

**Strangers in Their Own Land:
The Participation of Arizona's Hispanic Immigrants in Middle-skilled Healthcare
Occupations**

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“It's very hard to get productivity growth unless you have a lot of increases in the education of the labor force, which we can't really say we've had a lot over the last decade... Ensuring productivity growth, I think, is going to be the real challenge going forward.”

— *Randall S. Kroszner, 1/24/2019*
Deputy Dean for Executive Programs and Norman R. Bobins Professor of Economics,
Chicago Booth School of Business

“A man who finds his homeland sweet is still a tender beginner; he to whom every soil is as his native one is already strong; but the perfect man is he who finds the whole world is like a foreign land.”

— *Hugo de Saint-Victor*

ABSTRACT

The American middle-skilled labor market, which consists of jobs that require some post-secondary training but not a Bachelor's degree, presents various opportunities for Americans to obtain good-paying, socially important occupations without the heavy burden of student debt. However, American employers are facing a challenge: finding employees with the qualifications to fill middle-skilled positions. Projections suggest that the employment gap will only be exacerbated over the course of the next 15 years in a business-as-usual scenario, slowing the growth of the economy and preventing low-skilled workers from ascending to middle-skilled positions. One population that faces sobering challenges in obtaining middle-skilled occupations is the Hispanic/Latinx immigrant community. As a case study, this thesis explores the participation of first and second-generation Hispanic/Latinx immigrants in Arizona middle-skilled healthcare occupations (one of the fastest-growing labor submarkets in the U.S.). Through a variety of state and federal government data, as well as through interviews with key stakeholders in Arizona's middle-skill healthcare market, this thesis aims to establish the potential of Hispanic immigrants to participate more heavily in middle-skilled occupations, as well as define the challenges that this demographic group faces in gaining middle-skilled employment in the healthcare market. The paper finds that Hispanic immigrants participate in middle-skill occupations at a lower rate and participate in low-skilled occupations at a much higher rate than other racial/ethnic groups. In addition, it finds that Hispanic immigrants face significant cultural and socioeconomic barriers in obtaining middle-skilled positions and that they often experience difficulty in navigating the disjointed path to middle-skilled certification and employment. This thesis will conclude with policy recommendations that promote wage growth for Hispanic individuals and improve the productivity in healthcare markets (and perhaps other markets) in which middle-skilled jobs constitute a significant portion of job growth.

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Introduction

This thesis assesses the participation of Hispanic immigrants in middle-skilled healthcare occupations in Arizona’s Maricopa County. Middle-skilled jobs are those which generally require a high school diploma and limited secondary training; in healthcare, they include occupational therapy and physical therapy assistants, medical secretaries, nursing assistants, and many other roles. I define “middle-skill healthcare jobs” as those under the U.S. Bureau of Labor Statistics’ Occupational Profile 31-0000, titled “Healthcare Support Industry Occupations” (see Appendix 1). Though the middle-skilled labor market is growing quickly as a whole, economists have recently tended to highlight healthcare as the foremost of middle-skilled submarkets: the number of these jobs was projected to increase by 41% from 2012 to 2022, the fastest-growing occupational group in the United States.¹ Being known as a region well-suited for retirees (because of climate and standard-of-living), Arizona is home to a significant population of elderly citizens who will require increased healthcare attention in the coming years. When considering this and other factors in Arizona, such as a relatively high economic and population growth rate, the state’s Office of Economic Opportunity projects that the number of healthcare jobs will grow significantly before 2026 – by about 125,000 openings – with middle-skilled jobs constituting 69,215 of them.²

In terms of economic growth, this is good news. However, there is a problem: Federal Reserve officials (and other economists) are concerned that these high-growth labor markets and the U.S. economy will soon experience a shortage of workers.³ Though “labor shortages” may increase wages for workers, employers may struggle to fill job openings, leading to market

¹ Levanon, Gad, Ben Cheng, and Michael Paterra. "The risk of future labor shortages in different occupations and industries in the United States." *Business Economics* 49, no. 4 (2014): 227-243.

² Arizona Office of Economic Opportunity, *Arizona 10-Year Industry Employment Projections: 2016-2026*

³ The Federal Reserve, *April 19, 2017 National Summary*

convulsions and efficiency issues due to curbed growth. With an unemployment rate of 3.7% as of December 2018, companies in states across the country have begun to stress the difficulty they have had in hiring new employees, Arizona being one of those states.^{4,5,6} In order to meet economic growth, it is crucial for there to be a supply of workers who can fill the positions that arise. This is especially true for middle-skilled positions like those in healthcare, which are projected to grow at the highest rate.⁷ Filling middle-skilled labor, though a national challenge, is a localized issue and should be treated with solutions at the state and local level, but with assistance from the Federal Government.

With an estimated 920,000 foreign-born residents who largely come from Mexico and make up 13.4 percent of the population, Arizona is one of the American states with the most Hispanic immigrants, particularly by percentage.⁸ Institutional, scholarly, and popular perspectives that have motivated immigration policy as it pertains to labor have tended to present immigrants as belonging to one of two dichotomous groups – high-skilled or low-skilled.^{9,10,11,12} An approach that supposes immigrant laborers (especially those from Mexico and other Latin American countries to the south) can only be high-skilled or low-skilled negates their collective role in a market that is essential to the economy: middle-skilled labor. Moreover, these

⁴ Freeman, James. "Trump and America's Immigrant Shortage." *The Wall Street Journal*, Dow Jones & Company, 17 May 2018.

⁵ Rico, Gabriela. "Labor Shortage Impacting Tucson, U.S., Becoming Economic Threat." *Arizona Daily Star*, Arizona Daily Star, 23 Sept. 2018.

⁶ The Conference Board, "New Trend: Blue-Collar Workers are now Scarcer than White-Collared Workers." Conference Board Press Release, 13 December 2018.

⁷ Levanon, Gad, Ben Cheng, and Michael Pattera. "The risk of future labor shortages in different occupations and industries in the United States." *Business Economics* 49, no. 4 (2014): 227-243.

⁸ New American Economy, *The Contributions of New Americans in Arizona*. New American Economy, August 2016. Accessed November 14, 2018.

⁹ Borjas, George J., and Lawrence F. Katz. "The evolution of the Mexican-born workforce in the United States." *Mexican immigration to the United States*. University of Chicago Press, 2007.

¹⁰ Champlin, Dell. "Institutionalist perspectives on immigration policy: An update." *Journal of Economic Issues* 44, no. 2 (2010): 301-312

¹¹ Holzer, Harry J. *Immigration policy and less-skilled workers in the United States: Reflections on future directions for reform*. No. 22. IZA Policy Paper, 2011.

¹² Hainmueller, Jens, and Michael J. Hiscox. "Attitudes toward highly skilled and low-skilled immigration: Evidence from a survey experiment." *American political science review* 104, no. 1 (2010): 61-84.

institutional and popular perspectives ignore the potential of immigrants to gain the skills necessary to work in a middle-skilled job. To be sure, think tanks like the Migration Policy Institute and the National Skills Coalition have spurred conversation that considers middle-skilled immigrant labor as its own skill tier^{13,14}, but academic literature and popular perspectives have scarcely discussed immigrant participation in middle-skilled positions. These trends in immigration policy and scholarship lead me to a few questions: could first and second-generation Hispanic immigrants in Arizona play a greater role in the middle-skilled labor market? What factors are preventing Hispanic immigrants from filling middle-skilled jobs at higher rates?

In order to assess Hispanic participation in middle-skilled jobs in Arizona's Maricopa County, I focus on the local healthcare labor market, which is incredibly important in the expanding economy. I utilize quantitative data that illustrates the employment, ethnicity, and origin of birth details of middle-skilled healthcare workers. In addition, I have conducted interviews with middle-skill healthcare employees and their employers, immigrants seeking middle-skilled healthcare positions, and community social service agencies, which supplement the quantitative data and shed light on the various challenges that Hispanic immigrants face when entering the middle-skilled healthcare sector. My data demonstrates that Hispanic individuals are more likely to serve in low-skilled jobs than other groups, suggesting that there is great potential for the Hispanic demographic to upskill into middle-skilled positions. Additionally, my interviews demonstrate that the difficulties Hispanic immigrants face in navigating an excessively complicated system may be widespread and systematic. These challenges mainly stem from the difficulty of navigating a complicated middle-skilled

¹³ Capps, R., Fix, M., & Lin, S. Y. Y. (2010). *Still an Hourglass?: Immigrant Workers in Middle-skilled Jobs*. Migration Policy Institute.

¹⁴ National Skills Coalition, "Middle-Skill Credentials and Immigrant Workers: Arizona's Untapped Assets." National Skills Coalition.

occupational attainment system and a lack of information about it, which are compounded by language, cultural, and socioeconomic barriers that are more specific to Hispanic immigrants. Subsequently, I make policy recommendations that benefit U.S. healthcare labor markets, including reconsidering institutional perspectives on low-skilled immigrant laborers, as well as establishing an organizational structure that more plainly and explicitly connects aspiring immigrant workers to state and local government, certification-granting institutions and community organizations, clearly outlining the path to middle-skilled occupations. In turn, these recommendations could create a stronger, more efficient economy and provide better wages and working conditions for immigrants in Arizona and the United States.

Background

The late 19th Century brought an influx of migrants from regions other than Western Europe to the United States, including Eastern Asia and Mexico, the latter of which would become the largest source of immigrants for the U.S. throughout most of the 20th Century. The number of migrants from Mexico surged during the Mexican Revolution, and by 1930, the number of Mexican immigrants in the United States reached a conservatively estimated 600,000. Conveniently, the migrants largely settled in the Southwestern United States, in areas just north of the Mexico-U.S. border like Texas, New Mexico, California, and Arizona.¹⁵

Besides shaping the Southwestern United States in several cultural aspects, immigrants from Mexico (as well as other Latin American countries) played a huge role in several sectors of the Southwestern economy, especially the agricultural sector. Even while the U.S. Congress enacted exclusion and quota laws in the 1920s, Mexicans were exempt from any such laws. This was in part because few Mexicans stayed in the United States permanently (they migrated

¹⁵ Durand, J., Massey, D. S., & Zenteno, R. M. (2001). Mexican immigration to the United States: Continuities and changes. *Latin American research review*, 36(1), 107.

between Mexico and the U.S.). In addition, agricultural bosses in the Southwest lobbied the American executive branch to exempt Mexicans from the 1917 literacy requirement for immigrants.¹⁶ By the mid-20th Century, Mexicans were immigrating to the United States in greater numbers than any other ethnic or national group.

During the 1960s, institutional and popular views of Mexican immigrants began to change when, in 1964, the American government ended the Bracero Program, which allowed Mexican workers to migrate freely between the U.S. and Mexico. Though many of the earlier immigrants up to that point temporarily migrated to the American West as agricultural workers, Mexicans began to settle permanently in the United States due to the dangerous consequences of frequent border crossings (inability to reenter the United States and family separation). After 1965, a growing number of immigrants have come to the United States seeking favorable economic conditions rather than seeking specific employment opportunities.¹⁷ This means that the roles that Mexican and Latin American immigrants have played in the United States economy have become more diverse. However, Latin American immigrants still face relatively limited job opportunities, considering that they tend to have the lowest educational attainment of all immigrant groups.¹⁸ Largely, their jobs remain low-skilled – mostly in positions in the construction, transportation, and service sectors.¹⁹ In addition, it is important to note that an increasing number of Hispanic immigrants are coming to the United States with skilled and specialized knowledge, such as physicians' degrees.²⁰ Immigrants to America, including

¹⁶ Roseblatt, Karin Alejandra. *The Science and Politics of Race in Mexico and the United States, 1910-1950*. Chapel Hill: The University of North Carolina Press (2018), 82.

¹⁷ Eckstein, Susan, and Giovanni Peri. "Immigrant Niches and Immigrant Networks in the US Labor Market." *RSF* (2018).

¹⁸ Krogstad, Jens Manuel, and Jynnah Radford. "Education Levels of U.S. Immigrants Are on the Rise." *Pew Research Center*, Pew Research Center, 14 Sept. 2018. Web.

¹⁹ Eckstein, Susan, and Giovanni Peri. "Immigrant Niches and Immigrant Networks in the US Labor Market." *RSF* (2018).

²⁰ Zúñiga, Elena, and Miguel Molina. "Demographic trends in Mexico: The implications for skilled migration." *Washington DC: Migration Policy Institute* 3 (2008).

Hispanic immigrants, are likely to have either completed post-baccalaureate education or to lack a high school diploma.^{21,22} In other words, immigrants are more likely to be either high-skilled or low-skilled. This occurs because the United States Citizenship and Immigration Services tends to prioritize admitting high-skilled immigrants into the country, while illegal migrants tend to work low-skilled positions, even if they held middle-skilled positions in their countries of origin (this will be demonstrated in the Literature Review section). Though the jobs that Hispanic immigrants work tend to be low-wage and more labor-intensive, many persevere and provide opportunities, even if those opportunities occur in limited quantities, for their children to rise socioeconomically.²³

In the 21st Century, immigration policy has become a central issue for lawmakers in Washington, D.C. and beyond, garnering the attention of citizens, politicians, and news outlets. Yet, the issues surrounding immigration policy remain completely unresolved by the Federal Government, which has galvanized state governments to take their own action on immigration policy, resulting in localized immigration law. In part, the divisive and polarizing debate about immigrants is not informed by a fact-based, logical approach to immigration. Rather, it has been reduced to a varying array of powerful political symbols, which include but are not limited to: a supposed border wall on the Southern Border, MS-13 and other criminal migrants, and the idea that immigrants take “American jobs.” At the same time, deplorable border conditions and images like helpless children being interned and separated from their parents has increasingly polarized the debate and turned it into a moral question.

²¹ Hainmueller, Jens, and Michael J. Hiscox. "Attitudes toward highly skilled and low-skilled immigration: Evidence from a survey experiment." *American political science review* 104, no. 1 (2010): 61-84.

