Immigration, opportunity, and assimilation in a technology economy

Victor Nee[1] · Lucas G. Drouhot[2]

Abstract

We examine access to institutions and opportunity for entrepreneurs in a rising tech economy. A significant proportion of entrepreneurs and CEOs of tech firms in the American economy are either first- or second-generation immigrant minorities. Are these minority entrepreneurs assimilating into a rising economic elite? To what extent is the technology economy segmented by ethnic boundaries and sectors? On a range of empirical measures, including access to financial and social capital, firm performance, and normative beliefs on fairness and cooperation, we find second-generation immigrant minority tech entrepreneurs to be strikingly similar to their white counterparts. This study sheds new light on the institutional environment of a new regional technology economy, whereby barriers of entry are high in terms of human capital but economic competition is structurally and culturally open to immigrant minority entrepreneurs.

Keywords Assimilation · Entrepreneurs · Immigrant minority · Institutional change · Technology economy

Sociological research on immigrant entrepreneurs has long focused on forms of ethnic enterprise reliant on immigrant communities for financial resources, labor force, and bounded markets. Pioneering studies focused on ethnic solidarity as a social mechanism enabling bounded opportunities and upward socioeconomic mobility (Bonacich and Modell 1980; Wilson and Portes 1980; Light and Bonacich 1991; Light 1973, 2005; Portes and Zhou 1993; Min 2008). Saxenian (2006) details, for example, how

✉ Victor Nee
  vgn1@cornell.edu

  Lucas G. Drouhot
  Drouhot@mmg.mpg.de

[1] 330 Uris Hall, Department of Sociology, Cornell University, Ithaca, NY 14853, USA

[2] Max Planck Institute for the Study of Religious and Ethnic Diversity, 11 Hermann-Föge Weg, 37073 Göttingen, Germany

professional associations organized by Asian immigrants provided mentoring and connections helpful to immigrant entrepreneurs during the rise of Silicon Valley's high-technology economy in the 1970s. In 1979, a small group of Chinese immigrant engineers founded a local branch of the Chinese Institute of Engineers (CIE), which provided informal coaching to members on practical mechanics of founding and managing a firm, and on getting legal and financial help. In the 1980s and 1990s, in response to perceived discrimination, Chinese and Indian immigrants relied on such ethnic resources and networks to gain entry into the mainstream economy as entrepreneurs of high-tech start-up firms. Tech entrepreneurs from South Asia, Taiwan, mainland China, and also Israel leveraged transnational ethnic ties to secure and consolidate a strategic position in Silicon Valley, where Asian immigrant engineers and entrepreneurs had been informally excluded from entry into a close-knit corporate elite.

Historically, power and leadership in American corporations were preserved in the institutionalized domain of a white Protestant elite that was difficult for racial minorities to penetrate (Baltzell 1964; Domhoff 1967; Dobbin 2009). In the post-Civil rights era of institutional change, sociologists have examined labor market opportunity for racial minorities to identify mechanisms that enable entry and mobility in internal labor markets, leading to more racial and ethnic diversity in middle-level management (Edelman 1990, 1992; Dobbin et al. 1993; Kelly and Dobbin 1998; Waters 2001; Rivera 2012). Notwithstanding accounts of the success of notable individuals (Saxenian 2006), the extent to which immigrant minority tech entrepreneurs have now gained access into the entrepreneurial elite of America's technology economy has yet to be empirically confirmed. While the burgeoning literature on the second generation of post-1965 immigrant minorities underscores a broad social dynamic of assimilation (Drouhot and Nee 2019; Waters and Jiménez 2005; Kasinitz et al. 2008; Waters et al. 2010; Waters and Pineau 2015; Jiménez 2017), little is known about assimilation in the technology economy. Saxenian (2006) documents the significant representation of immigrant entrepreneurs from Taiwan, mainland China, South Asia, and Israel in Silicon Valley's high-technology economy; but does not address the question of assimilation of first- and second-generation immigrant entrepreneurs. Economic geographers measure the relative size of knowledge workers using the percentage of college-educated in a metropolitan region, but do not focus on immigrant entrepreneurs and inter-generational assimilation (Glaeser 2011; Moretti 2012; Storper 2013).

In this article, we explore the social patterns of participation of first and second-generation immigrant entrepreneurs through the lens of the rising tech economy in New York City (NYC). Emerging in the twenty-first century—much more recently than the older regional high-tech economies of Route 128 in the Boston area and Silicon Valley (Saxenian 1996)—this dynamic ecosystem provides a strategic research site to examine the social pattern of incorporation of immigrant entrepreneurs in a key sector of the American economy. Our approach relies on a large sample of NYC tech entrepreneurs who are CEOs of their firms. Respondents who participated in the survey are CEO founders of technology-enabled firms in Manhattan and Brooklyn. When we carried out the first wave survey of technology entrepreneurs in 2015, our sample represented 33% of the total population of technology firms established in New York City after the turn of the century, a period during which this new regional technology economy grew rapidly to become the second largest in the United States following Silicon Valley. The majority of technology entrepreneurs in Manhattan and Brooklyn are white males, but second-generation immigrant minority entrepreneurs are well represented among them.

This allows for comparative analyses across groupings of tech entrepreneurs by nativity and race. We address a set of research questions investigating whether access to opportunities and to institutional and organizational resources is open or closed to immigrant minority entrepreneurs in the NYC start-up tech economy. To what extent are first and second-generation immigrant entrepreneurs segmented into distinct sectors and reliant on ethnic networks and associations? Conversely, is there evidence of openness in participation in economic institutions and opportunity in this regional technology economy?

To explore whether a distinct ethnic stratification order is an emergent social pattern in NYC's technology economy, we trace business relationships, contact with angel investors, venture capitalists, and participation in economic institutions and organizations for native-born entrepreneurs, white immigrants, and first and second-generation immigrant minority entrepreneurs.[1] We also consider measurable dimensions of normative cultural beliefs underlying economic action in the tech economy. Our empirical results point to a social pattern of assimilation, whereby barriers to entry in the tech economy are high in terms of human and social capital, but economic competition is structurally and culturally open to immigrant and minority tech entrepreneurs.

Theory and institutional change

Contemporary patterns of immigrant and second-generation incorporation take place in an institutional environment molded by cultural beliefs and legal-regulatory reforms of the post-Civil Rights era (Edelman 1992; Dobbin et al. 1993; Dobbin 2009). The emergence of a high-technology economy in the United States historically coincided with World War II and the ensuing Cold War with the Soviet Union. In the aftermath of Nazi holocaust atrocities, a global delegitimization of racism contributed to an increasing realization in the United States of a need for institutional change. As the Civil Rights movement gained momentum, there developed a bipartisan political consensus in Congress to extend equality of rights to racial minorities (Skrentny 2002). Although it is well documented that specific anti-discriminatory laws, such as the Fair Housing Act of 1968, have not led to a reduction in the level of segregation for African Americans (Massey and Denton 1993), racial minorities have benefited from Civil Rights-era legislation insofar as it became formally illegal to maintain barriers excluding minorities from mainstream institutions—i.e, K-12 schools, higher education, the job market, workplaces, and residential neighborhoods (Skrentny 2002; Massey et al. 2002; Dobbin 2009). Institutional change extending formal equality of rights to racial minorities over time have cumulatively increased the costs of discrimination, thereby enabling a greater openness of access to mainstream institutions and organizations (Alba and Nee 2003; Portes and Rumbaut 2001). For instance, American universities have widely sought to implement remedial programs of equal opportunity and affirmative action to achieve a racially diverse student body (Skrentny 1996). This

---

[1] In general, we use "immigrant minority entrepreneurs" and "minority entrepreneurs" to refer to non-White entrepreneurs who are either 1st or 2nd generation immigrants, while "white immigrant entrepreneur" refers to White immigrants from both generations. We use more precise language regarding generation when relevant to our analysis. "Native" entrepreneurs refers to entrepreneurs who were born in the United States from US-born parents (3rd + generation) regardless of race.

institutional change, in combination with the selectivity of immigration from South and East Asia, contributed to a high level of enrollment of both foreign-born and second-generation Asian American students in selective colleges and universities (Massey et al. 2002; Lee and Zhou 2015). Immigrant families' aspirations for socioeconomic mobility for their children have also contributed to an ever-increasing share of students of minority backgrounds in selective American colleges (Feliciano and Lanuza 2017; Massey et al. 2002; Lee and Zhou 2015; Pew Hispanic Center 2013).

To ensure an institutional environment supportive of minority students, university administrators routinely sanctioned incidents of racial conflict and discrimination (Hurtado 1998; Gurin et al. 2002). Concomitantly, administrators instituted concrete measures and guidelines to foster a social environment supportive of positive contact across racial lines in the university community. With a critical mass of minority students on university campuses, cross-racial social interactions and close friendships became more commonplace, despite the persistent preference for racial homophily of white students (Pettigrew 1998; Chang et al. 2004; Bowman and Park 2014). Not surprisingly, shared ecological space increased the odds for encounters of diverse individuals who share common interests and values (Blau and Schwartz 1997).

Such broad social processes of institutional change are consequential for diversity in the tech economy, given the pivotal role research universities played in the emergence of regional technological and industrial advantage (Saxenian 1996; Moretti 2012). In the biotechnology industry, overlapping networks of university scientists and biologists in industry provided the conduits and channels of innovative activity and invention (Powell et al. 1996; Owen-Smith et al. 2004; Powell et al. 2005). Members of high-tech entrepreneurial teams are usually college graduates, and so are the core group of knowledge workers and professionals (Ruef 2010; Moretti 2012; Florida 2014). Importantly, many such graduates have had positive experiences in cross-racial social interaction and have internalized liberal cultural beliefs, etiquette, and social norms of the university campuses (Chang et al. 2004). This has reinforced norms of fair play and openness in the mainstream economy. Despite only sporadic enforcement by the federal government, human resource managers in American corporations and nonprofit organizations have upheld Title VII rules, opening access to jobs and career mobility for women and racial minorities in the corporate managerial elite (Zweigenhaft and Domhoff 1998; Dobbin 2009). Notwithstanding the persistence of vibrant immigrant enclave economies, human capital immigration from Asia and the influx of many highly skilled individuals who can fill technically demanding jobs have had a significant role in increasing diversity in the mainstream economy.

