. In every model in this table, the R^2 is greater than or equal to 0.95. Counts are rounded to the nearest 10,000 to ensure confidentiality. Cities in the ‘Large Cities’ category are those CBSAs that have labor forces over one million workers. Smaller Cities have labor forces less than one million. Least, Moderate and Most Diverse city categories generated by splitting diversity values into terciles. Following Clogg et al. (1995), we test the metro area coefficients across groups for statistically significant differences, finding a significant different between large and small cities, but not among the pairs of diversity level terciles ($p < 0.05$). Full model results available in an online appendix.

The first pair of estimates distinguish between workers living in cities with more or less than one million workers as of 1990. In large cities, changes in city and workplace diversity are both positively and significantly related to wages. Interestingly however, in smaller cities, we detect no significant relationship for urban diversity, and the coefficient on workplace diversity is considerably smaller than that estimated for workers in larger cities. This suggests the ‘general’ effects reported in Table 1 are largely driven by activities and interactions occurring in the largest metropolitan areas in the U.S. This is consistent with evidence found for other urban systems, such as for the Netherlands (Bakens et al., 2013) and England (Nathan, 2016).

The lower panel in Table 2 addresses whether the impacts of rising diversity are stronger for workers who live in already diverse contexts. Put another way, are the benefits from growing diversity linearly related to levels of immigrant diversity. Although the city-scale coefficients suggests an inverse U-shaped relationship, where diversity benefits are greatest in cities with intermediate levels of diversity, z -scores indicates these differences are not statistically significant, suggesting rising diversity may offer relatively comparable benefits across the diversity levels spectrum.

collection of cities. There is a high correlation between starting and end year diversity across cities.

4 New directions

We believe more work is needed to better understand the influence of immigrant diversity on regional economies. One avenue for future work is to push forward along the directions of current research, as discussed in section 2.3: investigating the relevant scales of diversity; the role of assimilation, half-life of cultural diversity, and other temporal dimensions of this relationship; and perhaps most importantly, rigorous testing of alternative mechanisms. But we also offer some new directions we find equally worthy of researchers' attention.

One new direction involves taking seriously the experiences of diversity by workers who are not native-born (white) males – a group less and less representative of the 'average' worker in rich nations today, if indeed it ever was. A question raised by the results in Table 1, is how these simplistic (and often static and problematic (Carter, 2009; Bonds, 2013)) demographic categories correlate with deeper underlying forces that shape how diversity operates. Race, ethnicity, gender, and nativity likely stand in for variation in terms of industry, occupation, task structure, compensation structures, and other factors, some of which have been subjected to empirical scrutiny in the existing literature, but not in systematic ways that allow us to account clearly for this variation. Black workers' seeming exclusion from the benefits of immigrant diversity suggests the importance of engaging with literatures on the racialized (and gendered) urban and economic systems in the U.S. (Massey and Denton, 1993; Parks, 2012; Bonds, 2013; Wright et al., 2014). Addressing these questions requires a new focus and additional theory.

Another new direction grows from the findings on urban heterogeneity presented in Table 2. Does city size merely stand in for the fact that certain kinds of activities – those most likely to benefit from diversity – are concentrated in the largest urban agglomerations? Or is there another channel by which agglomeration and diversity interact? Or is this relationship driven by historical immigration patterns in larger cities that shape institutions and enable smoother integration of immigrants into the labor force in larger cities (see for example Rodríguez-Pose and Von Berlepsch, 2014)? Existing techniques likely allow for progress on these questions, but only with some shift in the focus.

Scholars should also investigate the types and intensities of interaction needed to produce spillovers from diversity. Clearly sustained collaboration would seem to fit the bill,

but are more passive or fleeting interactions useful at all? This question is particularly salient at the scale of regional economies, and especially where residential segregation may limit interactions and trust.

Additionally, there is a need for careful research into the policy implications of this growing field, something much less discussed within this literature. These fall into three basic sets of considerations: one around immigration policy as a multi-scalar issue, another drawing on further research into the mechanisms at work, and a third around ‘unlocking’ potential benefits of immigrant diversity. We discuss each in turn.

The economic geography of diversity, as well as a broader economics of immigration, yields implications for national policymaking. Evidence suggests that skilled immigrants engaged in complex tasks generate nontrivial economic benefits (Kerr et al., 2015; Peri et al., 2015; Cooke and Kemeny, 2017), even if employment transition assistance is needed to ease adjustment costs (Kerr and Kerr, 2013). Evidence on the effects of less-skilled immigrants is more mixed, but even the most negative outcomes are modest, and a wealth of studies find that such immigrants are a net positive (e.g., Peri and Sparber, 2009; Ottaviano and Peri, 2012; Dustmann et al., 2013; Lewis and Peri, 2014; Peri, 2014; Cattaneo et al., 2013; Foged and Peri, 2016; Kemeny and Cooke, 2017a).¹⁰ This evidence suggests that the case for limiting immigration in countries like the U.S. cannot easily be made on economic grounds. But literature on diversity surveyed here suggests additional policy considerations at a subnational scale. In the U.S. at least, some policy levers have recently shifted from federal to municipal and county scales (e.g., Walker and Leitner, 2011; Nguyen and Gill, 2016). There are further important contributions to be made, particularly by geographers, on how urban regional economic dynamics may suggest particular subnational immigration policies.

A deeper understanding of the mechanisms at play in this relationship between diversity and productivity (as discussed in section 2.3) also has policy implications. If birthplace diversity has an independent positive effect on productivity as a result of the mixing of heuristics generated through interpersonal interaction, that suggests that the composition of immigration flows ought to be a policy priority, alongside efforts in firms and cities to

¹⁰There is debate on the effect of sudden, large influxes of immigrants with low levels of education. See, for example, the extensive and on-going debate about the Marielitos (e.g., Borjas, 1994a, 1995; Card, 2001, 2005; Borjas, 2015; Peri and Yasenov, 2015).

lower barriers to interaction. If, however, these effects are more about labor market efficiency or some teachable aspect of human capital, then immigration should be considered against other policy alternatives, such as investments in developing exceptional skills or changes to the incentive structure tied to less-desirable but systemically valuable jobs.

Existing research also raises a broader set of policy questions about how to ‘unlock’ any potential benefits of diversity. Similar to the thoughtful theoretical and empirical push-back among geographers against the simplest ‘contact leads to tolerance’ versions of the contact hypothesis (i.e., Leitner, 2012; Valentine and Sadgrove, 2014; Ray and Preston, 2015), there should be some healthy skepticism that the mere presence of people different from you makes you a better problem solver. So, what might facilitate positive spillovers? New analysis suggests that disadvantage and inequality are responsible for previously observed correlations between ethnoracial diversity and social distrust (Abascal and Baldassarri, 2015). Meanwhile, trust and inclusive local institutions raise the spillovers workers receive from immigrant diversity (Kemeny, 2012; Kemeny and Cooke, 2017b). Thus, beyond policies that shape who is allowed into a country, there ought to be more engagement with what features of localities actually foster the generative aspects of diversity. Careful research into this question could lead to policies that actively encourage and facilitate productive interactions in a heterogeneous populace. This surely leads policy discussions beyond the question of how to regulate borders, and also could spur engagement among quantitatively- and qualitatively-focused geographers.

There is still much work to be done to better understand the role of immigrant diversity in our regional economies. We hope that more geographers will take on this challenge and translate it into ways that allow everyone in our cities and countries to work together to the benefit of all.

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