²² Frank, Morgan R., Sun Lijun, Cebrian Manuel, Youn Hyejin, and Rahwan Iyad (2018, February). Small cities face greater impact from automation. *Journal of The Royal Society Interface* 15(139), 20170946.

²³ Portes, Alejandro, and Patricia Fernández-Kelly. "No margin for error: Educational and occupational achievement among disadvantaged children of immigrants." *The annals of the American academy of political and social science* 620.1 (2008): 12-36.

One of the most important rhetorical symbols are the immigrants who, according to 45th President of the United States Donald Trump, are “taking [American] jobs.”²⁴ According to a U.S. Gallup poll conducted in June 2017, 28% of respondents believed that increased immigration makes economic opportunities worse in the U.S., while only 20% believed that immigrants improve economic conditions.²⁵ Considering that economic opportunities are more robust in some states and communities (e.g., opportunities are more abundant in urban localities than in rural ones) than others, individuals may view the economic circumstances of their local communities as a reflection of wider economic circumstances in the United States. Even if immigrants aren’t taking jobs in their communities, there are few economic opportunities, which they believe (wrongly) must reflect that there are few available jobs in the United States. This sociological phenomenon may lead voters to believe and support President Trump’s statements about immigrants taking the jobs of native-born American residents²⁶, even when available economic data does not validate those statements. In fact, economic data suggests the opposite: there are not enough workers to fill positions in the United States.²⁷

As of December 2018, the United States is experiencing an extremely tight labor market, with unemployment falling to 3.7%. As the labor market becomes tighter, the U.S. will face a conundrum – its economy will grow and job opportunities will abound; however, the populace will not be able to fill those jobs. These conditions constitute what economists call a “labor shortage,” and many project that the United States will soon face pernicious labor shortages if

²⁴ Hoban, Brennan. “Do Immigrants ‘Steal’ Jobs from American Workers?” *Brookings.edu*, The Brookings Institution, 19 July 2018. Web.

²⁵ Gallup, Inc. “Immigration.” *Gallup.com*, 2017. Web.

²⁶ It is worth noting that this support from a significant subsection of the American populace enables the Trump administration to maintain its immigration policies, which not only separates young migrants from their parents, but reduces the number of immigrants in the United States.

²⁷ Important to remember: employment openings are highly localized and largely require some technical skills required through post-secondary training.

economic factors remain constant.²⁸ Though researchers like Sophia Koropeckyj of Moody's Analytics predict that the lack of workers will push wages up and thus attract more workers (leading to an equilibrium)²⁹, the lack of attention given to middle-skilled work may still render a dearth of workers.³⁰ A substantial number of workers who received training for occupational jobs, especially middle-skilled jobs, are now reaching retirement age, leaving middle-skilled labor markets in a vulnerable state. Notably, researchers have claimed that there are relatively few immigrants working in these occupations.³¹

One subsection of the American populace that tends to work low-skilled jobs and could benefit significantly from improved pathways into middle-skilled jobs is immigrant workers, which policy institutes have been astute to recognize. This is especially true of the Hispanic immigrant population of Arizona. Immigrant workers, as mentioned earlier, are likely to be either low-skilled or high-skilled^{32,33}, and even those with technical skills from their home country have a difficult time gaining certification from American institutions, simply because American institutions are so different from the ones immigrant workers are familiar with. In Arizona, about 20% of immigrant population holds a Bachelor's degree or higher, but the majority of immigrants have low levels of education: 23% have a high school diploma or equivalent while 38% have not finished high school.³⁴ These data points suggest a great potential for an increased number of middle-skill laborers if the state officials are willing to invest in educating and assisting its immigrant population, which would in turn improve the efficiency of

²⁸ Marshall, Patrick. "Labor Shortage Debate." *CQ Press*, CQ Researcher, Sept. 2018.

²⁹ Mutikani, Lucia. "U.S. Job Openings Hit Record High; Workers More Scarce." *Reuters*, Thomson Reuters, 12 Feb. 2019. Web.

³⁰ Maselli, I. (2012). The evolving supply and demand of skills in the labour market. *Intereconomics*, 47(1), 22-30.

³¹ Levanon, Gad, Ben Cheng, and Michael Paterra. "The risk of future labor shortages in different occupations and industries in the United States." *Business Economics* 49, no. 4 (2014): 227-243.

³² Zúñiga, Elena, and Miguel Molina. "Demographic trends in Mexico: The implications for skilled migration." Washington DC: Migration Policy Institute 3 (2008).

³³ Frank, Morgan R., Sun Lijun, Cebrian Manuel, Youn Hyejin, and Rahwan Iyad (2018, February). Small cities face greater impact from automation. *Journal of The Royal Society Interface* 15(139), 20170946.

³⁴ Migration Policy Institute. "State Demographics Data - US." *Migrationpolicy.org*, 1 Nov. 2018. Web.

the labor economy.

Arizona's immigrants do contribute significantly to the healthcare economy, though it is difficult to calculate to what extent. Scholars and researchers have not been particularly interested in measuring the share of immigrants and their ethnic/national characteristics in certain job markets, leading to a dearth of scholarly literature on the matter. According to a recent study, it is estimated that foreign-born/educated people make up 27% of the physician population and 35% of the psychiatrist population. However, the contributions to middle-skilled jobs are lower: foreign-born workers make up approximately 17% of the nursing, psychiatric, and home health professions.³⁵ The significant difference is emblematic of an effort to increase the number of high-skilled immigrant workers in the U.S. through visa programs, while middle-skilled professions have largely been ignored by state and federal officials.

The same study demonstrates that for every twelve job openings in Arizona's healthcare market, there is one unemployed healthcare worker, suggesting that the misalignment of supply and demand has already begun to take effect.³⁶ Jobs in the Arizona healthcare market will only continue to grow with the aging of the Baby Boomer generation and a significant number of retirees requiring increased healthcare attention. Figure 1 demonstrates that the Arizona healthcare labor employment has expanded extensively since 2008, growing between 2 and 4.5% yearly (excluding 2014), which is still significantly greater than the healthcare industry's growth in the United States. The magnitude of the healthcare sector's continued labor growth is especially clear when compared to other industries in the Arizona economy, which have been generally increasing since 2010, but at relatively modest rates (see Figure 2). Despite growth in

³⁵ New American Economy, *The Contributions of New Americans in Arizona*. New American Economy, August 2016. Accessed November 14, 2018.

³⁶ The ratio 12:1 ratio of jobs to unemployed workers should not be viewed as a precise measurement since not all middle-skilled job seekers obtain their positions through online websites. Rather, it is an imperfect suggestion of the lack of middle-skilled workers seeking middle-skilled healthcare jobs.

employment, the healthcare industry is still experiencing a shortage of qualified workers, a trend that is expected to continue *ceteris paribus*. The state has predicted that the number of middle-skilled healthcare jobs will grow by about 26,000 by 2026, an increase of 44.8% from 2016.³⁷ When considering that 72,964 available healthcare jobs were advertised online in 2014, it is evident that the healthcare market is experiencing substantial growth in Arizona in the coming years.

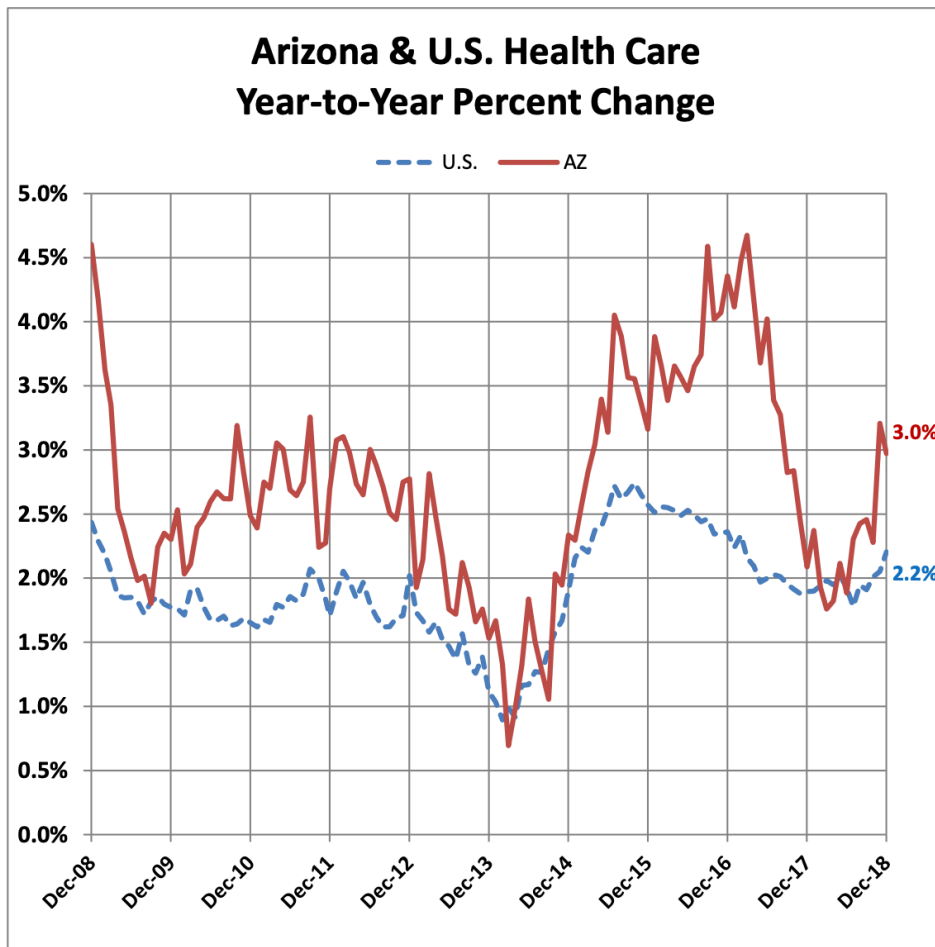


Figure 1: Arizona and U.S. Health Care Employment Growth by Year
 Prepared by the Arizona Office of Economic Opportunity,
 in cooperation with the U.S. Dept. of Labor and Bureau of Labor Statistics

³⁷ Arizona Office of Economic Opportunity, Arizona 10-Year Industry Employment Projections: 2016-2026

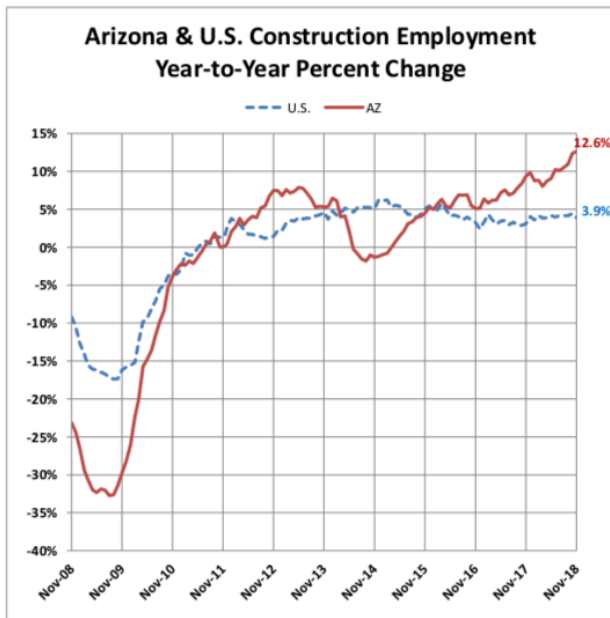
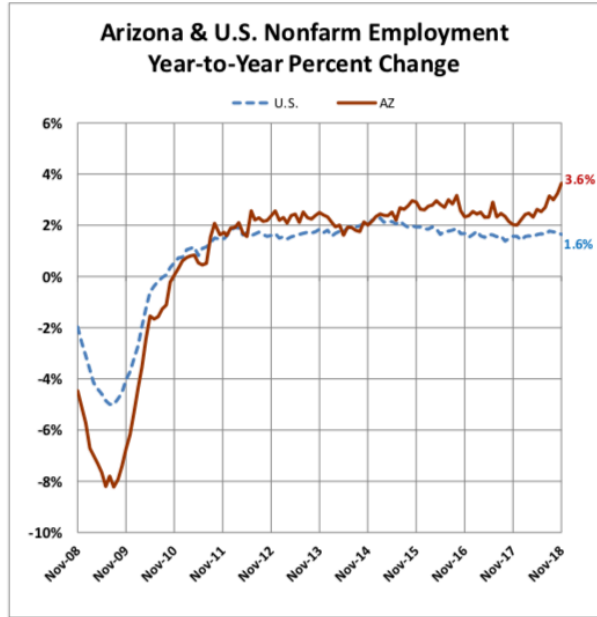
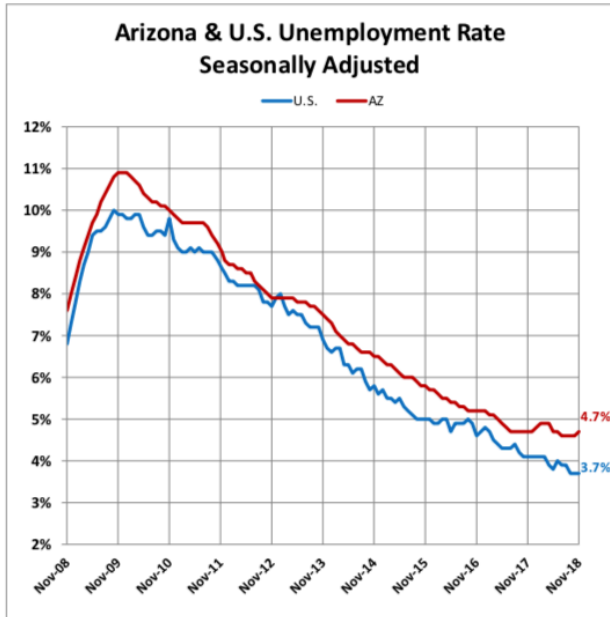


Figure 2: Arizona and U.S. Construction, Manufacturing, and General Employment Growth by Year
 Prepared by the Arizona Office of Economic Opportunity,
 in cooperation with the U.S. Dept. of Labor and Bureau of Labor Statistics

Literature Review

Scholarship has tended to focus on the migrant labor debate, especially as it pertains to Hispanic migrants, as a question of high-skilled and low-skilled laborers. Because this dichotomous approach negates the potential for low-skilled laborers to become middle-skilled workers, sorting immigrant laborers into one of two categories is reductive and over-simplistic. Nonetheless, it is understandable why the debate has been framed in this context – data suggests that migrants do typically come to the United States being either very low-skilled or very high-skilled, especially those from Mexico.^{38,39} The increasing number of high-skilled immigrants in the United States is a result of the country's current immigration policies, informed by the generally-accepted economic opinion that high-skilled workers benefit the economy.⁴⁰

Dell Champlin has demonstrated that the conversation regarding low-skilled workers has not reached a consensus. However, low-skilled immigrants are generally viewed by institutional economists and decision makers as having a negative effect on the economy by lowering wages for native workers and paying lower taxes, thus leading to the creation of immigration policies that are increasingly taxing of migrants and their health.⁴¹ Champlin challenges this notion that low-skilled workers don't bring value to the economy, claiming that the erroneous acceptance of this idea has led to the implementation of harsh deportation and border security policies. Such policies disproportionately affect Hispanic immigrants, who generally come from Mexico or Central America.