Neo-assimilation theory argues that extension of legal equality to minorities and naturalized citizens increases the chances of assimilation through the cumulative causation of purposive action and network effects. In the institutional environment of equality of rights and legal immigration evolving out of Civil Rights-era legislation, the "unintended consequences of practical strategies and actions undertaken in pursuit of familiar goals—a good education, a good job, a nice place to live, interesting friends and acquaintances, economic security—often result in specific forms of assimilation" (Nee and Alba 2013, p. 362). Social patterns of assimilation are confirmed by evidence of a diminishing significance of race in determining life chances. In the post-Civil Right era, cumulative institutional changes reflected in normative beliefs and legal/regulatory rules have made mainstream institutions and organizations more widely accessible for

the children of post-1965 immigration. Mainstream corporations, non-profit organizations, public administration, public service agencies, and the military are all subject to the anti-discrimination rules of post-Civil Rights era legislation. Not only has the perceived cost of discrimination opened access for minorities in mainstream institutions and organizations, but change in cultural and normative beliefs has contributed to the inclusion of social groups that previously were excluded (Edelman 1992; Clemens and Cook 1999; Alba and Nee 2003; Dobbin 2009).

Nonetheless, there is undoubtedly inequality of chances for native-born racial minorities to become tech entrepreneurs, for barriers to entry are high in terms of human capital needed to enable and motivate entrepreneurial action. Moreover, aspiring entrepreneurs must take on substantively greater risks than those entering pathways to careers in established organizations. The uncertainties of making bets on novelty and bringing the innovation to market makes entering a career in entrepreneurship in the tech economy a high-risk venture. Among the many risks, failure to anticipate or create new consumer taste and market demand commonly results in a startup firm's inability to attract angel or venture capital, and increased odds of business failure and bankruptcy. Entrepreneurial action and risk-taking in the competitive open economy necessitate an uncommon mix of individual-level capital: human, social, and financial.

Schumpeter's theory defined the "entrepreneurial function" as a distinctive form of economic action focused on innovative activity leading to "new combinations" that drive creative destruction of established industries. The entrepreneur's innovative activity initiates economic change through development of new products or a new method of production, through opening new markets, through discovery of new sources of inputs, or through new organization of industry. It is when entrepreneurial action leads to a "new combination" disrupting the established industry that entrepreneurial profits are realized. The entrepreneur is an economic actor with a high tolerance for uncertainty and risk, motivated by the dream that innovation "will lead to certain class positions for the successful entrepreneur and his family" (Schumpeter 1934, p. 78). In the neoclassical Schumpeterian narrative, "the typical entrepreneur is more self-centered than other types, because he relies less than they do on tradition and connection and because his characteristic task—theoretically as well as historically—consists precisely in breaking up old, and creating new, tradition. … there is the dream and the will to found a private kingdom … to succeed for the sake, not of the fruits of success, but of success itself … there is the joy of creating, of getting things done, or simply of exercising one's energy and ingenuity" (Schumpeter 1934, pp. 92–93).

Entrepreneurial action giving rise to creative destruction of established industries has played a central part as the engine of capitalist economic development (Landes 1969; Moykr 1990; North and Thomas 1973; Baomol 2002; Nee et al. 2010; Padgett and Powell 2012; Nee and Opper 2012). In the present era, tech entrepreneurs strive to become the next Steve Jobs in starting up technology firms that have the potential to disrupt an array of existing industries—financial services, E-commerce, advertising, education, medical care, software services, hospitality, and social media (DellaPosta and Nee 2019). However, the perception of higher risks and human capital requirements for entrepreneurship in the technology economy frequently renders the familiar pathways for careers in established organizations more attractive. The tech entrepreneur is a career pathway that attracts risk-takers who have a high tolerance for uncertainty in founding or joining a start-up firm in pursuit of Schumpeterian "creative destruction."

Linking theory with testable hypotheses

Our theoretical approach leads us to formulate hypotheses regarding the entrepreneurial action of immigrant minorities in the technology economy in three distinct but inter-related domains: namely, economic opportunity, business networks, and social norms of fairness and cooperation.

In the early days of the Silicon Valley, the perception of a "glass ceiling" limiting chances for career mobility in established tech firms motivated enterprising Asian immigrant scientists and engineers to exit mainstream firms to start their own tech firms, often by leveraging ethnic networks to channel capital flow from their origin country (Saxenian 1996, 2006). If this pattern of reliance on ethnic resources still holds across the technology economy, then there should be observable differences in the start-up experiences of immigrant minorities and white natives. Conversely, although there is undoubtedly inequality of chances for racial minorities to become tech entrepreneurs—for barriers to entry are high in terms of human capital—the extent of openness of economic institutions in the technology economy would be confirmed if there are more similarities than differences in the opportunities available for native and immigrant entrepreneurs who have founded firms in the tech economy. Thus we hypothesize that if informal and formal rules of open access extend to immigrant minority tech entrepreneurs, *there should be little or no significant difference in firm history, sectorial specialization, and ability to get funding from investors between immigrant minority and white native entrepreneurs.*

In regional technology economies, overlapping networks facilitate the social dynamics of knowledge spillover and sharing critical for innovative activity and economic growth. Marshall (1920, p. 271) famously observed in industrial districts of England that tacit knowledge and know-how are channeled by word of mouth in face-to-face interactions: "Mysteries of the trade become no mysteries; but are as it were in the air …. Good work is rightly appreciated, inventions and improvements in machinery, in processes and the general organization of the business have their merits promptly discussed: if one man starts a new idea, it is taken up by others and combined with suggestions of their own; and thus it becomes the source of further new ideas." The critical importance of knowledge spillover and sharing increases incentives and opportunities for workaday interactions across racial boundaries in the tech economy. Technology entrepreneurs, as purposive actors, routinely reach out to acquaintances and strangers who have novel ideas, useful know-how and experience to improve their chances of success in innovative activity. We hypothesize that *incentives and opportunities for knowledge spillover and sharing result in inclusive business networks that reflect the ethnic and racial diversity of knowledge workers and entrepreneurs in a regional technology economy.*

Organizational sociologists have long argued that, in advanced capitalism, isomorphic mechanisms lead to increasing homogeneity in cultural and normative beliefs and practices of organizational actors (DiMaggio and Powell 1983). Within spatially concentrated regional centers of the technology economy, frequency of face-to-face social encounters and open-access institutions facilitate shared social norms upholding fair play and cooperation. An open economy with overlapping networks of economic actors bridging ethnic boundaries should foster cultural similarity through repeated interaction between immigrant minority and native white entrepreneurs, leading to

"value synchronization" (Coleman 1990, chap. 11). Hence, we hypothesize that *when social norms upholding fair play and cooperation are broadly shared across ethnic and racial boundaries, there should be little or no difference in normative beliefs between immigrant minority and native white entrepreneurs.*

Empirical context: The tech economy in New York City

New York has seen the rise and decline of a succession of industrial and commercial sectors (Albion 1939; Glaeser 2011). The emergence of a new technology-enabled industrial district in New York City following the onset of the Great Recession of 2008 has been the most recent economic reinvention in the city's long history of urban renewal. In the midst of the implosion of the city's largest and most venerable investment banks, which led to the lay-off of more than 30,000 financial service workers within just one year, a new technology-driven service economy developed as a driver of renewal and structural change (Bowles and Giles 2012; Cometto and Piol 2013). Although the tech startup community was almost nonexistent at the time of the Great Recession in 2008, an ecosystem of technology firm startups rapidly grew— supported by $6 billion in venture capital investments by 2015 (Mulas and Gastelu-Iturri 2016). Distinctive of NYC's new technology-enabled economy is its concentration on innovations in software applications that link existing industries with the internet. Unlike the regional technology economies in the greater Boston area along Route 128 and Silicon Valley, with their focus on hardware, tech entrepreneurs in New York City have focused on innovations designed to increase productivity and profits of existing businesses by linking them to the World Wide Web. The aim of tech entrepreneurs has been to disrupt existing industries through innovations in software, as reflected in hyphenated names of sectors such as fin-tech, ed-tech, med-tech, ad-tech, and e-commerce. Economic spillover from the rising tech economy resulted in the creation of dozens of thousands of new jobs (e.g., tech jobs in non-tech sectors) both in the rising tech economy sector and in existing industries (e.g., financial services), as well as urban revitalization in boroughs like Brooklyn and Queens, where tech workers went to find lower rents and office spaces.

In the background of this remarkable economic development has been the continuing significance of mass immigration in the social fabric of the city. New York City has long been a traditional immigrant gateway in the United States, with a percentage of foreign-born in 2011—37%—that is similar to what it was in 1900 and approximately three times higher than for the United States as a whole (Lobo and Salvo 2013). In the first half of the twentieth century, immigrant groups from Italy and Eastern Europe— particularly Eastern European Jews—faced strong initial barriers as racialized minorities, but nevertheless achieved socioeconomic mobility across generations (Foner 2000). Contemporary immigrant groups from the West Indies, Latin America, and Asia largely appear to follow a similar trajectory of mobility in spite of their being nonwhite. In summary, from the Jews and Italians of yesteryear to the contemporary flows of immigration triggered by the 1965 Hart-Celler Act, immigration research suggests an overall pattern of intergenerational assimilation for immigrants to New York City (Foner 2000; Kasinitz et al. 2008).