³⁸ Borjas, George J., and Lawrence F. Katz. "The evolution of the Mexican-born workforce in the United States." *Mexican immigration to the United States*. University of Chicago Press, 2007.

³⁹ Zúñiga, Elena, and Miguel Molina. "Demographic trends in Mexico: The implications for skilled migration." Washington DC: Migration Policy Institute 3 (2008).

⁴⁰ Holzer, Harry J. Immigration policy and less-skilled workers in the United States: Reflections on future directions for reform. No. 22. IZA Policy Paper, 2011.

⁴¹ Champlin, Dell. "Institutionalist perspectives on immigration policy: An update." *Journal of Economic Issues* 44, no. 2 (2010): 301-312

Though Champlin does address misconceptions of the economics of immigration, even his argument ignores the potential of immigrants to move into middle-skilled jobs. The requirements necessary for gaining middle-skilled occupation – a high school diploma and some post-secondary training – should not be left completely out of the question for immigrants, even if they tend to come without those necessary skills.

Recent scholarship has begun to refute the notion that workers who come to the United States are either low or high-skilled and challenge that this classification should be solely based on the work that they do in the U.S. For instance, Hagan et al. document that even Hispanic immigrant laborers in low-skilled positions have some type of post-secondary training that they received in their native country.⁴² In “Skills on the Move,” the scholars perform a case study of 111 Hispanic immigrant construction workers, finding that the workers came to the United States with technical skillsets that they acquired in their communities of origin. According to the study, low levels of human capital keep some immigrants trapped in low-wage construction jobs, whereas others with soft skills can rise by using these skills and receiving more training.⁴³ Social and human capital are broadly defined in the scholastic canon as “productive resources that are the result of investment” – they include education, experience, natural talent, and most importantly, relationships between individuals.⁴⁴ For example, immigrants sometimes obtain employment by exercising soft skills or through working with a community organization. The Hagan et al. study also demonstrates an obvious but easily forgotten point – that Hispanic immigrants, regardless of their occupations in the United States, typically have the potential to

⁴² Hagan, Jacqueline, Nichola Lowe, and Christian Quingla. "Skills on the move: Rethinking the relationship between human capital and immigrant economic mobility." *Work and occupations* 38, no. 2 (2011): 149-178.

⁴³ The study also demonstrates that skilled workers have a hard time translating their certifications or degrees in the United States, a point that will be important in my discussion of the difficulties facing Hispanic immigrants seeking middle-skilled healthcare opportunities.

⁴⁴ Piazza-Georgi, Barbara. "The role of human and social capital in growth: extending our understanding." *Cambridge Journal of Economics* 26.4 (2002): 461-479.

gain mid-skill employment (in the study's case, individuals have already demonstrated their aptitude in their origin countries), but face impediments to gaining middle-skill certification and access to greater socioeconomic mobility (e.g., low levels of human capital). Not only would greater socioeconomic mobility benefit Hispanic immigrants, but it would benefit the broader economy in numerous ways: higher productivity, greater financial contribution to the state (through taxes), and better prices for consumers.⁴⁵ Researchers have asked questions regarding why Hispanic immigrants often struggle to advance socioeconomically, citing a variety of reasons and elucidating several phenomena, including the of psychological burden an individual or their family member's status as undocumented.^{46,47,48,49}

Even though one may think that documented immigrants may have more human and social capital than undocumented immigrants, St-Hillaire suggests that many children of immigrants in San Diego don't find social capital to be highly important to their socioeconomic success.⁵⁰ Hagan et al. and St-Hillaire's studies of immigrants suggest an important complication for socioeconomic mobility: maybe immigrant families, even those who are documented, haven't reached full socioeconomic potential because of a lack of social and human capital. More importantly, perhaps Hispanic immigrants (both first and second-generation) don't always understand the importance of social and human capital in the culture of American economic advancement. This, according to Xue Lan and Preissle, is manifest in the fact that Hispanic

⁴⁵ Holzer, Harry J. Immigration policy and less-skilled workers in the United States: Reflections on future directions for reform. No. 22. IZA Policy Paper, 2011.

⁴⁶ Amuedo-Dorantes, Catalina, Thitima Puttitanun, and Ana P. Martinez-Donate. "How do tougher immigration measures affect unauthorized immigrants?" *Demography* 50, no. 3 (2013): 1067-1091.

⁴⁷ Massey, Douglas S. "Do undocumented migrants earn lower wages than legal immigrants? New evidence from Mexico." *International Migration Review* 21.2 (1987): 236-274.

⁴⁸ Livingston, Gretchen, and Joan R. Kahn. "An American dream unfulfilled: The limited mobility of Mexican Americans." *Social Science Quarterly* 83, no. 4 (2002): 1003-1012.

⁴⁹ Enriquez, Laura E. "Multigenerational punishment: Shared experiences of undocumented immigration status within mixed-status families." *Journal of Marriage and Family* 77.4 (2015): 939-953.

⁵⁰ St-Hillaire, Aonghas. "The social adaptation of children of Mexican immigrants: Educational aspirations beyond junior high school." *Social science quarterly* 83, no. 4 (2002): 1026-1043.

immigrants are the most likely group of immigrants to drop-out of high school, even if this is certainly not the main motivating factor in Hispanic high school dropout rates, which is a complex phenomenon.⁵¹

Social and human capital are integral to the growing middle-skilled labor market, which consists of jobs that require post-secondary education and navigation of a complicated training system. Scholarly literature has largely neglected the economic implications of a growing middle-skilled job market, but policy think tanks, such as the National Skills Coalition (NSC), have produced a significant amount of literature on the matter, observing state changes in skill attainment-promoting policies and outlining how promoting middle-skilled occupational education fits into the larger schemes of state and local economies.⁵² The NSC has noted that the field is changing rapidly, and that skills policies should be highly localized. In Arizona, the location of my study, historical economic data from the Bureau of Labor Statistics (BLS) suggests that there were not enough middle-skilled workers to fill middle-skilled jobs in 2012, and that there were more low-skilled workers than low-skilled jobs available (see Figure 3).

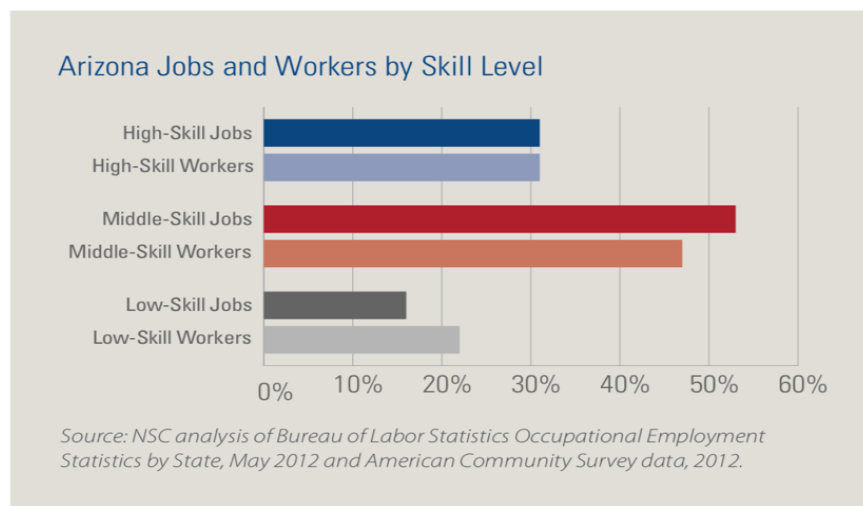


Figure 3: Arizona Jobs and Workers by Skill Level, 2012.

⁵¹ Rong, Xue Lan, and Judith Preissle. *Educating Immigrant Students. What We Need To Know To Meet the Challenges*. Corwin Press, Inc., A Sage Publications Company, 2455 Teller Road, Thousand Oaks, CA 91320, 1998.

⁵² Bergson-Shilcock, Amanda. "At the intersection of immigration and skills policy: A roadmap to smart policies for state and local leaders." *National Skills Coalition*, September 2018.

David Autor demonstrated that during the past four and a half decades, middle-skilled employment fell from constituting 38.4 to 23.3 percent of labor hours worked. During the same period, the number of high-skilled labor hours increased significantly (30.2 to 46.2 percent), while low-skilled work changed minimally (31.4 to 30.6 percent). From this, he draws that “occupational polarization appears to be a case of the middle-class joining the upper-class,” which he notes as “not something that economists should be worried about.”⁵³ This may be true, but ignores the fact that low-skilled employment has not changed; it can be assumed that greater inequality likely exists as a result.

Since 1980, the share of non-college employment in middle-skilled jobs has fallen from 43 to 29 percent, Autor notes. Though this general trend is worth noting, Autor separates workers into college-educated and non-college-educated groups, a binary distinction that doesn’t successfully portray the various types of college degrees. Nonetheless, Autor argues that urban labor markets have become more polarized, and that this polarization has been “far more disruptive for less-educated workers than they have been for more-educated workers.” This means that low-skilled workers have been adversely affected by market polarization, and are not likely to move into middle-skilled positions. One point that Autor fails to address is that, despite increased market polarization, middle-skilled positions that require post-secondary training are increasing faster than other types of positions. Before the eyes of economists and government officials, the nature of the required education for middle-skilled labor has also changed, as employers cannot find workers with the qualifications to fill middle-skilled positions.

In sum, academic and institutional perspectives have focused on the immigrant labor question as a binary matter of high-skilled and low-skilled workers, ignoring the potential of

⁵³ Autor, David H. "Work of the Past, Work of the Future." *Richard T. Ely Lecture given at Annual Meeting of American Economics Association, Atlanta, GA, January*. Vol. 4. 2019.

low-skilled Hispanic immigrants to upskill into middle-skilled jobs. Meanwhile, many factors inhibit Hispanic immigrants from gaining middle-skilled occupation, including language and cultural barriers, as well as a lack of human and social capital. While academics have studied the polarization of the contemporary labor market, they have scarcely focused on the middle-skilled labor market, and much less on the racial/ethnic characteristics and backgrounds of those working in middle-skilled jobs in comparison to low and high-skilled jobs.

Methods

In order to study the participation of Hispanic immigrants in middle-skilled healthcare positions, I chose Arizona as a case study for several reasons: Arizona has a large immigrant population, is home to a significant number of Hispanic immigrants who come from Mexico and other Latin American Countries further south⁵⁴, has a quickly-growing economy in the Phoenix region, and has an aging population of retirees who will need more healthcare access. Though I hope my research provokes reflections about immigrant laborers in the United States (especially Hispanic immigrants) more broadly, I am focusing my study on Arizona because the crossroads of middle-skilled labor and immigration are best approached at a more localized level. In addition, I have decided to gather information on middle-skilled healthcare jobs for similar reasons: to narrow the sights of my study on a market that is especially emblematic of the growth that the economy and middle-skilled job markets will see. Additionally, I wanted to focus on healthcare because it is an essential industry not only in our economy, but also in our society. Without an efficient system of healthcare due to insufficient employees, individuals will receive lower quality medical care and suffer worse health outcomes.

I utilize a mixed-methods approach in this thesis. First, I use quantitative data from the

⁵⁴ 60% of foreign-born people (documented and undocumented) in Arizona are Latino.

U.S. Bureau of Labor Statistics, the Arizona Office of Economic Opportunity, and the American Community Survey for a variety of purposes: (1) to make projections of the future employment gap in middle-skilled healthcare jobs in Arizona, (2) to estimate potential wage and productivity growth in Arizona, and (3) to assess the participation of immigrants and Hispanics in low-skilled and middle-skilled positions (especially compared to other groups). In addition, qualitative data plays a significant role in my research. I conducted semi-structured interviews with a variety of stakeholders in the Arizona healthcare market, including middle-skilled labor experts, middle-skill healthcare employees, healthcare employers, immigrants seeking middle-skilled healthcare positions, and members of community social service agencies. I agreed to keep the identities of the participants in my interviews confidential; in this thesis, they are referred to by pseudonyms (unless otherwise noted). This qualitative data serves to supplement the quantitative data by illuminating what challenges these stakeholders face in obtaining (or helping others obtain) middle-skilled employment, as well as to understand what policies (private and governmental) have been successful in increasing the number of middle-skilled immigrant laborers. This approach is best served to provide answers for how first and second-generation Hispanic immigrants in Arizona could play a greater role in the middle-skilled labor market and what factors inhibit upskilling into middle-skilled jobs. In sum, the quantitative element is essential for providing overall economic data and describing general trends, but the qualitative information is critical for helping us understand the specific and more complex circumstances, unique and shared, that individuals face.

Quantitative Data

Usually, middle-skilled healthcare occupations are defined as occupations in the health industry that require some post-secondary training but not a Bachelor's degree. The United

States Bureau of Labor Statistics defines such jobs under Occupational Profile 31-0000 (see Appendix 1). For my analysis, I used this definition of middle-skilled healthcare jobs in order to assess market growth and labor participation. Some of these occupations only require limited on-the-job training, but this is still considered post-secondary training.

For this thesis, I used available data from multiple sources: the U.S. Bureau of Labor Statistics (BLS), the Arizona Office of Economic Opportunity (AZOEO), and the American Community Survey (ACS). I used the data for three main tasks:

1. To project the future employment gap in middle-skilled healthcare jobs in Arizona
2. To estimate potential wage and productivity growth in Arizona under different scenarios
3. To assess the participation of immigrants and Hispanics in middle-skilled healthcare jobs, as well as in low-skilled and high-skilled jobs

For the first task, I used projections of employment growth and projected job openings from the Arizona Office of Economic Opportunity's Long-Term Employment Projections to 2026⁵⁵. From these data, I calculated the projected shortages. To demonstrate the potential gains for low-skilled employees, I used the same data. To calculate the potential wage growth in the middle-skilled healthcare market, I subtracted a yearly wage based on minimum wage (the assumed general income for low-skilled work) from the average wage of each middle-skilled healthcare job.

Finally, to assess the participation of immigrants and Hispanics in middle-skilled healthcare jobs and low-skilled jobs, I used employment estimation data from the American Community Survey (ACS), a branch of the U.S. Census Bureau that estimates population and employment figures between census years. More specifically, I used ACS's 2017 1-year "Sex by

⁵⁵ Arizona Office of Economic Opportunity, Arizona 10-Year Industry Employment Projections: 2016-2026

Occupation for the Civilian Employed Population 16 Years and Over” data for six different populations: Hispanic/Latino, non-Hispanic White (or European-American), Asian, Black/African-American, American Indian, and “Other” (which consists any individuals not belonging to the previous five groups). This was the most recent data available that provided detailed occupational employment estimates while also denoting those occupational figures based on racial group. It would have been preferable to use 5-year estimates rather than the 1-year estimates, but occupational data on the 5-year estimates were less detailed.

I used three statistical tests (Pearson’s chi-square test, likelihood ratio test, and baseline-category logit model for nominal responses) on the data to assess whether Arizona’s Hispanic population (which largely consists of first or second-generation immigrants) was underrepresented, overrepresented, or appropriately represented in various occupation types. The dozens of occupation types were categorized into three different skills groups: low-skilled, middle-skilled, and high-skilled. I used these three tests to assess a null hypothesis: that race and occupation type (high, middle, or low-skilled) are independent of each other. In other words, rejecting the null hypothesis would mean that race and tier of skill are strongly correlated variables in Arizona’s laborer population.

Ultimately, I found noticeable trends in the participation of Arizona’s Hispanic population in jobs of different occupational skill level. In other words, I analyzed how likely it is for Arizona’s Hispanics to work in middle-skilled occupations, and whether they predominately constitute the low-skilled market. This holds implications for their potential to rise from low-skilled positions into the middle-skill labor market (especially the middle-skilled healthcare submarket). If one group comprises a relatively higher percent of low-skilled positions, it means there are many low-skilled workers who could potentially upskill and fill middle-skilled jobs.

Qualitative Data

To supplement the quantitative data, I conducted 17 interviews with stakeholders in the middle-skilled healthcare market to better understand what social factors impact an individual's ability or decision to pursue a middle-skilled healthcare occupation, as well as to understand the healthcare sector's criteria for hiring middle-skilled employees. The interviews were with various types of stakeholders, including: middle-skill healthcare employees, healthcare employers (usually human resources representatives), first and second-generation immigrants seeking (or who had previously sought) middle-skilled healthcare positions, and community social service agents. Some of the institutions that the interviewees were associated with included: Banner Health, Mayo Clinic, Pima Medical Institute, Phoenix College, Friendly House, and Chicanos Por La Causa, all of which are located in Maricopa County. I also interviewed middle-skilled labor experts from the National Skills Coalition (NSC).

During the semi-structured interviews, I asked questions intended to clarify the factors that motivate Hispanic immigrants into middle-skilled healthcare jobs, as well as to elucidate the factors that prevent Hispanic immigrants from pursuing such jobs. The interviews that I conducted provided information critical to understanding the training and employment processes for Hispanic laborers seeking middle-skilled opportunities. The questions that I approached each interview with varied on each individual and their role in the middle-skilled healthcare labor market. Often, I allowed the discussion to stray from my prepared questions, which offered unexpected but often significant details and insights. Ultimately, my goal was to determine whether there were overarching reasons for success and failure in the pursuit of middle-skilled occupations – whether those reasons were simple details capable of fitting into a statistical analysis or complex factors that demand exploration through qualitative analysis.

These methods faced limitations. By no means were my interviews an exhaustive study of stakeholders in the middle-skilled market. Given more time and greater resources, I would have liked to interview more people, especially more middle-skilled Hispanic laborers. Everyone had a unique story, with personal circumstances that changed the nature of their aspirations and the barriers that they faced. Though each story was different, I did interview enough people to notice trends in the challenges that individuals face on the path to obtaining middle-skilled positions.

The various stakeholders provided different perspectives and information. Middle-skilled healthcare employees (specifically Hispanic employees) were essential to broaching the questions posed in this thesis – they provided details about their path to their occupation and their thoughts on Hispanic participation in middle-skilled healthcare markets. I interviewed Hispanic immigrants with various backgrounds – first and second-generation, foreign and native-born, English-speaking and non-English speaking, and refugees. Human resources employees were helpful sources in understanding the specific healthcare provider’s hiring practices and perspectives in the process of finding middle-skilled laborers. While limited in scope, my interviews with post-secondary training service centers, where laborers must go and receive training if they desire to attain middle-skilled healthcare positions, shed light on a system that requires skillful navigation through bureaucratic and professional requirements. Finally, my interviews with agents of social service organizations were particularly helpful in understanding how immigrants navigate the complicated system of middle-skill occupational attainment and led me to understand the significant role that such organizations play in their local communities.

Data and Results

Qualitative Data

Using projection data from the Bureau of Labor Statistics and the Arizona Office for Economic Opportunity, I calculated the expected labor shortage by each middle-skilled healthcare occupation in Arizona. The total shortage was calculated at 38,672, or 19.6% of the available jobs (See Appendix 2). In other words, this calculation projects that nearly 20% of middle-skilled healthcare jobs will be unfilled in 2026. In Appendices 3 and 4, the unfilled and filled job (market efficiency) rates are available by occupation type, respectively. Aides and assistants for Physical Therapy and Occupational Therapy exhibit noticeably higher shortage rates, as well as pharmacy aides. Positions such as medical and dental assistants are still expected to be unfilled at lower rates of 16% this is still a significant shortage; it is nearly 1/6 of the entire market.

I utilized this projected data to construct estimations of untapped wages in Arizona's middle-skilled healthcare labor market in 2026. I used Arizona's minimum wage (\$11/hour, with a standard 40-hour work week) as a baseline for the potential wage gain calculation, seeing that Arizona needs to shift its low-skilled workers into high-skilled occupations (see Figure 1). In total, I estimated that over \$207 million⁵⁶ in potential wage gains would go uncollected in 2026, with the average potential wage gain varying depending on the occupational position (Appendix 6). Some positions, such as home health aides, would receive minimal annual wage gains (the average is \$1,100, by far the lowest among occupations), whereas other occupations like occupational therapy assistants, physical therapy assistants, and massage therapists, received

⁵⁶ This figure is in 2016 US Dollars

significant annual wage increases (their averages were \$39,210, \$32,190, and \$23,220, respectively). See Appendix 6 for full calculations.

It should be noted that this calculation is based on various limiting factors – namely, that wage rates are endogenous to other variables like supply of workers, technological changes, and growth in demand. The uncertainty of wages renders this model a conjecture regarding potential wage growth for low-skilled workers if they are to obtain middle-skilled training and jobs. Nonetheless, the model still offers a quantitative, general understanding of the potential for wage increases, as well as the consequences of suppressing wage growth *ceteris paribus*. Wages could increase less or more by 2026; this projection serves as a baseline.

As mentioned in the Methods section, my assessment of Hispanic participation in middle-skilled jobs used 2017 1-year “Sex by Occupation for the Civilian Employed Population 16 Years and Over” data for six different racial/ethnic groups: Hispanic/Latino, non-Hispanic White, Asian, Black/African-American, American Indian, and “Other.” First, I created a table using the data to estimate the total number of jobs held in each occupation by individuals of each racial group (see Figure 4). From this data, I calculated the proportion of individuals from different racial groups working in low, middle, and high-skilled jobs (visible in Figure 5). Next, I used R to run three statistical tests with the data, which are displayed in full in Appendix 9.

Race	Lowskilled	Midskilled	Highskilled
AmIndian	65009	7769	35132
Asian	42058	2958	71887
Black	68385	8274	62948
Hispanic	610366	49987	308483
White	701999	69005	982380
Other	137878	7630	57435

Figure 4: Estimates of Individuals in Skilled Occupations by Race (data from American Community Survey’s 2017 1-year Sex by Occupation for the Civilian Employed Population 16 Years and Over data)

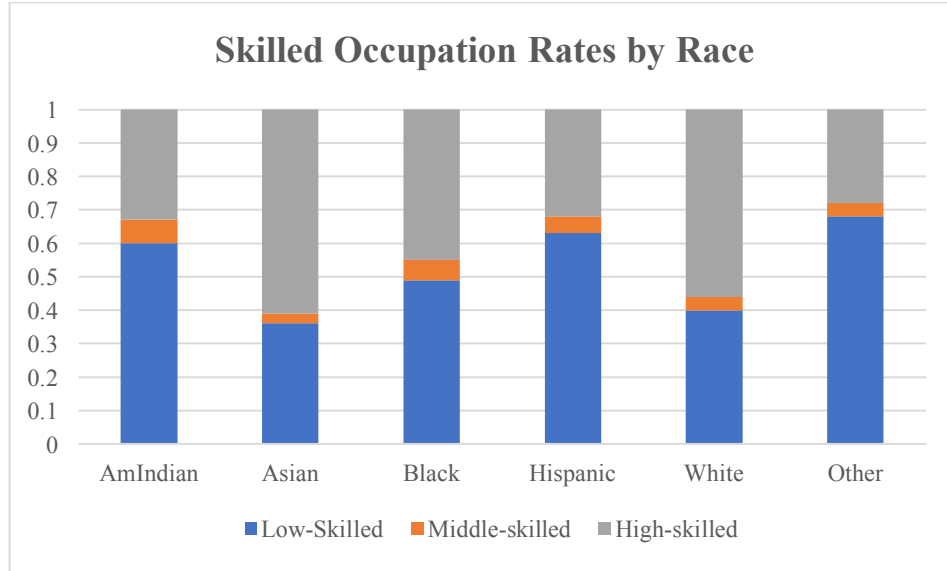


Figure 5: Skilled Occupation Rates by Race

The results of the first two tests that I performed, a Pearson chi-square test and a likelihood ratio test, suggest that there is a statistically significant relationship between a person's race and whether they are employed in a high, middle, or low-skilled position. Pearson's chi square statistic is 198555.1 and the likelihood ratio test statistic is 201516.2. Both statistics are very large compared to expected values ($df = 10$). The null hypothesis, which is that race and occupational skill level are independent, is rejected because the p-value of the test is minuscule ($p < 2.2e-16$).

Race	Low-Skilled	Middle-skilled	High-skilled
AmIndian	72.32	45.03	-91.10
Asian	-93.61	-32.10	107.12
Black	-3.33	27.84	-8.15
Hispanic	318.31	41.74	-336.46
White	-363.64	-46.28	383.79
Other	172.27	-15.08	-383.79

Figure 6: Standardized Residuals from Pearson's chi-square test

Examining the standardized residuals from Pearson's chi-square, we can compare expected values, given that the null hypothesis of independence is true against observed counts

in each cell. For example, there are more American Indians in low-skilled and middle-skilled jobs than expected. The standardized residual value for Hispanic is 318.31, which is very large. There are many more Hispanics in low-skilled jobs than expected. Another value of note is that the residual for non-Hispanic White is 383.79, so there are many more white people in high-skilled jobs than expected.

In addition, I created a baseline-category logit model for nominal responses (those nominal responses were the racial/ethnic categories of the individuals in the data). Through the model, I ran statistical regressions on each racial group to determine whether race is correlated with the type of job (low, middle, or high-skilled) that individual from each racial category hold. Just as the Pearson chi-square and likelihood ratio tests did, this regression suggests there is very strong evidence of dependence between race and job type. In the model, positive estimate values suggest a likelihood to be working in low-skilled positions, while more negative values suggest the opposite – a likelihood to be working in high-skilled positions. Hispanic workers have the highest values, meaning they are far more likely to work in low-skilled positions and less likely to work in high-skilled positions. For the full statistical analysis, see Appendix 9.

These data are useful in demonstrating that Arizona's Hispanic immigrants face difficulty in reaching middle-skilled opportunities in the medicine and beyond. However, they leave an essential question to be answered: why? There are dozens of potential answers, and numerous variables that can be associated with the skills gap. To go about answering this question, I spoke with a variety of stakeholders in the middle-skilled labor market, including employers, middle-skilled employees, those seeking middle-skilled employment, and community developers.