Research on immigrant entrepreneurship in New York City has focused on entrepreneurship in the ethnic economy—that is, where ethnic solidarity and enforceable trust in ethnic networks act as the backbone of entrepreneurial action and economic competitiveness (Waldinger 1986). Zhou's study of Chinatown (Zhou 1992) and Min's (2008) study of Korean entrepreneurship suggest a tight link between ethnic boundaries and entrepreneurial action as a key avenue of socioeconomic mobility for low-skilled immigrants, resulting in immigrant entrepreneurship taking the form of an immigrant enclave economy or middleman minority in inner-city racial ghettoes. In this article, we shift the focus of study to a mainstream domain of the American economy where empirical studies have yet to provide a comparative institutional analysis of white and minority technology entrepreneurs (Schneiberg and Clemens 2006). In the mainstream economy—unlike immigrant ethnic economies where undocumented migrants are likely to find employment—founders are with few exceptions documented residents or American citizens when they register a new firm. Our study of technology entrepreneurs thus focuses on legal immigrants and their adult children.

We define institutions as a dominant system of interrelated informal and formal elements—custom, conventions, norms, beliefs, and rules—governing social relationships within which actors pursue and fix the limits of legitimate interests (Nee 1998, 2005). They are self-reinforcing social structures that provide a framework for competition and cooperation, enabling, motivating, and guiding credible commitment in principal-agent relationships. Although institutional elements are characteristically invisible, social action enabled and guided by institutions leaves behavioral traces that can be measured and recorded, and hence are amenable to comparative analysis. Our focus is on economic institutions that constitute the structure of opportunity of the technology economy. In our comparative analysis, we analyze entrepreneurial action and patterns of participation in core economic institutions among founding CEOs of technology firms to determine whether a distinct ethnic stratification order is an emergent social pattern in NYC's technology economy. To our knowledge, this is the first time such a systematic, comparative analysis has been conducted to assess the ethnic and racial openness of a technology economy to minority entrepreneurs.

Data and empirical approach

We draw on data from a 2015 survey of tech firms founded after 2000 in Manhattan and Brooklyn. We identified a total population of 990 tech CEOs and co-founders; 325 of these tech entrepreneurs completed our survey online or over the phone, thus yielding data from a third of our population of interest. In other words, we take advantage of a very large sample of a relatively small population, and we are therefore confident that the substantive lessons we draw from our analyses reflect the reality of the NY tech economy with a high degree of accuracy.

For the mixed networks hypothesis, we used data from a 2018 re-survey of a subset of respondents. The Cornell University's Survey Research Institute completed the first wave survey, and the University of New Hampshire Survey Research Institute the second wave. The surveys include questions about biography and demographic characteristics, as well as past and current firms. For this study, we focus on the respondent's current firm, the conditions in which said firm was founded, and the

respondent's interactions with institutions within the tech economy, both formal (such as Meetup.com events) and informal (such as normative beliefs regarding fairness and cooperation). We ascertained the quality of our sample through a comparison with data from the American Community Survey (see Table 6 in the Appendix for further detail).

Demographic and racial characteristics

Overall, our sample of respondents reflects the human and economic capital selectivity of the knowledge economy, as 94 % have a bachelor's degree or higher, 83 % report a father having a white-collar profession, and less than 15 % perceive their family income upon growing up as having been below or far below average. As a whole, entrepreneurs in the NYC tech economy can be characterized as coming from socially privileged backgrounds. In terms of nativity, 20 % were born outside the United States, another 25 % were either born in the United States with at least one foreign-born parent or born abroad and living in the United States before age sixteen, and 55 % are native-born in the United States of native-born parents. Approximately 45 % of tech entrepreneurs in our sample are either first or second-generation immigrants, substantially higher than the 25 % immigrant and second generation of the general population. The immigrant and second-generation include tech entrepreneurs of East Asian, European, Israeli, South Asian, Turkish, and South Asian origin. Russian-origin Jewish tech entrepreneurs were immigrants to Israel (Senor and Singer 2011). Approximately 82 % of the sample self-identified as white, while most nonwhite entrepreneurs are from the post-1965 immigration. The principal investigator conducted, from 2012 to 2018, 95 face-to-face interviews with tech entrepreneurs, many of whom were first- or second-generation immigrant entrepreneurs. Significantly, ethnic and racial differentiation among entrepreneurs did not emerge as cognitively and discursively salient (Brubaker et al. 2004) in the course of lengthy semi-structured interviews, which was a reason we did not draw directly on the interviews for this article, but they informed our analysis. Table 5 (see appendix section) provides descriptive, demographic statistics for our sample of tech entrepreneurs.

Figure 1 shows racial identification among the immigrant and second-generation entrepreneurs. While the first generation is largely white (reflecting a long tradition of transatlantic entrepreneurs from Europe), more than half of second-generation entrepreneurs identify as racial minorities. The high representation of Asian entrepreneurs in the second generation is particularly noteworthy. Overall, second-generation minority entrepreneurs (i.e., children of the post-1965 immigration) account for 13 % of all entrepreneurs in NYC's technology-enabled economy. Immigrant-origin individuals identifying as White primarily hail from Western Europe and, to a lesser extent, from the Middle East (including Israel), while Asian-origin individuals primarily come from India, China, and East and Southeast Asia.[2]

Figure 1 underscores the comparatively low shares of respondents identifying as Black and Hispanic in our data. This reflects the selective nature of the technology economy in terms of economic and human capital—in this regard both Black- and Hispanic-origin populations tend to be disadvantaged relative to Asian and White

---

[2] Due to anonymity issues, we refrain from discussing national origins in more detail when considering the small number of individuals from certain countries, potentially making our survey's respondents identifiable.
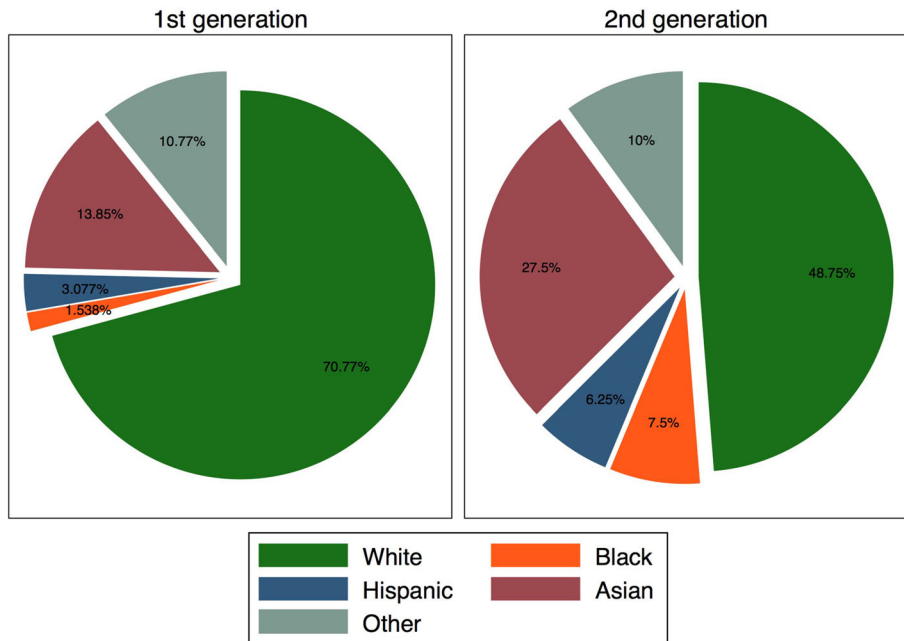
Fig. 1 Racial identification among immigrant entrepreneurs in NYC tech economy

populations in the United States (Kao and Thompson 2003)—and reflects the well-known dynamic of social reproduction and transmission of advantage among the socially privileged (Bourdieu and Passeron 1970). What motivates our study is whether or not patterns of ethnic and racial stratification persist *within* the technology economy. In the analyses that follow, we systematically compare white and nonwhite immigrants across generations to native (i.e., third-plus generation) entrepreneurs. This allows us to consolidate nonwhite racial categories and thus gain statistical power; also, the white/nonwhite line has historically been the most salient and consequential for immigrant minorities (Fox and Guglielmo 2012; Dobbin 2009; Skrentny 2002; Ignatiev 1995).[3] For the first series of analysis, we use analyses of variance to compare these groups across an array of survey items.[4] This is preferable to a series of regression models in which interacting all the predictors with immigrant generation variables across the number of survey outcomes we are interested in would result in an excessively high number of poorly specified models. In the last part of our analyses, we use ordinary least square regression to model firm

---

[3] We check the robustness of our results to different specifications of race in the robustness checks section.

[4] For the series of ANOVA tests that follow, we maximize the number of observations per test rather than keeping it constant with listwise deletions for the few missing observations across some tests but not others. If intergroup differences do exist, maximizing the number of observations per test is the more cautious and conservative approach given the small size of our population and some of our subgroups of interest. This being said, all the tests presented here were re-run with a listwise deletion approach to keep the sample constant across tests, and the results are identical to those presented here, save for two ANOVA tests—the proportion of those with a white collar father and the use of accelerator programs—for which significance fell below 0.05. These are available from the authors upon request.

performance, which we operationalize with two variables: firm revenue per employee, and current firm value. The aim of the OLS regression is to confirm our empirical analysis, which points to little or no effect of immigrant minority origin on access to opportunity and resources in the NYC regional technology economy. We model firm performance as a function of capital and venture investment, social capital with other entrepreneurs, patent holding, government support, use of economic institutions indicating integration in the NYC tech ecology, sex, gender, and immigrant/racial status.