Qualitative Data

Lack of Documentation

From the interviews that I conducted, I learned that for the 275,000 unauthorized immigrants in Arizona, obtaining a middle-skilled healthcare job is simply not possible. Not only must licensure be applied for with a Social Security Number (which undocumented immigrants do not have), but community colleges in the state do not offer classes to undocumented immigrants, and large employers in the state are required to use E-Verify, a web-based service that the federal government uses to confirm the eligibility of each worker to work in the United States. Unauthorized immigrants must earn income through various other avenues, mostly low-skilled work in the service sector. This is a considerable segment (nearly 4%) of the population that has no access to obtain middle-skilled employment.⁵⁷ Arizona's policy is a striking contrast to its neighbor, California, where undocumented immigrants can apply for middle-skilled licensure with an ITIN (Individual Taxpayer Identification Number), which any American without a Social Security Number uses to pay taxes. These differing policies are emblematic of the power that states have in defining the lives of immigrants, despite the fact that the United States Congress has the responsibility to "establish a uniform Rule of Naturalization" under Article 1, Section 8, Clause 4 of the U.S. Constitution.

However, undocumented individuals are not the only immigrants who face challenges in the middle-skilled labor market. Many of the impediments that prevent Hispanic immigrants from obtaining middle-skilled jobs apply to second-generation immigrants, who are legal citizens of the United States. Largely, those impediments are similar to those that other US-born

⁵⁷ It is also worth noting that in 2007, the number of undocumented immigrants in the country was estimated to be 500,000; the Obama administration's deportation policies and the Recession of 2008-2009 played a large role in diminishing the undocumented population in Arizona.

individuals face: it's hard to make time for training when you are busy working a low-wage job to survive, challenging to pay for childcare and transportation costs while you pursue mid-skilled training, and difficult to understand which certifications will lead to the best opportunities and most satisfying jobs⁵⁸. In the Phoenix area, a few community organizations play a key role in assisting immigrants follow the path to middle-skilled healthcare opportunities.

Community Social Service Organizations

Community social service organizations, such as Friendly House and Chicanos Por La Causa (both located in Phoenix), provide workforce development services for members of the community, who are predominantly Hispanic first or second-generation immigrants. Generally, these organizations are selective in who they decide to support. When it comes to aspiring program participants, various Friendly House administrators stressed that they “don't like to set anyone up to fail.” Carol, the director of a training program (Integrated Basic Skills Training, or IBST) for aspiring medical assistants who also need to complete their GEDs, explains:

We want to make sure that they're successful. If their scores are at the standardized level of a 6th grader, we are setting them up for failure. We say, okay, you have to test at a 9th grade level. The average for people coming in is a 3rd to 5th grade level. It's not necessarily impossible for them to succeed in the program, but we say: why put that strain on them? If they don't test to that score, we put them in GED classes and say “if you improve your scores by next time around, we can put you in the next [medical assistant training] cohort.” After they meet scores requirements they are able to join the IBST programs. What we see is that they do so much better if their score is higher on the assessment piece.

The services of these community organizations include: offering English classes, organizing cohorts for various middle-skill training programs (healthcare among them), and helping those participants procure scholarships through the city of Phoenix or Maricopa County. In addition,

⁵⁸ It is my speculation that these (1) these factors induce difficulties for Hispanic immigrants and middle-skill seekers alike, and that (2) middle-skilled jobs are more satisfying than low-skilled jobs. Both of these assumptions are based on patterns that I observed in my interviews.

the organizations assist vulnerable program participants obtain assistance paying for child care, rent, food, transportation, and work materials. Guadalupe, an administrator at Friendly House, explained the necessity of providing such services:

If people have issues with transportation, depression; I just try to provide different resources for the student. What is unique about Friendly House is that we provide a wide variety of resources. We also try to address those barriers. Often they want to come in and learn, but how are they going to learn if they haven't eaten in two days? We also help to identify what other needs you have and what other barriers [social, etc.] we can help you overcome. And if we can't do it in house, we give them a place and number that they can go to. We've had things like "I'm about to be evicted." When they come in for orientation we tell them about other services so that they can think ahead as well.

Most importantly, the organizations provide an indispensable asset: guidance. They assist individuals in meeting specific requirements for training programs, determining their next steps, and make sure that they understand the system. They provide such guidance for both first and second-generation immigrants, whose needs are often different, but are often similar in terms of overcoming cultural barriers and dealing with a system that is difficult to navigate.

Friendly House, a multi-service organization that supports immigrants in various ways (education, workforce development, and family services), serves as a pillar of community for immigrants. Though its doors are open to all residents of the area, it has primarily served the Hispanic immigrant community for years. One key service it provides is to help immigrants translate their certifications from other countries into U.S. certifications. This was the case for Sara, who immigrated from Venezuela and is currently seeking to obtain a medical assistant certification. Though it will likely take years for Sara to improve her English skills to the level necessary for a career as a medical assistant with an English-speaking clientele (she has a family she has to provide for and currently works as a preschool assistant), she has a key strategic advantage by living in Phoenix: a substantial Spanish-speaking population across the city's

communities. Sara will likely serve, after receiving her certification, in a Spanish-speaking clinic like Clinica Adelante. Medical services are also desired by Spanish speakers in Arizona, since it is an industry in which providers “don’t get to choose” their customers, according to a Banner Health spokesperson. The state of Arizona still needs Spanish speakers who are certified to work middle-skilled jobs, especially in healthcare. For some middle-skilled positions (e.g., phlebotomist) in predominately-Hispanic areas, a comprehensive knowledge of English is not required, in which Hispanic immigrants with backgrounds in medical care could fill occupational opportunities. Relatedly, a comprehensive knowledge of Spanish can be an asset in these areas. Seeing that there are likely many immigrants who don’t utilize their education from their native country (as is evident in “Skills on the Move” from the Literature Review section), it may be possible for Hispanic immigrants with medical backgrounds to fill such occupations in areas with a high proportion of Spanish speakers.

Top officials at Friendly House agreed that second-generation immigrants make up “the majority” of those that the organization serves. Through one of its programs, Integrated Basic Skills Training (IBST), Friendly House helps community members seeking middle-skilled certification reach their goals by guiding them through applying for tuition scholarships, tutoring, meeting daily challenges, and often, helping them obtain their GEDs. Since a high school diploma or equivalent is required for middle-skilled jobs, this program is essential for immigrants whose circumstances led them to drop out of high school prematurely. Aside from receiving a GED, program participants must take classes, pass exams, participate in an externship, graduate the program, and receive state certification in order to gain employment as a medical assistant.

Cultural and Language Barriers

Mariana, the daughter of Mexican immigrants to the U.S., participated in the program in 2015; she explained her excitement over the fact that the IBST program helped her obtain her GED: “I was like... this is awesome. I hadn’t come across a program like [IBST]. I know way back, like in my grandparents’ era, they did have programs like that but they [discontinued them].” At the time that she discovered the IBST program, Mariana was 28 and working in low-skilled jobs that left her feeling unfulfilled: “the only thing I could get was, like, a Walmart job... things like that, which I was not satisfied with. You know, I’m American, I’m Mexican, but I still want to work,” she exclaimed with a laugh.⁵⁹

IBST is just one program that engages with the community to offer a chance for individuals to obtain middle-skilled healthcare jobs – a bona fide network of workforce development programs exists across the Phoenix Metro area and the State of Arizona. Aida Jimenez⁶⁰, Friendly House’s Vice President of Adult Education and Workforce Development, explains that all of Arizona’s workforce development organizations are working toward a common goal:

In the end, we’re looking for the same results: for people to become self-sufficient. I believe that working with any program whether we do the same thing or not is to benefit the participant or the community versus getting in my territory or not. That’s not how we work.

Chicanos Por La Causa (CPLC), another organization in the Phoenix area that primarily serves (in a *de facto* rather than targeted manner) second-generation immigrants, offers a Job Seeker and Youth Services program. According to its director, Reeta Devi⁶¹, the program serves well

⁵⁹ The stereotype of Mexican-Americans as lazy still persists in the national racial and immigration dialogue, as is evidenced by the jokes that even Mexican-Americans tell.

⁶⁰ This is the interviewee’s real name.

⁶¹ This is the interviewee’s real name

over the 163 youth required by the Department of Labor, many of whom are referred by Friendly House organizers. Victor Contreras⁶², the Director of Workforce Solutions at CPLC, explains that this Phoenix youth program (serving about 200 participants) accounts for 43% of CPLC's total funding⁶³. These WIOA grants and other private sources of funding are obtained through competitive applications, which the CPLC "grant and resource development team helps write in partnership" with Victor and "other subject matter experts." The recipients of the program can be aged 14-21 if they are currently enrolled in school or 16-24 if they are not, and they can receive \$3,000 per year in tuition assistance from the Department of Labor's Workforce Innovation and Opportunity Act (WIOA) program.⁶⁴

I interviewed 11 first and second-generation Hispanic immigrants who were either working in middle-skilled healthcare jobs or were going through/had already gone through processes to work in those positions. There were several overarching themes in these interviews. First and most obviously, language barriers tend to be the foremost concern for immigrants whose first language is not English. In one interview, Angelica, a DACA recipient whose first language is Spanish, claimed that "it's been hard to understand everything. But I've been determined to work hard. I want to have success." Mariana, a participant in the Friendly House's IBST program explained the troubles of her classmates: "it was kind of hard for the girls whose second language was English, but they all did it and they got their GEDs. Sara, a refugee who immigrated to Arizona from Venezuela in 2015, claimed that "the hardest part for me is learning English. You face a lot of limitations without knowing English."

⁶² Interviewee's real name

⁶³ Other CPLC programs serve Tucson and Maryvale, with 200 and 225 community members served in each program, respectively.

⁶⁴ The City of Phoenix, which facilitates funding from the DOL, requires that at most 10% can be in school when they receive financial assistance.

Even for Sara, language is not the sole barrier wedged between her and her new community. More than anything, the cultural barriers are significant and permeate many aspects of life. For instance, “when someone says something curt, I don’t quite understand. But you learn that it’s just a different culture,” Sara says. More than anything, it’s the small actions that she was used to in her culture, like kissing someone on the cheek or calling them “mi amor,” that are less than welcome in Phoenix. According to Sara, “you have to maintain your distance” in Phoenix.

These cultural barriers, while still isolating, are more economically incidental compared to the barriers that play a role in preventing immigrants from obtaining middle-skilled jobs. Antonio, a second-generation immigrant who became a medical assistant, claims that “it’s not just going to school and learning how to give injections and take temperatures and blood pressures, it’s more than that.” To Antonio, persistence and confidence are elements that are lacking in minority communities, probably due to their already-disadvantaged status and the overwhelming intricacies of the training and certification processes. An anecdote of his illuminated the subjective conditions of immigrants: “My uncle came over illegally and he could never progress. He would say, ‘it’s like you’re in a golden cage. Your cage is pretty but you can’t get out.’ People don’t realize that they have opportunities to grow but they don’t even know where to start.”

Emma, another second-generation immigrant working as an occupational therapy assistant, summed up the challenge of overcoming cultural differences: “for someone who comes from a migrant family, you’re always being torn between who you are personally and who you’re supposed to be professionally. I don’t think that some people are confident enough to really break the barriers. You’re kind of taught to keep your head down.”

These details were reinforced by human resources representatives from healthcare providers in Arizona, who said they noticed similar problems with prospective employees. In some cases, after gaining employment, medical assistant workers who were required to obtain national licensure within six months simply failed to follow through with the final requirements. Anna, a recruiter for Banner Health, described an issue that the company (which is the largest employer in the state of Arizona) has been encountering:

Banner is requiring that within 6 months of employment, the medical assistant has to become nationally certified, and not all the schools are communicating that. So, as you get this influx of folks who went to school (Pima or Carrington College, or wherever they may go), they do their externship and they're thinking they're ready to be a MA. And then, they speak to someone like me. [National licensure] is not a requirement to get the position, but it is a requirement to keep the position. They have 6 months – the responsibility ultimately falls on the candidate, and there's an additional cost for that. Depending on your background, you may not be able to get that testing done within time, and if that doesn't happen then your position is terminated.

When I asked Anna whether this challenge disproportionately affects minority communities, she responded:

Absolutely. Generally, the population tends to be more of a minority group or refugee group. You hear that they want to get into the medical field. That's their response when I ask what prompted your interest. I get that. However, if you don't have good communication from the educational source you're coming from about what it's going to take, you're going to fall out or you're going to fall back. A lot of those who want to get into the medical field don't understand. They say, "No, I have my certification." It's hard for them to differentiate, after going to Carrington College and getting a certificate, the national certification from the certification that they got from the school. I do see the major difference in minority groups. I think it's a lack of understanding. Not necessarily a language barrier, but more of a cultural barrier.

Social Service organizations, like Friendly House and CPLC, exist to break down those barriers by providing guidance to disadvantaged youth and adults. However, even these

organizations face a disjointed, bureaucratic process through which training and certification must be obtained.

Obscured Pathways

Sometimes, important information is not clear to program participants throughout the process of gaining employment. Mariana, the second-generation immigrant who participated in Friendly House's IBST program, recounted: "I already had my externship set, I was going to do it at Banner University... but then a few girls [in the program] said they weren't going to continue to do the GED." After considerable disagreement between the participants and Banner University ensued, the program disallowed those who hadn't completed their GED from participating in externships, a key part of the occupational attainment process. Mariana's training and participation in the program (aside from obtaining her GED) ended up going to waste. She felt misled; she was told that she would "definitely" be getting a job in 4 months. When she started the IBST program, she was not relayed all the procedural information necessary to obtain employment, most importantly the need to acquire her GED quickly.

Constant miscommunications of this sort were frequently noted by key players in all corners of the middle-skilled healthcare industry. These miscommunications result from the difficulty that comes with navigating the middle-skilled occupational system, which overwhelms immigrants, who are already facing cultural or socioeconomic barriers. Employees, employers, community college administrators, and social service agents all provided anecdotes of aspiring workers failing to attain all the necessary requirements. Though it remains unclear whether failure to complete these programs is primarily due to unnecessarily obscured procedures and requirements, my research suggests that this is a critical site for further research to inform systematic improvements.