Assimilation in the tech economy

Do immigrant and minority entrepreneurs cluster in specific sectors of the tech economy in New York City? In the human-capital intensive economy of Silicon Valley in the 1980s and 1990s, Asian entrepreneurs sorted in different sectors of the technology economy, Taiwanese in microchip and Indians in software industries (Saxenian 1999). In NYC's tech economy, however, all sectors are well represented across immigrant groups (see Fig. 2). We find discrete sectors of the tech economy to be only weakly associated with our immigrant categories at the intersection of nativity and race (Cramér's V = 0.18). This result is robust to alternative specifications of immigrant minority statuses, for which the association with economic sector remains weak by conventional standards.[5] In aggregate, then, the tech economy in New York can be described as integrated: immigrant generation and racial categories do not coincide with specific patterns of economic specialization. We find little evidence of a social pattern of ethnic economies in specific subsectors of NYC's tech economy.

While there is undoubtedly inequality of chances as regards the ability to become a tech entrepreneur (for barriers of entry are high in terms of human capital), open-access economic institutions *within* this ecosystem would be confirmed if there are more similarities than differences in the opportunities available for white and nonwhite entrepreneurs who have founded firms in the tech economy. Is there evidence of significant difference in firm history, ability to get funding from investors, or involvement with economic institutions in NYC's rising tech economy?

Founding conditions and startup funding

Among Asian engineers in the Silicon Valley who made the move to entrepreneurship, a significant factor was the "glass ceiling" blocking their opportunities for upward mobility (Saxenian 2006). How do immigrant and minority entrepreneurs fare in the New York tech economy? In our sample, 164 CEOs of tech firms (slightly over half of our sample) transitioned to entrepreneurship from employee positions. If immigrant and

---

[5] Cramér's V for the association between nativity (first/s-generation/natives) and economic sector is 0.19. For the association between a binary specification of nativity (born abroad/born in the US) and economic sector, it is 0.187. For the association between a binary specification of race (White/non-White) and economic sector, it is 0.134. For the association between a 5-way specification of race (White/Black/Hispanic/Asian/Other) and economic sector, it is 0.179.
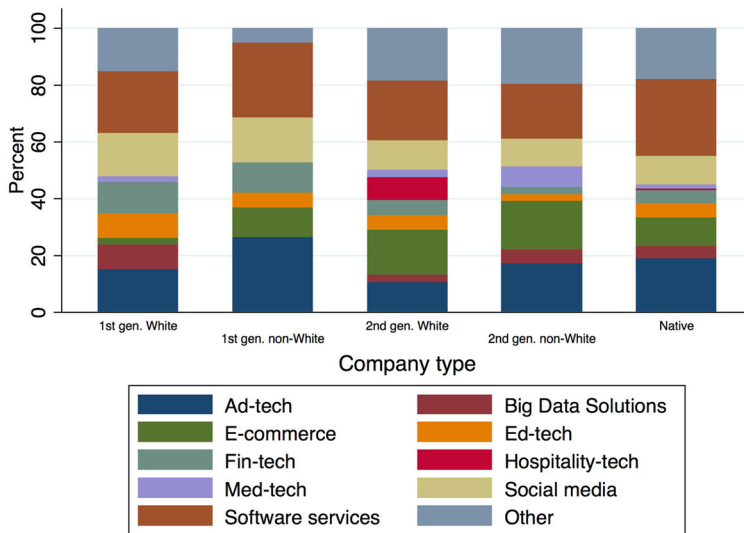
Fig. 2 Distribution of entrepreneurs by sectors of the tech economy, by race and nativity

minority entrepreneurs came to entrepreneurship out of necessity, we would expect the annual salary in their last job to be lower than for other groups.

Figure 3 compares the annual salary at the respondent's last job across our subgroups of interest. US-born minority entrepreneurs have lower annual salaries on average, but the difference is slight. The results are identical (though not shown here) when including an additional 62 respondents who answered this question but did not finish the survey and are excluded in other analyses.[6] Immigrant entrepreneurs in the NYC tech economy do not appear to be self-employed out of necessity, but out of opportunity.

A crucial measure of equal opportunity concerns the ability to get start-up funding from investors. Are immigrant entrepreneurs at a disadvantage in terms of ability to get funding for their ventures? Across our sample, respondents had founded slightly over two companies on average—a number that did not significantly vary across immigrant and native groups. We find that firm-founding period and entrepreneur nativity are weakly associated (Cramér's V = 0.256). Table 1 describes the sources of funding for initial and current capital by immigrant groups.

For initial capital, entrepreneurs mobilized two sources. Across subgroups, entrepreneurs used their own money to found their firms, which they complemented with investments from angel/seed investors. Notably, few entrepreneurs relied on loans from family members or friends. The greater reliance on family loans of second-generation minority entrepreneurs is entirely driven by four respondents for whom family loans contributed between a quarter and a half of their initial capital, while 90 % in that subgroup did not rely on family members at all.

In terms of current capital, we observe similar tendencies. Along with retained earnings, personal savings and angel or seed investors form the main sources of capital.

---

[6] In addition, we compared annual salaries among 154 respondents who had another job before founding a tech firm. The resulting graph (available upon request) is substantively identical to Figure 3.
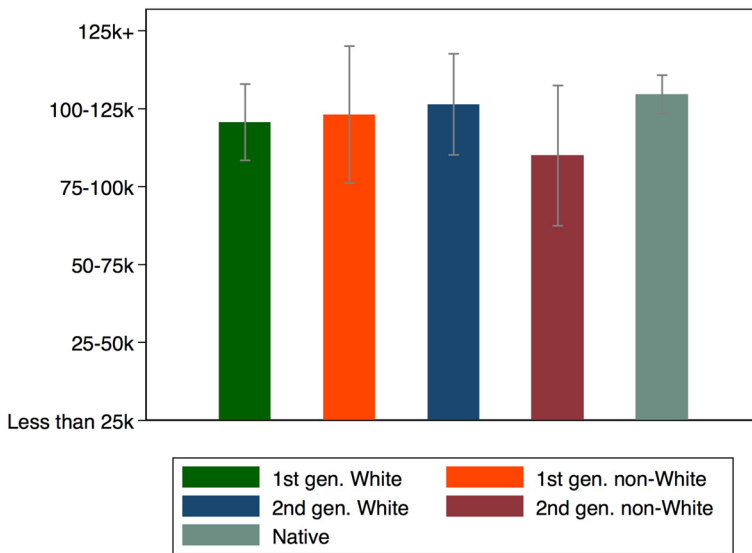
Fig. 3 Average annual salary when leaving last job, by subgroup (error bars are 95% confidence intervals)

The role of personal networks for financing is even smaller than in the case of initial capital. Separate analyses of variances confirm the absence of differences in sources of initial and current capital across immigrant and native subgroups—a result, once again, robust to alternative specifications of nativity and race. Overall, immigrant entrepreneurs—regardless of their racial background—and native-born minority entrepreneurs are not at a disadvantage in terms of ability to get funding for their ventures.

Table 1 Mean values and (standard deviations) for sources of initial and current capital, by race & nativity (for F-tests: $* = p < 0.05$, $** = p < 0.01$)

	1st gen. White	1st gen. Non-White	2nd gen. White	2nd gen. Non-White	Native	F-test for group difference
Founders' own money % - Initial capital	66.93 (42.50)	68.16 (42.07)	53.46 (46.96)	64.63 (39.31)	65.89 (41.83)	NS
Loans from family members % - Initial capital	3.80 (13.63)	6.84 (16.68)	5.77 (18.59)	11.22 (25.37)	5.60 (16.79)	NS
Angel/Seed investor % - Initial capital	21.33 (37.84)	25.00 (43.04)	30.00 (43.33)	17.07 (32.81)	20.14 (37.25)	NS
Founders' own money % - Current capital	23.48 (38.08)	35.05 (46.36)	13.53 (31.38)	22.23 (34.54)	22.95 (38.38)	NS
Retained earnings % - Current capital	28.98 (39.99)	22.11 (39.24)	32.84 (44.36)	37.75 (43.50)	34.26 (43.80)	NS
Loans from family members % - Current capital	0.98 (4.69)	0.00 (0.00)	0.00 (0.00)	3.62 (11.43)	1.02 (5.85)	NS
Angel/Seed investor % - Current capital	17.48 (31.77)	23.00 (39.14)	23.24 (38.37)	22.02 (34.76)	16.47 (32.90)	NS

If immigrant entrepreneurs are entering the mainstream of the knowledge economy, this should be visible in equal rates of participation in the economic institutions of the tech economy (see Table 2). A large subgroup of respondents report they have pitched innovative ideas and products at the NYC Tech Meetup to solicit feedback from the tech community and attract the attention of angel investors and venture capitalists in the audience. Meanwhile, other institutional resources such as hackathons are used far less often. However, second-generation immigrant minority entrepreneurs use accelerator programs *more* than other groups. Overall, the absence of cross-group differences indicate that the formal institutions undergirding the tech economy in New York City are open to immigrant outsiders across generations. This provides support for our first hypothesis on open access to the technology economy for immigrant minority entrepreneurs.

Participation in social networks

As a measure of reliance on social capital and professional social relationships among tech entrepreneurs in New York, the survey asked "Have other entrepreneurs in your community helped you or your company during the start-up period in any of the following areas?" Respondents answered "Yes" or "No" for each of the items listed in the Table 3 below. Overall, support from fellow entrepreneurs is widespread: the vast majority of respondents report having received help to find customers and mentoring from others. Once again, these patterns of solidarity and support among entrepreneurs do not vary across subgroups. Minority entrepreneurs do not lack social capital compared to white entrepreneurs.

Yet, it would be theoretically possible for entrepreneurial action and day-to-day business to be racially segmented if this assistance primarily occurs among members of the same ethnoracial group, as it would in an ethnic enclave or in the Silicon Valley context where ethnic associations play an important role. In this case, one would not observe ethnoracial segmentation at the aggregate level of the economic sector—something Fig. 2 strongly suggests not to be the case—but rather at the micro level of everyday business relationships, which is plausible in light of the wealth of previous

Table 2 Use of business institutions (0 = no, 1 = yes), by race & nativity (for F-tests: $* = p < 0.05$, $** = p < 0.01$)

	1st gen. White	1st gen. Non-White	2nd gen. White	2nd gen. Non-White	Native	F-test for group difference
NYC Tech Meetup demo – Used	0.48 (0.51)	0.37 (0.50)	0.41 (0.50)	0.34 (0.48)	0.46 (0.50)	NS
General Assembly – Used	0.20 (0.41)	0.24 (0.44)	0.31 (0.47)	0.35 (0.48)	0.24 (0.43)	NS
Accelerator programs – Used	0.20 (0.40)	0.12 (0.33)	0.13 (0.34)	0.30 (0.46)	0.11 (0.32)	*
Entrepreneur competitions/ hackathons – Used	0.20 (0.41)	0.31 (0.48)	0.24 (0.43)	0.31 (0.47)	0.26 (0.44)	NS
Research universities – Collaboration	0.20 (0.40)	0.06 (0.24)	0.05 (0.23)	0.10 (0.30)	0.19 (0.39)	NS

Table 3 Means values and (standard deviations) for help received from another entrepreneur (0 = no, 1 = yes), by race & nativity (for F-tests: * = $p < 0.05$, ** = $p < 0.01$)

	1st gen. White	1st gen. Non-White	2nd gen. White	2nd gen. Non-White	Native	F-test for group difference
Finding customers/clients - Entrepreneurs help	0.70 (0.47)	0.47 (0.51)	0.72 (0.46)	0.61 (0.49)	0.65 (0.48)	NS
Advice/mentoring - Entrepreneurs help	0.76 (0.43)	0.68 (0.48)	0.87 (0.34)	0.75 (0.44)	0.75 (0.44)	NS
Immigration of personnel - Entrepreneurs help	0.13 (0.34)	0.16 (0.37)	0.16 (0.37)	0.23 (0.43)	0.11 (0.31)	NS
Government/regulatory requirements - Entrepreneurs help	0.18 (0.39)	0.16 (0.37)	0.13 (0.34)	0.15 (0.36)	0.13 (0.33)	NS
Finding funding - Entrepreneurs help	0.47 (0.50)	0.37 (0.50)	0.39 (0.50)	0.42 (0.50)	0.37 (0.48)	NS

studies showcasing the impact of race in American social networks in general (e.g., McPherson et al. 2001; DiPrete et al. 2006; Molica et al. 2003). To analyze whether ethnoracial differences structure business relationships, we conducted a resurvey (2018) of the original sample ($N = 156$) and asked respondents about the relative share of different racial groups among their professional business relationships: "Thinking of all your current professional relationships, what percentage would you say are..?" Respondents indicated the relative percentage for racial groups as defined in the US Census (see Fig. 4).
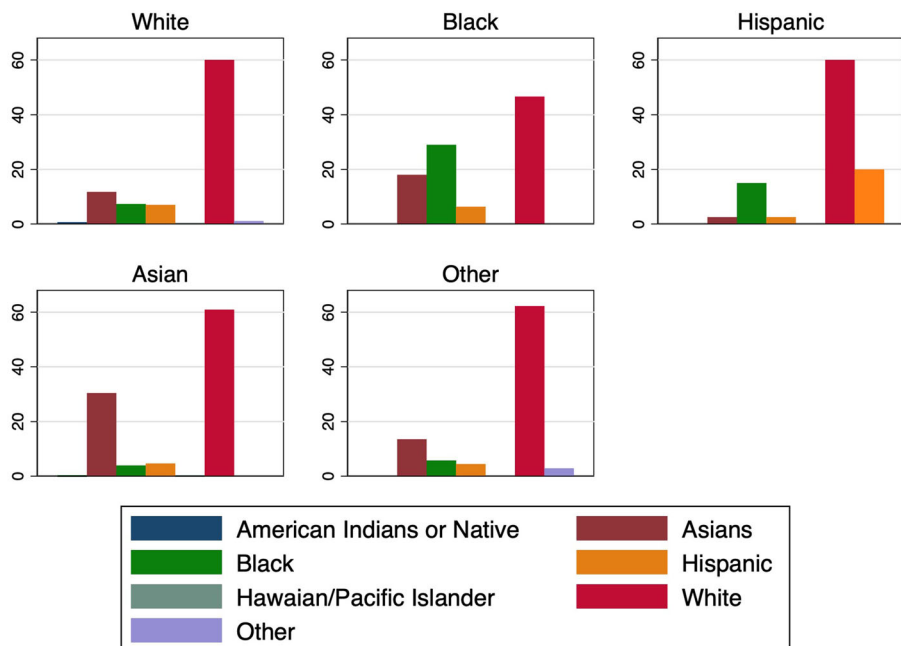
Fig. 4 Self-reported racial composition of professional networks by respondent's race (y axis indicates %)

   As it turns out, the racial composition of professional business networks is rather constant across racial groups. With the exception of Asian entrepreneurs reporting a significantly larger proportion of Asians in their professional networks, we do not observe strong patterns of racial and ethnic segmentation. The racial composition of networks more or less reflects the relative size of each racial group in the tech industry, with the white majority group being the largest for all professional networks regardless of the respondent's race. Overall, then, business networks in the NYC tech economy appear to be reasonably mixed. Respondents typically identify a large portion of their professional networks— forty to 80 %—as members of different racial groups from their own. We repeated the same procedure across immigrant groups at the intersection of race and nativity. The racial composition of professional networks does not vary across our immigrant subgroups of interest, and we find no significant differences in the relative share of each racial group across our immigrant subgroups (see Fig. 5).

   Both the relative similarity of professional networks across racial subgroups and the sizable share of cross-racial interactions taking place between members of different subgroups suggest that racial boundaries within the NYC tech economy are porous. The limits to racially mixed networks thus appear to be exogenous to the NYC tech economy itself, and they likely reflect selection processes on human capital—a clear barrier of entry—taking place in K-12 and higher education rather than in the recruiting, founding of firms, and other competitive processes making up the tech economy itself.
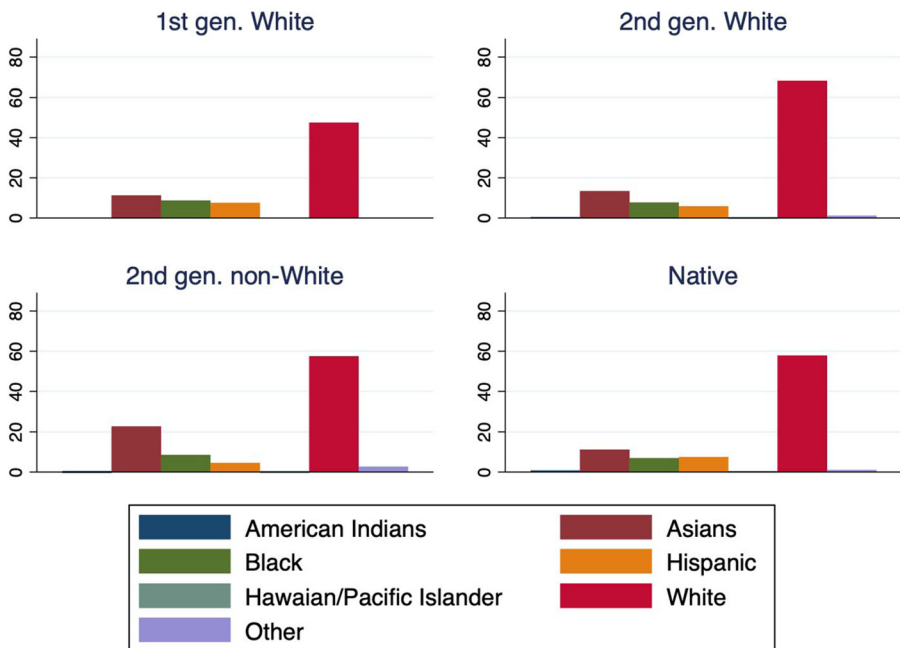

Fig. 5 Self-reported network composition of professional networks by respondent's nativity, by subgroup (y axis indicates %)/ Note: The resurvey did not feature 1st gen. Non-White respondents

Normative beliefs and social norms

We attempt to discern entrepreneurs' perception of social norms in their business community through a set of six survey items describing hypothetical scenarios, designed to measure mutual monitoring, reciprocity, norm enforcemen,t and reputation dynamics (see the appendix for more detail on question wording). In the first, an entrepreneur frivolously spends funding received from an angel investor on furniture and office design. In the second, a young entrepreneur presents a poorly prepared product demonstration to a crowd of fellow technologists in the NY Tech Meetup. In the third, an entrepreneur steals innovative ideas from peers. In the fourth, an entrepreneur talks down a colleague's success during a celebration of that success. In the fifth, an entrepreneur recruits key personnel away from competitors. In the sixth, an entrepreneur refuses to give advice to a younger entrepreneur starting up his or her own company. For each scenario, the respondent was asked what consequences he or she would expect for such behavior: e.g., whether there would be gossip about the event or difficulty finding cooperative peers and opportunities in the future or getting invited to future events. Table 4 reports detailed responses for each scenario across subgroups.