Discussion

Based on the quantitative projections of labor shortages in the Arizona economy, it appears that there are currently more middle-skilled jobs than there are workers to fill them and that the discrepancy will only continue to be exacerbated by 2026. This means that there is an immense opportunity to improve productivity and increase workers' wages by more heavily prioritizing middle-skilled labor development, especially in the healthcare market. Since Hispanic and Latino immigrants constitute a group that tends to work low-skilled jobs at higher rates than non-Hispanic citizens, they are a group for whom upskilling would provide a significant benefit in terms of real wages and social status. At the same time, realigning the labor market by helping low-skilled workers upskill into middle-skilled positions would be beneficial to the Arizona labor market.

Undocumented immigrants (a group that this paper does not focus on) make up a sizeable portion of Arizona's total population, but existing immigration and labor laws completely impede them from attaining middle-skilled jobs, improving their lives, and filling open jobs in the middle-skilled labor market. Interestingly, this is not the case when it comes to entrepreneurship – illegal immigrants can found and grow their own businesses, a popular alternative to trying to gain legal employment. Essentially, it is a loophole in American immigration policy that exists so as to not curb entrepreneurship among undocumented immigrants. This contradictory policy begs the question: why is it deemed beneficial to allow undocumented immigrants to start their own businesses but not to attain middle-skilled occupations? Shouldn't they be allowed the choice in how they would like to make their living and contribute to the state economy? The impediments facing Hispanic immigrants in Arizona are worth considering, as are policies like California's authorization to use an ITIN to apply for

licensure. Such restrictions currently prohibit a portion of the population from achieving middle-skilled employment status.

This study reveals that several the topics pertaining to immigration middle-skilled labor have been framed erroneously. First, immigrants tend to be viewed by economists, government officials, and the general population to be either low-skilled or high-skilled. This oversimplified, binary distinction ignores the potential of low-skilled immigrants to rise into middle-skilled jobs. In fact, many immigrants come to the United States with training and certification in a given field or occupation, but are unable to (or unaware that they can) translate those certifications. These phenomena keep the wages of immigrants low, and prevent them from obtaining middle-skilled occupations.

In terms of labor and college education, academic studies have not yet noticed that the American labor market is becoming transfigured into three tiers: low, middle, and high-skilled positions. This may play a part in why immigrants are not institutionally and popularly viewed as having the potential to gain middle-skilled employment. Until the middle-skilled labor shortage is properly addressed and middle-skilled jobs are viewed as a way to raise wages and socioeconomic status, the American economy should expect a continued shortage of middle-skilled laborers.

In addition, academics have not focused enough attention on second-generation Hispanic immigrants, who form the population that is most equipped to move into middle-skilled occupations. Yet, second-generation Hispanic immigrants still face significant obstacles in reaching these positions. Alienated and caught between their identities as American and Hispanic (which should not be, and in reality are not, mutually exclusive), they struggle with cultural and socioeconomic barriers. More than anything, the complicated and disjointed nature of the

middle-skilled occupational attainment system makes following the pathway incredibly difficult. This was evident in several of the interviews that I conducted. A neoclassical economist may rely on the “invisible hand” argument to claim that this system must be efficient, and that equilibrium will occur naturally. However, the discrepancy between middle-skilled workers and unfilled middle-skilled jobs is evidence that the middle-skilled labor market is not inherently efficient, but require more attention from America’s institutions, better support systems for low-skilled workers, and a clearer procedural process.

For first and second-generation Hispanic immigrants, gaining middle-skilled employment is legally possible, but the challenges are significant and daunting. They tend to face cultural barriers and come from disadvantaged socioeconomic situations, and don’t necessarily understand how to navigate middle-skilled labor market and its requirements. Presumably, this means that many members of the Hispanic immigrant population don’t enter middle-skilled jobs because they may not know that these opportunities exist or they may think that such positions are completely inaccessible to them. Since my interviews were only with immigrant residents and citizens who were exposed to middle-skilled training, this presumption faces limitations and requires further research. However, through my interviews, I learned that middle-skilled jobs are not particularly well known to the Hispanic population and opportunities within this labor sector may not be well-understood by the general population more broadly either.

Moreover, Hispanic immigrants sometimes find it overwhelmingly difficult navigate the middle-skilled labor market and its byzantine network of requirements. The system is complicated and causes significant misunderstanding among Hispanic immigrants for a diverse set of reasons, including language barriers an obscured system of procedural requirements. Cultural barriers exacerbate the issue, as immigrants appear more likely to feel alienated in their

pursuit of middle-skilled occupations, as they feel alienated by noticing the general correlations between socioeconomic status and race/ethnicity. This was evident in several of the interviews I conducted with employees, middle-skilled occupation seekers, and healthcare employers. Though each person had a different perspective, they all noticed these trends taking place among minority populations.

This study provides an indication, more than anything, that the participation of the Hispanic population in middle-skilled labor markets remains understudied. Generally, there are many areas in which data collection could be improved and many ways that academic literature could focus its gaze to study the challenges to filling middle-skilled jobs and assisting minority populations to attain them. More broadly, there is currently a lack of sufficient information on the occupational status of foreign-born American residents to compare with native-born citizens. The existence of such information would have made the qualitative portion of my study more straightforward by permitting an analysis of whether an immigrant's "generation" and documentation affect their likelihood to hold a low, high, or middle-skilled job. However, the personal risk to undocumented (and even documented) immigrants of providing one's origin of birth to researchers in the current political climate makes obtaining reliable research on the topic very difficult, and perhaps, infeasible. This regrettably renders the labor dynamics of undocumented immigrants obscured, making it difficult for academics to understand structural impediments and disadvantages and to provide sound policy recommendations for the betterment of individuals, families, and labor markets. Nonetheless, further research could increase the sampling size of my study to provide a more robust understanding of what impediments minority groups (especially Hispanic immigrants) face in obtaining middle-skilled positions.

Policy Recommendations

As Arizona employers experience an aggravated lack of middle-skilled workers, its economy is at risk – not of total meltdown, but of a slow decline in productivity. This is especially important for the healthcare industry, since it is an industry whose productivity holds very real consequences for the health of our society and its individuals. It will be a challenge for the state to build a sustainable system that gives citizens the skills they need to fill middle-skilled work opportunities. With respect to Arizona’s immigrants, the challenges are even more significant because of cultural, language, and socioeconomic barriers that exist. Adapting immigrant workers to US labor markets is an issue so complex that it cannot be solved (or even improved) with a single set of solutions. However, this paper will present several policy recommendations to improve both the lives of immigrants in Arizona by providing them with opportunities to increase their wages, to grow professionally, and work in dignified jobs, as well as improve the economic prospects of Arizona, its businesses and consumers, and more broadly, the United States.

First, I propose that one way to improve the socioeconomic mobility of first and second-generation Hispanic immigrants is to provide them with more opportunities for occupational post-secondary education. Community organizations that work to help first and second-generation immigrants pursue opportunities in middle-skilled healthcare positions play a vital role in the cause. These organizations (such as Friendly House and Chicanos Por La Causa in Phoenix) assist immigrants of different backgrounds and generational status (as well as other community members) in various ways: economic support of up to \$3,000 for tuition per year, language classes, and helping to map out a pathway to reaching success. By offering various tools of support, the community organizations assist program participants with overcoming many

difficulties of being an immigrant – cultural and economic – that appear from various directions. This multi-pronged approach is best for integrating immigrant families into the middle-skilled workforce. Their model should be more broadly applied to a greater portion of the Hispanic immigrant population, as well as to a wider range of middle-skilled positions, especially in the middle-skilled healthcare sector. Increased funding for these programs may provide an increased number of middle-skilled workers; however, policymakers should be wary not to solely provide increased funds to organizations. The personal involvement of social servants in helping immigrants obtain middle-skilled employment should proportionally rise with the increase in funds. The personal guidance provided to aspiring middle-skilled workers is essential; without it, these organizations would become factories, outputting “qualified” workers at a lower rate.

Second, to improve the ease of guiding Hispanic immigrants into middle-skilled healthcare (& other mid-skilled) jobs, the state of Arizona should establish an organizational structure that plainly and explicitly connects aspiring workers to state and local government certification-granting institutions and community organizations. This can be realized through better partnerships between the state and various institutions (college, businesses, and certification granters). As mentioned, an increased amount of funding would help community organizations assist more people, but a pathway system organized by the state would have more significant organizational effects, which might be more important than increased funding. A government-organized program directly linking private healthcare firms to training facilities and community organizations can more effectively streamline a system that is easier to navigate not only for immigrants, but for citizens generally. The formal requirements of the middle-skilled healthcare job market are overwhelming for many; the result is that many possible workers drop out prematurely because they don’t fully understand the system’s requirements.

This system could be organized and outlined out by Arizona's Labor Department, in partnership with the Department of Education, and distributed through schools and community organizations, since those two locations tend to be the starting points for Hispanic pursuing middle-skilled occupations. Though I would also recommend such a statewide system for all residents, there should be a separate organizational structure that specifically meets the needs of immigrants (who are predominately Hispanic in Arizona).

Lastly, and more broadly, it would be beneficial to reconsider the institutional and popular assumptions of American immigrants, especially Hispanic immigrants. In order to attract competent workers, the United States should prioritize allowing middle-skilled workers to immigrate to the United States, as it does with high-skilled workers (e.g., physicians). To meet the growing demands of businesses, I recommend a more labor-focused immigration policy for middle-skilled immigrants that attracts immigrants with previous educational experience. Our immigration system should be based on meeting the needs of localized labor markets. In communities like Arizona's Maricopa County, there are large Spanish-speaking communities, where the expertise of Spanish-speaking immigrants in middle-skilled healthcare positions would be extremely helpful. In time, immigrants could learn English, expanding their horizons and possibilities for professional advancement while breaking down cultural and language barriers. In addition, viewing immigrant labor as a binary divide between low-skilled and high-skilled workers is overly simplistic; it would be best for policymakers to consider the potential of low-skilled workers to upskill into middle-skilled jobs, as middle-skilled workers will likely become desperately needed on the near horizon.

Conclusions

While data suggests that the middle-skilled labor shortage is increasing, especially in the healthcare submarket and in Arizona, there seem to be various problems for people hoping to attain middle-skilled positions. A complicated system of community colleges, certification-granting institutions, and employers makes obtaining middle-skilled work in the healthcare industry difficult, especially for disadvantaged groups.

In Arizona, first and second-generation Hispanic immigrants make up a substantial portion of the population. However, data demonstrates that Hispanics still hold low-skilled positions at far higher rates than other groups (e.g., White/European-Americans) and are far less likely to work in high-skilled positions. The high number of Hispanic immigrants in low-skilled occupations begs the question: what prevents them from upskilling into middle-skilled jobs and filling the apparently copious open positions?

On top of the complicated middle-skilled occupational attainment system, Hispanic immigrants deal with language, cultural, and socioeconomic barriers that are particularly disadvantageous. Though aided by community organizations, they still face difficulty in obtaining the necessary certifications for their positions. Sometimes, they prematurely give up – a lack of information compounds the challenges for many immigrants, as overwhelming, unexpected requirements rear their heads late in the process. In Arizona, Hispanic immigrants represent a population with great potential to upskill and fill middle-skilled positions, given that they constitute a statistically significant portion of low-skilled laborers. Addressing the challenges that Hispanic immigrants face with a comprehensive approach will be crucial in driving Hispanic immigrants (first and second-generation) into middle-skilled jobs, improving socioeconomic conditions while strengthening the Arizona economy.

If the state of Arizona were to create a more streamlined system, better outlined for first and second-generation Hispanic immigrants (as well as the rest of the population), it could create better socioeconomic opportunities for low-skilled, low-wage workers. A more supportive structure of middle-skilled labor training and a more inclusive path to employment for Hispanic immigrants will not only provide low-skilled workers with greater opportunities to advance socioeconomically, but will also strengthen the general welfare of the Arizona economy. This is also true for all socioeconomically disadvantaged people across the United States. Similarly, improved policies specific to other local and state economies also hold promise to allow for more middle-skill jobs to be filled in the United States and for workers to upskill into improved socioeconomic circumstances.

Appendix 1

Healthcare Support Industry Occupations (Standard Occupation Classification Code 31-000) United States Bureau of Labor Statistics

31-0000 Healthcare Support Occupations

- 31-1000 Nursing, Psychiatric, and Home Health Aides
 - 31-1010 Nursing, Psychiatric, and Home Health Aides
 - 31-1011 [Home Health Aides](#)
 - 31-1013 [Psychiatric Aides](#)
 - 31-1014 [Nursing Assistants](#)
 - 31-1015 [Orderlies](#)
- 31-2000 Occupational Therapy and Physical Therapist Assistants and Aides
 - 31-2010 Occupational Therapy Assistants and Aides
 - 31-2011 [Occupational Therapy Assistants](#)
 - 31-2012 [Occupational Therapy Aides](#)
 - 31-2020 Physical Therapist Assistants and Aides
 - 31-2021 [Physical Therapist Assistants](#)
 - 31-2022 [Physical Therapist Aides](#)
- 31-9000 Other Healthcare Support Occupations
 - 31-9010 Massage Therapists
 - 31-9011 [Massage Therapists](#)
 - 31-9090 Miscellaneous Healthcare Support Occupations
 - 31-9091 [Dental Assistants](#)
 - 31-9092 [Medical Assistants](#)
 - 31-9093 [Medical Equipment Preparers](#)
 - 31-9094 [Medical Transcriptionists](#)
 - 31-9095 [Pharmacy Aides](#)
 - 31-9096 [Veterinary Assistants and Laboratory Animal Caretakers](#)
 - 31-9097 [Phlebotomists](#)
 - 31-9099 [Healthcare Support Workers, All Other](#)

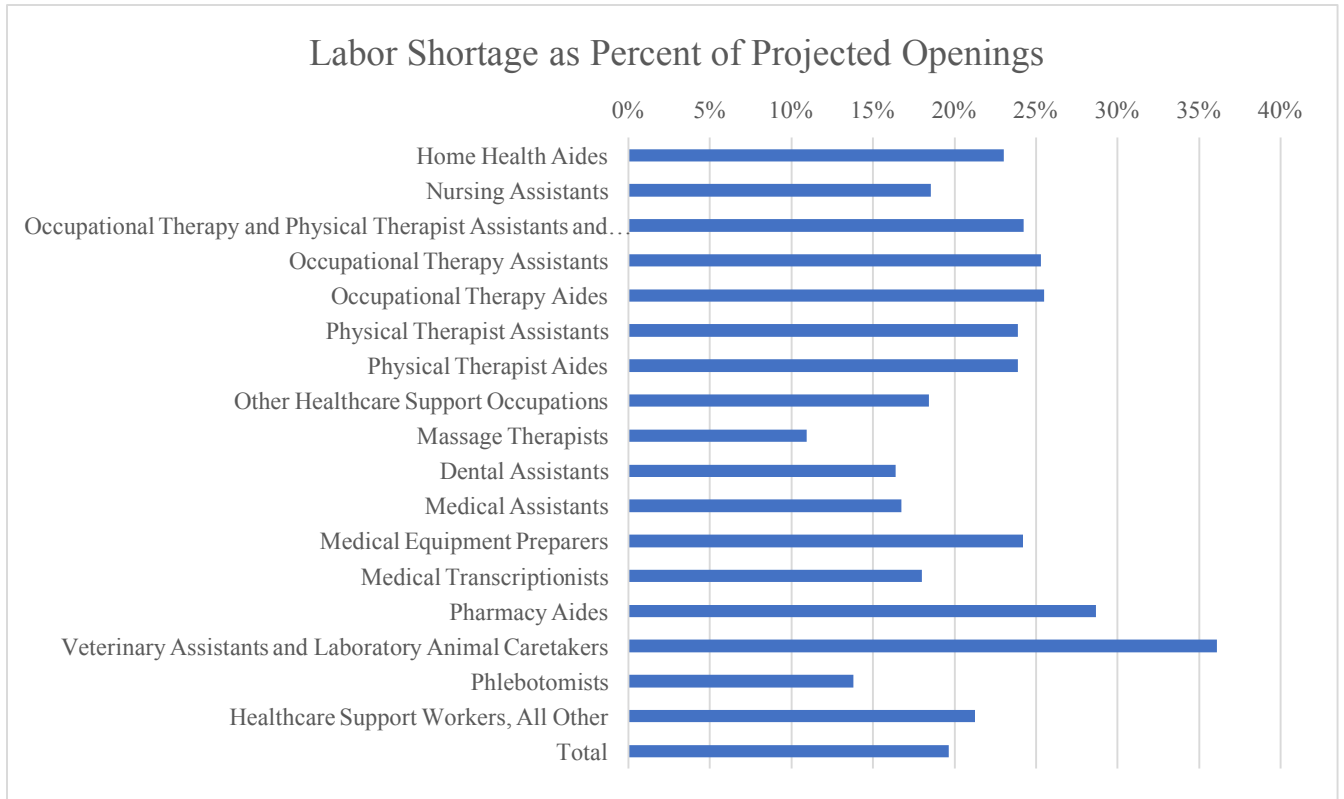
Located at https://www.bls.gov/oes/current/oes_stru.htm#31-0000

Appendix 2
Projected Employment, Job Openings, and Labor Shortage of
Arizona Middle-skilled Healthcare Occupations, 2026

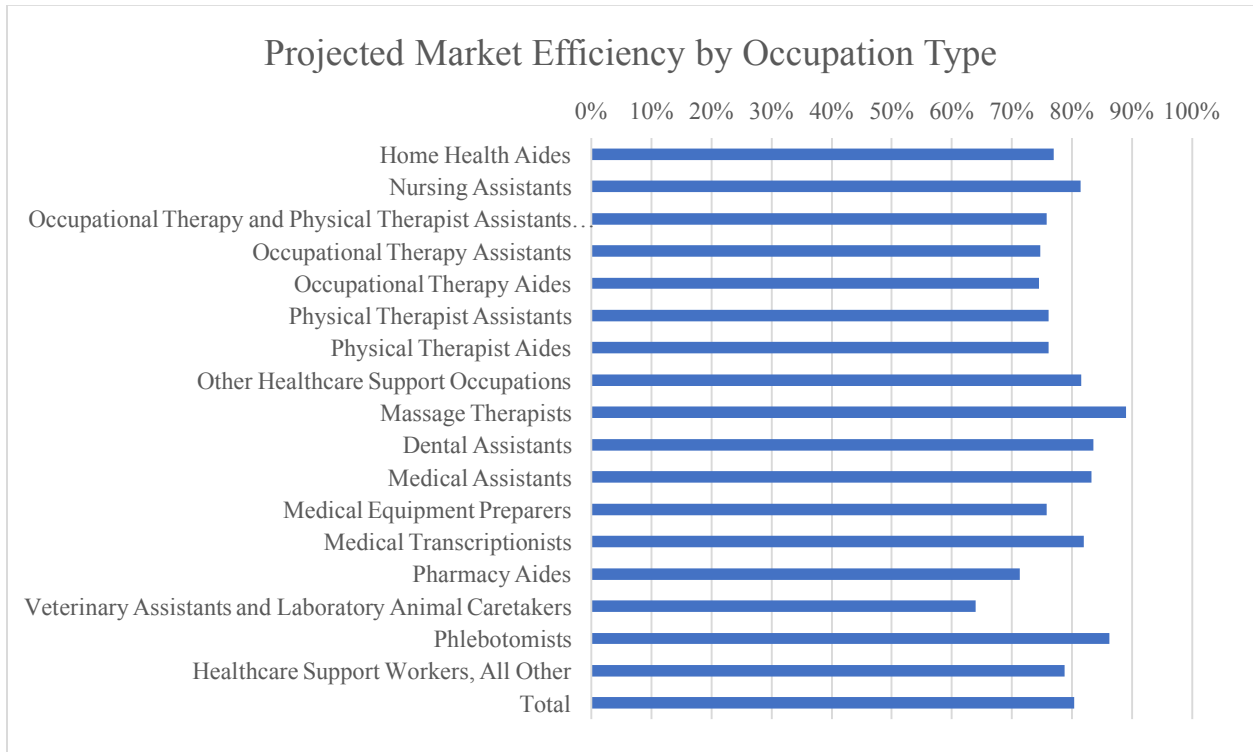
SOC Code	SOC Title	2026 Employment	2026 Openings	Labor Shortage	Shortage of Employment
31-1011	Home Health Aides	27,507	35,734	8,227	23.0%
31-1014	Nursing Assistants	20,260	24,879	4,619	18.6%
31-2000	Occupational Therapy and Physical Therapist Assistants and Aides	4,485	5,919	1,434	24.2%
31-2011	Occupational Therapy Assistants	824	1,103	279	25.3%
31-2012	Occupational Therapy Aides	196	263	67	25.5%
31-2021	Physical Therapist Assistants	2,156	2,833	677	23.9%
31-2022	Physical Therapist Aides	1,309	1,720	411	23.9%
31-9000	Other Healthcare Support Occupations	50,790	62,269	11,479	18.4%
31-9011	Massage Therapists	4,030	4,525	495	10.9%
31-9091	Dental Assistants	9,298	11,123	1,825	16.4%
31-9092	Medical Assistants	25,654	30,813	5,159	16.7%
31-9093	Medical Equipment Preparers	1,934	2,551	617	24.2%
31-9094	Medical Transcriptionists	1,211	1,477	266	18.0%
31-9095	Pharmacy Aides	239	335	96	28.7%
31-9096	Veterinary Assistants and Laboratory Animal Caretakers	3,293	5,151	1,858	36.1%
31-9097	Phlebotomists	2,025	2,349	324	13.8%
31-9099	Healthcare Support Workers, All Other	3,106	3,945	839	21.3%
	Total	103,042	128,801	25,759	20.0%

Employment and Openings Projections from Arizona Office of Economic Opportunity

Appendix 3
Predicted Labor Shortage as Percentage of
Arizona Middle-skilled Healthcare Job Openings, 2026



Appendix 4
Projected Labor Market Efficiency by Occupational Type, 2026



Appendix 5

Arizona Middle-skilled Healthcare Hourly and Annual Wages by Occupational Type

Occupation (SOC code)	Employment ⁽¹⁾	Employment percent relative standard error	Hourly mean wage	Annual mean wage ⁽²⁾	Wage percent relative standard error ⁽³⁾	Hourly median wage	Annual median wage ⁽²⁾	Employment per 1,000 jobs	Location Quotient
Healthcare Support Occupations (310000)	69,180	3.4	\$15.35	\$31,920	1.2	\$14.18	\$29,490	25.6	0.89
Home Health Aides (311011)	15,720	15.3	11.53	\$23,980	1.8	\$10.99	\$22,860	5.8	1.01
Nursing Assistants (311014)	14,300	6.0	14.65	\$30,470	0.9	\$14.23	\$29,600	5.3	0.52
Orderlies (311015)	740	4.8	12.37	\$25,730	1.3	\$11.85	\$24,660	0.3	0.74
Occupational Therapy Assistants (312011)	570	14.0	29.85	\$62,090	1.4	\$30.94	\$64,350	0.2	0.72
Occupational Therapy Aides (312012)	160	31.9	19.56	\$40,690	5.7	\$17.50	\$36,400	0.1	1.08
Physical Therapist Assistants (312021)	1400	10.8	26.48	\$55,070	4.2	\$27.80	\$57,810	0.5	0.82
Physical Therapist Aides (312022)	860	23.5	13.33	\$27,730	2.3	\$12.48	\$25,950	0.3	0.92
Massage Therapists (319011)	2,040	12.1	22.17	\$46,100	3.8	\$19.60	\$40,760	0.8	1.04
Dental Assistants (319091)	7,030	5.4	19.03	\$39,580	1.5	\$19.16	\$39,850	2.6	1.10
Medical Assistants (319092)	17,510	4.3	15.79	\$32,840	1.2	\$15.10	\$31,410	6.5	1.43
Medical Equipment Preparers (319093)	1,290	11.2	16.87	\$35,080	1.1	\$16.44	\$34,190	0.5	1.26
Medical Transcriptionists (319094)	1,000	6.3	14.42	\$29,990	8.6	\$11.89	\$24,730	0.4	0.95
Pharmacy Aides (319095)	190	20.7	18.06	\$37,560	2.2	\$17.57	\$36,550	0.1	0.28
Veterinary Assistants and Laboratory Animal Caretakers (319096)	2,430	15.2	13.27	\$27,610	2.7	\$12.66	\$26,330	0.9	1.52
Phlebotomists (319097)	1,370	14.6	15.59	\$32,430	2.1	\$15.11	\$31,420	0.5	0.59
Healthcare Support Workers, All Other (319099)	2,560	18.3	17.34	\$36,070	2.8	\$17.24	\$35,860	0.9	1.47

(1) Estimates for detailed occupations do not sum to the totals because the totals include occupations not shown separately. Estimates do not include self-employed workers.

(2) Annual wages have been calculated by multiplying the hourly mean wage by 2,080 hours.

(3) The relative standard error (RSE) is a measure of the reliability of a survey statistic. The smaller the relative standard error, the more precise the estimate.

Appendix 6
Estimation of Potential Untapped Wages in
Arizona Middle-skilled Healthcare Occupations, 2026*

Standard Occupation Classification (SOC)		Employment			Shortage % of Labor Market	Average Annual Wage	Potential Annual Wages	Total Annual Wage Gains	Annual Wage Gains Per Worker	AZ Annual Minimum Wage
SOC Code	SOC Title	2016 Estimate	2026 Projection	Labor Shortage						
31-1011	Home Health Aides	15,960	27,507	8,227	29.9%	\$23,980	\$197,283,460	\$9,049,700	\$1,100	\$22,880
31-1014	Nursing Assistants	15,003	20,260	4,619	22.8%	\$30,470	\$140,740,930	\$35,058,210	\$7,590	
31-2000	Occupational Therapy & Physical Therapist Assistants/Aides	3,005	4,485	1,434	32.0%					
31-2011	Occupational Therapy Assistants	573	824	279	33.9%	\$62,090	\$17,323,110	\$10,939,590	\$39,210	
31-2012	Occupational Therapy Aides	135	196	67	34.2%	\$40,690	\$2,726,230	\$1,193,270	\$17,810	
31-2021	Physical Therapist Assistants	1,430	2,156	677	31.4%	\$55,070	\$37,282,390	\$21,792,630	\$32,190	
31-2022	Physical Therapist Aides	867	1,309	411	31.4%	\$27,730	\$11,397,030	\$1,993,350	\$4,850	
31-9000	Other Healthcare Support Occupations	37,195	50,790	11,479	22.6%					
31-9011	Massage Therapists	3,131	4,030	495	12.3%	\$46,100	\$22,819,500	\$11,493,900	\$23,220	
31-9091	Dental Assistants	6,995	9,298	1,825	19.6%	\$39,580	\$72,233,500	\$30,477,500	\$16,700	
31-9092	Medical Assistants	17,635	25,654	5,159	20.1%	\$32,840	\$169,421,560	\$51,383,640	\$9,960	
31-9093	Medical Equipment Preparers	1,451	1,934	617	31.9%	\$35,080	\$21,644,360	\$7,527,400	\$12,200	
31-9094	Medical Transcriptionists	1,064	1,211	266	22.0%	\$29,990	\$7,977,340	\$1,891,260	\$7,110	
31-9095	Pharmacy Aides	194	239	96	40.2%	\$37,560	\$3,605,760	\$1,409,280	\$14,680	
31-9096	Veterinary Assistants and Laboratory Animal Caretakers	2,594	3,293	1,858	56.4%	\$27,610	\$51,299,380	\$8,788,340	\$4,730	
31-9097	Phlebotomists	1,409	2,025	324	16.0%	\$32,430	\$10,507,320	\$3,094,200	\$9,550	
31-9099	Healthcare Support Workers, All Other	2,722	3,106	839	27.0%	\$36,070	\$30,262,730	\$11,066,410	\$13,190	
	Total	71,163	103,042	25,759	25.0%		\$796,524,600	\$207,158,680		

* Based on minimum wage of \$11 per hour and 40 working hours per week.