For all these scenarios, a sizeable minority expects negative gossip in the community as a consequence. But certain scenarios tend to arouse expectations of the more serious consequences, such as difficulty finding funding or cooperative peers. For instance, respondents do not generally expect strong, negative repercussions from a poor demonstration at the NY Tech Meetup; however, they expect lower tolerance for frivolous spending of an investor's money or uncollegial behavior such as talking down others' success. Importantly, a normative consensus exists across subgroups, as minority entrepreneurs do not differ in their responses from their white counterparts in their perception of these community norms. In the technology economy, an open-access institutional environment is associated with shared normative beliefs among minority and majority group entrepreneurs.
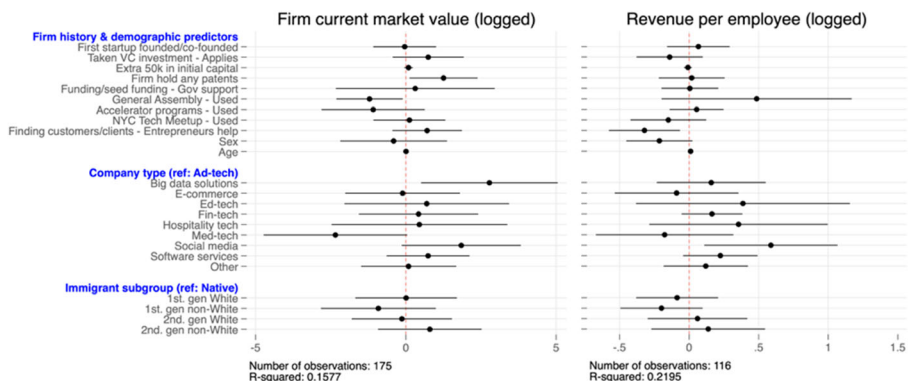
Firm performance

Finally, we use regression analysis to confirm a comparative institutional analysis that underscores little or no statistically significant effects of immigrant minority origin for second- generation CEOs of startup firms in NYC technology economy. We ascertain the overall pattern documented so far with statistical modelling of firm performance, which we operationalize with two variables: firm revenue per employee and current firm value, both logged due to their positively skewed distributions. We use ordinary least square regression to model firm performance as a function of capital and venture investment, social capital with other entrepreneurs, patent holding, government support, use of economic institutions indicating integration in the NYC tech ecology, sex, gender, and immigrant/racial status. The results in Fig. 6 were obtained with robust standard errors and inverse probability weighting of each respondent to be included in each analytic sample, as some of these outcomes (e.g., expected profit) and independent (e.g., holding a patent) variables have a large number of missing values.[7]

---

[7] Regression analyses without inverse weighting show virtually identical results.

Table 4 Means values and (standard deviations) for perception of social norms (0 = no, 1 = yes), by race & nativity (for F-tests: * = $p < 0.05$, ** = $p < 0.01$)

	1st gen. White	1st gen. Non-White	2nd gen. White	2nd gen. Non-White	Native	F-test for group difference
Furniture - Gossip	0.15 (0.36)	0.37 (0.50)	0.13 (0.34)	0.22 (0.42)	0.24 (0.43)	NS
Poor demo - Gossip	0.30 (0.47)	0.21 (0.42)	0.28 (0.46)	0.51 (0.51)	0.43 (0.50)	*
Pick ideas from peers - Gossip	0.39 (0.49)	0.42 (0.51)	0.23 (0.43)	0.44 (0.50)	0.43 (0.50)	NS
Talking colleagues down - Gossip	0.30 (0.47)	0.32 (0.48)	0.18 (0.39)	0.29 (0.46)	0.34 (0.48)	NS
Recruit away engineers/ developers - Gossip	0.33 (0.47)	0.26 (0.45)	0.23 (0.43)	0.39 (0.49)	0.29 (0.45)	NS
Rejects comments/refuses advice - Gossip	0.24 (0.43)	0.26 (0.45)	0.23 (0.43)	0.17 (0.38)	0.14 (0.35)	NS
Furniture - Funding difficulty	0.35 (0.48)	0.58 (0.51)	0.54 (0.51)	0.56 (0.50)	0.49 (0.50)	NS
Poor demo - Difficulty finding future opportunities	0.17 (0.38)	0.26 (0.45)	0.36 (0.49)	0.32 (0.47)	0.33 (0.47)	NS
Pick ideas from peers - Difficulty finding cooperative peers	0.41 (0.50)	0.47 (0.51)	0.31 (0.47)	0.49 (0.51)	0.47 (0.50)	NS
Talking colleagues down - Unlikely to invite in future	0.46 (0.50)	0.68 (0.48)	0.44 (0.50)	0.39 (0.49)	0.47 (0.50)	NS
Recruit away engineers/developers - Difficulty finding cooperative peers	0.35 (0.48)	0.42 (0.51)	0.41 (0.50)	0.44 (0.50)	0.43 (0.50)	NS
Rejects comments/refuses advice - Difficulty finding cooperative peers	0.43 (0.50)	0.42 (0.51)	0.36 (0.49)	0.54 (0.50)	0.42 (0.50)	NS

Of key interest for this study are the bottom four coefficients, dummy indicators for the subgroup to which the respondent belongs. Importantly, the pattern across

Fig. 6 Coefficients for two OLS models of firm performance (error bars are 95% confidence intervals)

subgroups is comparable for both models, and suggests increasing similarity with natives across generations. Nonwhite CEOs who are foreign-born appear slightly disadvantaged compared to their native counterparts, but this does not hold for the second generation. More generally, one sees other variables stronger both in magnitude and significance shaping the performance of firms: patent holding, social capital, and tech sector appear more influential than immigrant subgroup. While the small number of observations in some subgroups should deter one from drawing strong conclusions regarding intergroup difference or absence thereof, CEO's nativity and race per se appear rather irrelevant in shaping the fate of tech firms in the NYC technology economy.

Robustness checks

Although the respondents who completed the 2015 firm-level survey constitute one-third of the population of tech firms in Manhattan and Brooklyn in 2014, relatively small sample sizes in some subgroups arouse concern. To gain further statistical power, we ran all tests for group differences using two alternative specifications for immigrant status and race, separately. In a first series of robustness checks, we distinguished between first generation, second generation, and native entrepreneurs regardless of race, on one hand, and entrepreneurs born abroad and those born in the United States, on the other. In a second series of robustness checks, we recoded racial background in binary (white vs nonwhite) and ternary (white, Asian, nonwhite) specifications. Across these alternate specifications, yielding six hundred and ten anova and t-tests for group difference, no clear pattern of differentiation emerged among NYC tech entrepreneurs.[8] Statistically significant differences were not stable across specifications. The number of tests showing differences approximately corresponds to the number of false positives to be expected under standard levels of statistical significance (i.e. $\alpha = 0.05$).[9] We thus gain further confidence that our substantive results are not due to our specifications of the nativity/race variable.

Conclusion

On this broad inclusive set of measures of participation in economic institutions and equality of access to key resources in a rising regional technology economy, we find little or no significant differences among native-born white, white immigrant and second-generation minority tech entrepreneurs. Looking at patterns of economic participation, past salaries and sources of funding, social relations and business acquaintanceship networks, social norms and cultural beliefs, and aspects of firm performance, we have found an unambiguous pattern of assimilation in the NYC technology ecosystem, whereby the economic

---

[8] These results are not included in this article due to space constraints but are available upon request.
[9] In these series of tests, note that we do not apply Bonferroni corrections since they make for more conservative tests. Applying Bonferroni corrections would be substantively meaningful in cases of apparently strong intergroup difference across our series of test, but since we do not find them here, we do not need to resort to that more conservative strategy. Had we found strong intergroup differences, we would have applied Bonferroni corrections as a robustness check.

experiences of tech entrepreneurs of these diverse backgrounds are strikingly similar. In particular, we find no evidence of the type of economic segmentation one would expect under conditions of widespread discrimination or incentives for minority entrepreneurs to congregate in ethnic niches. In the rising technology economy of New York City, immigrant and nonwhite second-generation tech entrepreneurs are well on the road to assimilation in the mainstream of economic institutions and organizations. These results are consistent with the main prediction of neo-assimilation theory: under conditions of legal equality and human capital migration flows, assimilation trajectories among immigrants and their children are shaped by purposive action, embeddedness in social networks, and endowment in human, cultural, and social capital rather than race or immigrant status per se (Alba and Nee 2003; Nee and Alba 2013; Drouhot and Nee 2019).

While inequality in access to human capital no doubt determines who has access to participation in the knowledge economy in the first place (Massey et al. 2002), we find little evidence of ethnic disparities once such access has been achieved. Barriers to participation in the tech economy among immigrant minorities thus reside *outside* this ecosystem, e.g., in the access to selective educational institutions upon which participation is predicated. These barriers produce a population that is, of course, highly selected, for not everyone chooses to become an entrepreneur and not everyone who chooses to do so, succeeds. Yet, existing evidence on educational attainment (Waters and Pineau 2015; Morgan and Galbgiser 2014) and firm survival (Kerr and Kerr 2016) suggests such selection processes to be similar among natives and immigrants. In particular, Kerr and Kerr's (2016)'s large-scale study of immigrant entrepreneurship in the United States between 1995 and 2008 shows that entrepreneurs' nativity is unrelated to firm survival. Hence, we are confident that the assimilation pattern we document is not due to survival bias induced by a particularly resilient group of minority entrepreneurs.

Our findings suggest that the inclusion of Black and Hispanic populations in the tech economy hinges upon their accumulation of economic and human capital rather than racial barriers to entry in the technology economy. On the one hand, Hispanic-origin populations are experiencing great intergenerational gain in educational attainment (Duncan and Trejo 2015) and enrolling in American colleges at record rates (Pew Hispanic Center 2013). Furthermore, contemporary migration flows from Sub-Saharan Africa are highly selective in terms of human capital, and the children of African migrants see enrollment in selective colleges as a sine qua non condition for social success (Imoagene 2017). The recruitment efforts of elite universities towards achieving diverse student bodies are likely to increase diversity within the tech economy in the long run (Warikoo 2016). On the other hand, such efforts remain bound by the general dynamics of intergenerational social reproduction (Bourdieu and Passeron 1970). Simply put, Hispanic-origin migrant groups typically come with far lower stocks of social and human capital compared to Asian-origin migrant groups (Drouhot and Nee 2019). As such, their wider inclusion in the

technology economy will take time and multiple generations. In the absence of strong racial barriers per se, however, we view the robust presence of Asian-origin entrepreneurs in the NYC tech economy as suggestive of a longer-term trend of diversification and normalization of ethnoracial diversity in knowledge-intensive sectors of the economy such as the technology economy.

Contrary to the experience of earlier waves of immigrant (particularly Asian) entrepreneurs in Silicon Valley being pushed into entrepreneurship out of constraints, entrepreneurial action among immigrant and minority technologists in New York City is unencumbered by their racial and immigrant background. Simply put, ethnicity and nativity are not salient aspects of economic action in the NYC tech economy. As American higher education has institutionalized the rules of equal opportunity and civil rights enacted in Civil Rights era legislation and upheld in the university community by liberal cultural beliefs and social norms, so have knowledge workers and entrepreneurs upheld the values of equal opportunity and diversity in the tech economy. In both these environments, informal and formal rules promoting diversity and merit-based achievement are upheld as key to creativity and innovation. Comparing Saxenian's (2006) Silicon Valley study with the results presented here, one thus discerns a rather optimistic narrative of declining significance of race and ethnicity within the technology intensive branches of the knowledge economy—arguably some of the most productive sectors of the American economy as a whole (Moretti 2012). In traditional immigrant gateways like New York City, such normalization may be part and parcel of the social fabric of the city. But given the highly specialized and globally competitive nature of technological innovation, the normalization of immigration-driven diversity will likely become an increasingly important component of economic competitiveness throughout the United State in the future.

Appendix

Table 5 provides descriptive statistics on gender, age, parental occupation (whether or not the respondent's parents were white-collar workers or professionals), family income at age sixteen (ranging from 1 "far below average" to 5 "far above average"), and whether or not the respondent holds a master's degree or above. Most of these tech entrepreneurs are male; this is true across subgroups. Most come from socioeconomically advantaged families, with above-average family income and at least one parent—sometimes both—in white-collar or professional occupations. They are, unsurprisingly, highly educated; a high proportion holds a master's degree or more.

Analyses of variance and pairwise t-tests show significant differences in age, father's occupation, and proportion of those holding a master's degree or more. In particular, second-generation minority entrepreneurs are younger than all other subgroups, while first-generation immigrant minority entrepreneurs are more educated than all other

Table 5 Mean values and (standard deviations) for background characteristics of tech entrepreneurs in NYC, by race & nativity (for F-tests: $* = p < 0.05$, $** = p < 0.01$)

	1st gen. White	1st gen. Non-White	2nd gen. White	2nd gen. Non-White	Native	F-test for group difference
Proportion female	0.13 (0.34)	0.26 (0.45)	0.18 (0.39)	0.17 (0.38)	0.09 (0.29)	NS
Age	40.11 (7.42)	41.47 (6.92)	41.68 (9.82)	34.93 (6.28)	39.99 (8.35)	**
Proportion with white collar or professional father	0.85 (0.36)	0.58 (0.51)	0.74 (0.44)	0.80 (0.40)	0.87 (0.33)	*
Proportion with white collar or professional mother	0.57 (0.50)	0.32 (0.48)	0.31 (0.47)	0.44 (0.50)	0.42 (0.50)	NS
Proportion holding master's or higher	0.52 (0.51)	0.79 (0.42)	0.38 (0.49)	0.32 (0.47)	0.38 (0.49)	**
Family income at age 16	3.36 (1.03)	2.89 (0.99)	3.53 (0.73)	3.46 (0.81)	3.37 (0.80)	NS
Observations	46	19	39	41	180	

subgroups. This latter difference, however, might reflect selection effects for immigrant tech entrepreneurs educated abroad.

Comparison of study sample to data from the American Community Survey

We ascertain the quality of our sample by comparing its demographic composition against that of self-employed individuals working in the software, data processing and internet and internet media industries in New York City in the 2013–2017 pooled data from the American Community Survey (see Table 6). This comparison is necessarily imperfect insofar as certain sectors of the tech economy in New York City (e.g., medical technology or advertising) are likely

Table 6 Mean values for demographic variables in the NY Tech Survey and the 2013–2017 pooled data from the American Community Survey for self-employed individuals working in select tech industries in New York City (for T-tests for cross-mean difference: $* = p < 0.05$, $** = p < 0.01$). *

	NY tech survey	2013–2017 ACS	T-test for independent means
Proportion female	0.13	0.22	**
Age	39.65	42.91	**
Proportion holding master's or higher	0.42	0.47	NS
Proportion foreign born	0.27	0.33	NS
Proportion White	0.79	0.79	NS
Proportion Asian	0.10	0.14	NS
Observations	325*	116	

*N.B. the number of observations in the NY Tech Survey for the age and gender tests are 324 and 319, respectively.

to get classified with non-tech equivalent in the ACS data, but the results are nevertheless useful.

Our sample of CEOs is slightly younger and more male than the comparison population in the American Community Survey, but appears broadly comparable on other dimensions which are central to our study, such as nativity and race. While the ACS does not have data on parental nativity, such demographic similarity suggests our sample to be a robust empirical basis for our study.

References

Alba, R., & Nee, V. (2003). *Remaking the American mainstream: Assimilation and contemporary immigration*. Cambridge: Harvard University Press.

Albion, R. G. (1939). *The rise of New York port, 1815–1860*. New York: Charles Scribner's Sons.

Baltzell, D. (1964). *The Protestant establishment: Aristocracy and caste in America*. New York: Vintage.

Baomol, W. J. (2002). *The free-market innovation machine: Analyzing the growth miracle of capitalism*. Cambridge: MIT Press.

Blau, P. M., & Schwartz, J. E. (1997). *Crosscutting social circles: Testing a macrostructural theory of intergroup relations*. New York: Routledge.

Bonacich, E., & Modell, J. (1980). *The Economic Basis of Ethnic Solidarity: Small Business in the Japanese American Community*. Berkeley, London, and Los Angeles: University of California Press.

Bourdieu, P., & Passeron, J.-C. (1970). *Reproduction in education, culture and society*. London: Sage Publications.

Bowman, N. A., & Park, J. J. (2014). Interracial contact on college campuses: Comparing and contrasting predictors of cross-racial interaction and interracial friendships. *The Journal of Higher Education, 85*(5), 660–690.

Bowles, J., & Giles, D. (2012). *New Tech City*. New York: Center for an Urban Future.

Brubaker, R., Loveman, M., & Stamatov, P. (2004). Ethnicity as cognition. *Theory and Society, 33*, 31–64.

Chang, M. J., Astin, A. W., & Kim, D. (2004). Cross-racial interaction among undergraduates: Some consequences, causes and patterns. *Research in Higher Education, 45*(5), 529–553.

Clemens, E. S., & Cook, J. M. (1999). Politics and institutionalism: Explaining durability and change. *Annual Review of Sociology, 25*, 441–466.

Coleman, J. S. (1990). *Foundations of social theory*. Belknap: Cambridge.

Cometto, M. T., & Piol, A.. 2013. Tech and the City: The making of New York's startup community. Mirandola Press.

DellaPosta, D., & Nee, V. (2019). Emergence of diverse and specialized knowledge in a metropolitan tech cluster. *Social Science Research, 86*, 102377.

DiPrete, T. A., Gelman, M. C. T., Teitler, J., & Zheng, T. (2006). Segregation in social networks based on acquaintanceship and trust. *American Journal of Sociology, 116*(4), 1234–1283.

Dobbin, F. (2009). *Inventing equal opportunity*. Princeton: Princeton University Press.

Dobbin, F., Sutton, J., Meyer, J., & Scott, R. W. (1993). Equal opportunity law and the construction of internal labor markets. *American Journal of Sociology, 99*, 396–427.

Domhoff, G. W. (1967). *Who rules America*. Englewoods Cliffs: Prentice-Hall.

Drouhot, L. G., & Nee, V. (2019). Assimilation and the second generation in Europe and America: Blending and segregating social dynamics between immigrants and natives. *Annual Review of Sociology, 45*, 177–189.

Duncan, B., & Trejo, S. J. (2015). Assessing the socio-economic mobility and integration of U.S. immigrants and their descendants. *Annals of the American Academy of Political and Social Sciences, 657*(1), 108–135.

Edelman, L. B. (1990). Legal environments and organizational governance: The expansion of due process in the American workplace. *American Journal of Sociology, 95*, 1401–1440.

Edelman, L. B. (1992). Legal ambiguity and symbolic structures: Organizational mediation of civil rights law. *American Journal of Sociology, 97*, 1531–1576.

Feliciano, C., & Lanuza, Y. R. (2017). An immigrant paradox? Contextual attainment and intergenerational educational mobility. *American Sociological Review, 82*(1), 211–241.

Florida, R. (2014). *The rise of the creative class—Revisited*. New York: Basic Books.

Foner, N. (2000). *From Ellis Island to JHFK: New York's two great waves of immigration.* New Haven and New York: Yale University Press and Russell Sage Foundation.

Fox, C., & Guglielmo, T. A. (2012). Defining America's racial boundaries: Blacks, Mexicans and European immigrants, 1890-1945. *American Journal of Sociology, 118,* 327–379.

Glaeser, E. (2011). *Triumph of the City: How our greatest invention makes us richer, smarter, greener, healthier, and happier.* New York: Penguin Books.

Gurin, P., Dey, E. L., Hurtado, S., & Gurin, G. (2002). Diversity and higher education: Theory and impact on educational outcomes. *Harvard Educational Review, 72,* 330–366.