Appendix 7

Arizona Workforce Estimates by Racial/Ethnic Group (2017), numerical and percentage

Arizona Workforce Estimates by Racial/Ethnic Group (2017)	Population Estimate							Total	Skill Variable
	American Indian	Asian	Black/African- American	Hispanic / Latino	White (Not Hispanic)	Other			
Total:	107,910	116,903	139,607	968,836	1,753,384	202,943	3,289,583		
Management occupations	5,739	13,397	8,846	65,271	104,878	10,634	208,765	3	
Business and financial operations occupations	2,966	6,161	10,023	30,114	108,066	5,089	162,419	3	
Computer and mathematical occupations	1,003	10,902	2,694	11,751	17,495	2,496	46,341	3	
Architecture and engineering occupations	1,354	6,437	1,765	9,944	41,468	2,182	63,150	3	
Life, physical, and social science occupations	599	1,774	374	2,300	15,264	438	20,749	3	
Community and social service occupations	3,316	778	1,983	13,387	27,441	3,150	50,055	3	
Legal occupations	396	810	637	4,558	19,668	369	26,438	3	
Education, training, and library occupations	5,078	5,655	6,798	32,626	120,277	5,418	175,852	3	
Arts, design, entertainment, sports, and media occupations	1,287	2,111	2,281	10,793	38,430	2,063	56,965	3	
Health diagnosing and treating practitioners and other	1,525	11,489	5,609	13,725	86,848	2,944	122,140	3	
Health technologists and technicians	2,745	2,550	6,509	14,716	29,275	3,730	59,525	3	
Healthcare support occupations	4,294	2,311	3,796	22,922	25,969	3,950	63,242	2	
Fire fighting and prevention, and other protective service	1,859	296	3,871	12,527	24,753	1,813	45,119	2	
Law enforcement workers including supervisors	1,616	351	607	14,538	18,283	1,867	37,262	2	
Food preparation and serving related occupations	9,124	7,477	6,375	79,791	88,717	17,501	208,985	1	
Building and grounds cleaning and maintenance occupations	7,088	1,775	5,035	85,371	39,947	20,589	159,805	1	
Personal care and service occupations	7,061	7,777	7,325	38,950	65,114	7,235	133,462	1	
Sales and related occupations	9,124	9,823	15,429	99,298	215,270	18,922	367,866	3	
Office and administrative support occupations	15,460	13,009	27,870	147,920	250,516	30,354	485,129	1	
Farming, fishing, and forestry occupations	372	0	294	12,310	1,197	3,141	17,314	1	
Construction and extraction occupations	8,305	532	2,021	92,389	61,094	24,672	189,013	1	
Installation, maintenance, and repair occupations	3,043	1,612	3,416	31,542	56,935	5,343	101,891	1	
Production occupations	6,659	6,873	4,795	46,528	48,462	10,897	124,214	1	
Transportation occupations	4,999	1,659	6,455	35,264	59,820	7,997	116,194	1	
Material moving occupations	2,898	1,344	4,799	40,301	27,197	10,149	86,688	1	

Arizona Workforce Estimates by Racial/Ethnic Group as Percentage of Total Jobs (2017)	Population Estimate							Total	Skill Variable
	American Indian	Asian	Black/African- American	Hispanic / Latino	White (Not Hispanic)	Other			
Total:	3.28%	3.55%	4.24%	29.45%	53.30%	6.17%	100.00%		
Management occupations	0.17%	0.41%	0.27%	1.98%	3.19%	0.32%	6.35%	3	
Business and financial	0.09%	0.19%	0.30%	0.92%	3.29%	0.15%	4.94%	3	
Computer and mathematical	0.03%	0.33%	0.08%	0.36%	0.53%	0.08%	1.41%	3	
Architecture and	0.04%	0.20%	0.05%	0.30%	1.26%	0.07%	1.92%	3	
Life, physical, and social	0.02%	0.05%	0.01%	0.07%	0.46%	0.01%	0.63%	3	
Community and social	0.10%	0.02%	0.06%	0.41%	0.83%	0.10%	1.52%	3	
Legal occupations	0.01%	0.02%	0.02%	0.14%	0.60%	0.01%	0.80%	3	
Education, training, and	0.15%	0.17%	0.21%	0.99%	3.66%	0.16%	5.35%	3	
Arts, design, entertainment,	0.04%	0.06%	0.07%	0.33%	1.17%	0.06%	1.73%	3	
Health diagnosing and	0.05%	0.35%	0.17%	0.42%	2.64%	0.09%	3.71%	3	
Health technologists and	0.08%	0.08%	0.20%	0.45%	0.89%	0.11%	1.81%	3	
Healthcare support	0.13%	0.07%	0.12%	0.70%	0.79%	0.12%	1.92%	2	
Fire fighting and	0.06%	0.01%	0.12%	0.38%	0.75%	0.06%	1.37%	2	
Law enforcement workers	0.05%	0.01%	0.02%	0.44%	0.56%	0.06%	1.13%	2	
Food preparation and serving	0.28%	0.23%	0.19%	2.43%	2.70%	0.53%	6.35%	1	
Building and grounds	0.22%	0.05%	0.15%	2.60%	1.21%	0.63%	4.86%	1	
Personal care and service	0.21%	0.24%	0.22%	1.18%	1.98%	0.22%	4.06%	1	
Sales and related occupations	0.28%	0.30%	0.47%	3.02%	6.54%	0.58%	11.18%	3	
Office and administrative	0.47%	0.40%	0.85%	4.50%	7.62%	0.92%	14.75%	1	
Farming, fishing, and	0.01%	0.00%	0.01%	0.37%	0.04%	0.10%	0.53%	1	
Construction and extraction	0.25%	0.02%	0.06%	2.81%	1.86%	0.75%	5.75%	1	
Installation, maintenance,	0.09%	0.05%	0.10%	0.96%	1.73%	0.16%	3.10%	1	
Production occupations	0.20%	0.21%	0.15%	1.41%	1.47%	0.33%	3.78%	1	
Transportation occupations	0.15%	0.05%	0.20%	1.07%	1.82%	0.24%	3.53%	1	
Material moving occupations	0.09%	0.04%	0.15%	1.23%	0.83%	0.31%	2.64%	1	

Appendix 8
Proportions of Occupational Skill Type by Race*

Race	Low-Skilled	Middle-skilled	High-skilled
AmIndian	0.60	0.07	0.33
Asian	0.36	0.03	0.61
Black	0.49	0.06	0.45
Hispanic	0.63	0.05	0.32
White	0.40	0.04	0.56
Other	0.68	0.04	0.28

*Based on American Community Survey 2017 1-year “Sex by Occupation for the Civilian Employed Population 16 Years and Over” data

Appendix 9: Statistical Tests in R

The Participation of Racial Groups in Low, Middle, and High-skilled Occupations in Arizona

Timothy Jose L'Heureux

```
# Create dataset in R
```

```
library(VGAM)
Race = c("AmIndian", "Asian", "Black", "Hispanic", "White", "Other")
Lowskilled = c(65009, 42058, 68385, 610366, 701999, 137878)
Midskilled = c(7769, 2958, 8274, 49987, 69005, 7630)
Highskilled = c(35132, 71887, 62948, 308483, 982380, 57435)
jobData = data.frame(Race, Lowskilled, Midskilled, Highskilled)
jobData
```

Race	Lowskilled	Midskilled	Highskilled
AmIndian	65009	7769	35132
Asian	42058	2958	71887
Black	68385	8274	62948
Hispanic	610366	49987	308483
White	701999	69005	982380
Other	137878	7630	57435

First let's make a two-way contingency table. The explanatory variable is Race/ Ethnic Identity and the response is job type.

```
n11 = 65009
n12 = 7769
n13 = 35132
n21 = 42058
n22 = 2958
n23 = 71887
n31 = 68385
n32 = 8274
n33 = 62948
n41 = 610366
n42 = 49987
n43 = 308483
n51 = 701999
n52 = 69005
n53 = 982380
n61 = 137878
n62 = 7630
n63 = 57435
data.tblj <- matrix( c(n11, n12, n13,
                      n21, n22, n23,
                      n31, n32, n33,
                      n41, n42, n43,
```

```

        n51, n52, n53,
        n61, n62, n63),
    byrow=TRUE, nrow=6,
    dimnames = list(
      c("AmIndian", "Asian", "Black", "Hispanic", "White", "Other"),
      c("Lowskilled","Midskilled", "Highskilled")
    )
)
data.tblj

##           Lowskilled Midskilled Highskilled
## AmIndian      65009      7769      35132
## Asian         42058      2958      71887
## Black         68385      8274      62948
## Hispanic      610366     49987     308483
## White         701999     69005     982380
## Other         137878      7630      57435

chisq.resultsj = chisq.test(data.tblj)
chisq.resultsj

##
## Pearson's Chi-squared test
##
## data: data.tblj
## X-squared = 198560, df = 10, p-value < 2.2e-16

observedj = chisq.resultsj$observed
expectedj = chisq.resultsj$expected
X2j = sum( (observedj - expectedj)^2 / expectedj )
data.frame(X2.statistic = X2j, pvalue = 1 - pchisq(X2j, df=10) )



| X2.statistic | pvalue |
|--------------|--------|
| 198555.1     | 0      |



G2j = 2 * sum( observedj * log(observedj / expectedj) )
data.frame(G2.statistic = G2j, pvalue = 1 - pchisq(G2j, df=10) )



| G2.statistic | pvalue |
|--------------|--------|
| 201516.2     | 0      |



chisq.resultsj$stdres

##           Lowskilled Midskilled Highskilled
## AmIndian      72.315271    45.02646   -91.103313
## Asian        -93.608284   -32.10021    107.124770
## Black         -3.326365    27.84223    -8.151738
## Hispanic      318.313385    41.74401  -336.461550
## White        -363.639652   -46.27895   383.790585
## Other         172.270038   -15.08353  -166.546877

```

Pearson's chi square statistic is 198555.1 and the likelihood ratio test statistic is 201516.2. Both statistics are very large compared to expected (df = 10). The p-values are very small. From this output, we reject the null hypothesis of independence between race and job skill level.

Examining the standardized residuals from Pearson's chi-square, we can compare expected values, given that the null hypothesis of independence is true against observed counts in each cell. For example, there are more American Indians in low-skilled and middle-skilled jobs than expected. The standardized residual value for Hispanic is 318.313385, which is very large. There are *many* more Hispanics in low-skilled jobs than expected. Another value of note is that the residual for White is 383.790585, so there are *many* more white people in highskilled jobs than expected.

There is very strong evidence of association between race.

Generates a marginal table: value of each cell divided by sum of row cells

```

jobskill = matrix(c(Lowskilled, Midskilled, Highskilled), nrow=6)
dimnames(jobskill)=list(c("AmIndian", "Asian", "Black", "Hispanic", "White", "Other"), c("Low-skill", "Mid-skill", "High-skill"))
round(prop.table(jobskill,1), 2)

```

##	Low-skilled	Mid-skilled	High-skilled
## AmIndian	0.60	0.07	0.33
## Asian	0.36	0.03	0.61
## Black	0.49	0.06	0.45
## Hispanic	0.63	0.05	0.32
## White	0.40	0.04	0.56
## Other	0.68	0.04	0.28

We can see that American Indians, Hispanics, and Other are most likely to be in a low-skilled job. Whites and Asians are most likely to be in a high-skilled job.

```

R = as.factor(Race)
arizonafit1 = vglm(cbind(Lowskilled, Midskilled, Highskilled) ~ Race, data=jobData, family=multinomial)
#coef(arizonafit1)
#summary(arizonafit1)
coef(summaryvglm(arizonafit1))

```

##	Estimate	Std. Error	z value	Pr(> z)
## (Intercept):1	0.61541333	0.006621674	92.939239	0.000000e+00
## (Intercept):2	-1.50897094	0.012537176	-120.359719	0.000000e+00
## RaceAsian:1	-1.15145915	0.009029617	-127.520272	0.000000e+00
## RaceAsian:2	-1.68161114	0.022564524	-74.524555	0.000000e+00
## RaceBlack:1	-0.53256881	0.008622980	-61.761574	0.000000e+00
## RaceBlack:2	-0.52021998	0.017144312	-30.343591	3.052562e-202
## RaceHispanic:1	0.06697871	0.006980444	9.595194	8.375902e-22
## RaceHispanic:2	-0.31093282	0.013432336	-23.148083	1.519838e-118
## RaceOther:1	0.26030204	0.008277097	31.448469	4.404874e-217
## RaceOther:2	-0.50959509	0.017482945	-29.148127	8.823459e-187
## RaceWhite:1	-0.95145955	0.006803602	-139.846439	0.000000e+00
## RaceWhite:2	-1.14682829	0.013141172	-87.269861	0.000000e+00

The fitted model is $\log\left(\frac{\hat{\pi}_1}{\hat{\pi}_3}\right) = \hat{\alpha}_1 + \hat{\beta}_1 = \log\left(\frac{\hat{\pi}_2}{\hat{\pi}_3}\right) = \hat{\alpha}_1 + \hat{\beta}_1 =$

The null hypothesis implies that race and job type are independent. There is very strong evidence of dependence between race and job type (P-value < 2.2e-16); we reject the null hypothesis.

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