Hurtado, S. (1998). Enhancing campus climates for racial/ethnic diversity: Educational policy and practice. *Review of Higher Education, 21,* 279–302.

Imoagene, O. (2017). *Beyond expectations: Second-generation Nigerians in the United States and Britain.* Oakland: University of California Press.

Ignatiev, N. (1995). *How the Irish became white.* New York and London: Routledge.

Jiménez, T. (2017). *The other side of assimilation: How immigrants are changing American life.* Berkeley and Los Angeles: University of California Press.

Kao, G., & Thompson, J. S. (2003). Racial and ethnic stratification in educational achievement and attainment. *Annual Review of Sociology, 29,* 417–442.

Kasinitz, P., Mollenkopf, J. H., Waters, M. C., & Holdaway, J. (2008). *Inheriting the City: The children of immigrants come of age.* New York and Cambridge: Russell Sage Foundation and Harvard University Press.

Kelly, E., & Dobbin, F. (1998). The rise and decline of antidiscrimination enforcement. *American Behavioral Scientist, 41,* 960–984.

Kerr, S. P., & Kerr, W. R. (2016). Immigrant entrepreneurship" *NBER Working Paper Series,* working paper 17–011.

Landes, D. (1969). *The unbound Prometheus.* New York: Cambridge University Press.

Lee, J., & Zhou, M. (2015). *The Asian American achievement paradox.* New York: Russell Sage Foundation.

Light, I. (1973). *Ethnic Enterprise in America.* Berkeley and Los Angeles: University of California Press.

Light, I. (2005). Ethnic economy. In R. Swedberg & N. Smelser (Eds.), *The handbook of economic sociology.* Princeton and Oxford: Princeton University Press.

Light, I., & Bonacich, E. (1991). *Immigrant Entrepreneurs: Koreans in Los Angeles, 1965–1982.* Berkeley and Los Angeles: University of California Press.

Lobo, A., & Salvo, J. J. (2013). The newest new-Yorkers. *2013 Edition.* New York: Department of City Planning.

Marshall, A. (1920) (Eighth edition). *Principles of Economics.* London: MacMillan.

Massey, D. S., & Denton, N. A. (1993). *American apartheid: Segregation and the making of the underclass.* Cambridge: Harvard University Press.

Massey, D. S., Charles, C. Z., Lundy, G. F., & Fischer, M. J. (2002). *The source of the river: The social origins of freshmen at America's selective colleges and universities.* Princeton: Princeton University Press.

McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a feather: Homophily in social networks. *Annual Review of Sociology, 27,* 415–444.

Min, P. G. (2008). *Ethnic solidarity for economic survival: Korean greengrocers in New York City.* New York: Russell Sage Foundation.

Molica, K. A., Gray, B., & Treviño, L. K. (2003). Racial Homophily and its persistence in newcomers' social networks. *Organization Science, 14*(2), 123–136.

Moretti, E. (2012). *The new geography of jobs.* Boston and New York: Houghton Mifflin Harcourt.

Moykr, J. (1990). *The lever of riches.* New York: Oxford University Press.

Morgan, S. L., & Galbgiser, D. (2014). Mexican ancestry, immigrant generation, and educational attainment in the United States. *Sociological Science, 1,* 397–422.

Mulas, V., & Gastelu-Iturri, M. (2016). New York City: Transforming a City into a tech innovation leader. World Bank Reports.

Nee, V. (1998). Norms and networks in economic and organizational performance. *American Economic Review, 88,* 85–89.

Nee, V. (2005). The new institutionalisms in economics and sociology. In N. J. Smelser & R. Swedberg (Eds.), *The handbook of economic sociology* (pp. 49–74). Princeton and New York: Princeton University Press and Russell Sage Foundation.

Nee, V. K., Jeong-han, & Opper, S. (2010). A theory of innovation: Institutions, markets and the firm. *Journal of Institutional and Theoretical Economics, 166,* 397–425.

Nee, V., & Opper, S. (2012). *Capitalism from below: Markets and institutional change in China*. Cambridge: Harvard University Press.

Nee, V., & Alba, R. (2013). Assimilation as rational action in contexts defined by institutions and boundaries. In Rafael Wittek, tom a.B. Snijders, & victor Nee (Eds.) *The Handbook of Rational Choice Social Research* (pp. 355-380). Stanford: Stanford University press.

North, D. C., & Thomas, R. P. (1973). *The rise of the Western world: A new economic history*. Cambridge: Cambridge University Press.

Owen-Smith, J., Powell, W., & Powell, W. (2004). Knowledge networks as channels and conduits: The effects of spillover in the Boston biotechnology community. *Organization Science, 15*, 5–21.

Padgett, J. F., & Powell, W. W. (2012). *The emergence of organizations and markets*. Princeton: Princeton University Press.

Pettigrew, T. (1998). Intergroup contact theory. *Annual Review of Psychology, 49*, 65–85.

Pew Hispanic Center. (2013). Hispanic high school graduates pass whites in rate of college enrollment. Retrieved from http://www.pewresearch.org/fact-tank/2013/09/04/hispanic-college- enrollment-rate-surpasses-whites-for-the-first-time/ (August 2017).

Portes, A., & Zhou, M. (1993). The new second generation: Segmented assimilation and its variants. *Annals of the American Academy of Political and Social Science., 530*, 74–96. https://doi.org/10.1177/0002716293530001006.

Portes, A., & Rumbaut, R. G. (2001). *Legacies: The Story of the Immigrant Generation*. Berkeley & Los Angeles: University of California Press.

Powell, W. W., Koput, K. W., & Smith-Doerr, L. (1996). Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. *Administrative Science Quarterly, 41*, 116–145.

Powell, W. W., White, D. R., Koput, K. W., & Owen-Smith, J. (2005). Network Dynamics and Field Evolution: The Growth of Interorganizational Collaboration in the Life Sciences. *American Journal of Sociology, 110*, 1132–1205.

Rivera, L. (2012). Hiring as cultural matching: The case of elite professional service firms. *American Sociological Review, 77*, 999–1022.

Ruef, M. (2010). *The entrepreneurial group: Social identities, relations, and collective action*. Princeton: Princeton University Press.

Saxenian, A. (1996). *Regional advantage: Culture and competition in Silicon Valley and route 128*. Cambridge: Harvard University Press.

Saxenian, A. (1999). *Silicon Valley's new immigrant entrepreneurs*. San Francisco: Public Policy Institute of California.

Saxenian, A. (2006). *The new Argonauts: Regional advantage in a global economy*. Cambridge: Harvard University Press.

Schumpeter, J. A. (1934). *The Theory of Economic Development:An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle*. Cambridge: Harvard University Press.

Schneiberg, M., & Clemens, E. S. (2006). The typical tools for the job: Research strategies in institutional analysis. *Sociological Theory, 14*, 195–227.

Senor, D., & Singer, S. (2011). *Start-up nation: The story of Israel's economic miracle*. New York: Council of Foreign Relations.

Skrentny, J. (1996). *The ironies of affirmative action: Politics, culture and justice in America*. Chicago: University of Chicago Press.

Skrentny, J. (2002). *The minority rights revolution*. Cambridge: Harvard University Press.

Storper, M. (2013). *Keys to the City: How economics, institutions, social interaction, and politics shape development*. Princeton: Princeton University Press.

Waldinger, R. (1986). Immigrant enterprise: a critique and reformulation. *Theory and Society, 15*, 249–285.

Warikoo, N. (2016). *The diversity bargain: And other dilemmas of race, admissions, and meritocracy at elite universities*. Chicago: University of Chicago Press.

Waters, M. C. (2001). *Black identities: West Indian immigrant dreams and American realities*. Cambridge: Harvard University Press.

Waters, M. C., & Jiménez, T. R. (2005). Assessing immigrant assimilation: New empirical and theoretical challenges. *Annual Review of Sociology, 31*, 105–125.

Waters, M. C., Tran, V. C., Kasinitz, P., & Mollenkopf, J. H. (2010). Segmented assimilation revisited: Types of acculturation and socioeconomic mobility in young adulthood. *Ethnic and Racial Studies, 33*(7), 1168–1193.

Waters, M. C., & Pineau, M. G. (Eds.). (2015). *The Integration of Immigrants into American Society. Panel on the integration of immigrants into American society, committee on population. Division of behavioral and social sciences and education*. Washington, DC: The National Academies Press.

Wilson, K. L., & Portes, A. (1980). Immigrant Enclaves: An Analysis of the Labor Market Experiences of Cubans in Miami. *American Journal of Sociology, 86*, 295–319.

Zhou, M. (1992). *Chinatown: The socioeconomic potential of an urban enclave*. Philadelphia: Temple University Press.

Zweigenhaft, R. L., & Domhoff, G. W. (1998). *Diversity in the power elite: Have women and minorities reached the top?* New Haven: Yale University Press.

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Victor Nee is the Frank and Rosa Rhodes Professor of Economic Sociology at Cornell University. He received his PhD in Sociology from Harvard University. His research program involves studies of the economic institutions of capitalism. Currently he is engaged in research on the American technology economy and is completing a ten-year study of the rise of modern capitalism in the Yangtze River Delta in China. His co-authored books include *The New Institutionalism in Sociology* (1998), *Remaking the American Mainstream* (2003), and *Capitalism from Below* (2012).

Lucas G. Drouhot is a postdoctoral research fellow at the Max Planck Institute for the Study of Religious and Ethnic Diversity (Göttingen, Germany), with substantive interests in international migration, social networks, and social stratification. His current research agenda focuses on the incorporation of children of immigrants in Western Europe and the United States, with an empirical focus on social mobility trajectories, friendship patterns, and acculturation dynamics as they relate to broader processes of assimilation. He holds a PhD in Sociology from Cornell University.