

Immigration and Baumolian Entrepreneurship in the United States

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Abstract

We investigate immigration and entrepreneurship—productive and unproductive—in the United States. Previous studies of this relationship focus on specific immigrant populations and single-variable definitions of entrepreneurship. We focus on all migrants, examining authorized and unauthorized populations. Additionally, we explore multiple measures of entrepreneurship, capturing wealth-generating and redistributive behavior. For most measures of productive entrepreneurship, our results show positive and statistically significant correlations with authorized immigration. Investigating unproductive entrepreneurship yields statistically significant results, but the signs of our coefficients depend on the proxy used. This all suggests that the institutional environment to which migrants move rewards productive entrepreneurship but has a mixed effect toward unproductive entrepreneurship.

JEL Codes: J60, J61

Keywords: migrant workers, entrepreneurship, unauthorized immigration

I. Introduction

Is immigration associated with entrepreneurship? Recent studies of immigration and entrepreneurship provide varied results. For example, Hunt and Gauthier-Loiselle (2010) find a positive, statistically significant relationship between the share of the population composed of immigrant college graduates and patents per capita. Ozgen, Nijkamp, and Poot (2010) find that a diverse composition of immigrants is a more important determinant of innovation (measured by patents per capita) than the proportion of the population that is composed of immigrants. In contrast, Maré, Fabling, and Stillman (2011) find no evidence of a relationship

between the proportion of immigrant workers and innovation after adjusting for factors such as firm size, industry, and research and development expenditures.

In this paper, we test the relationship between immigration and entrepreneurship in a different way. Using multiple proxies for productive, wealth-generating activity and unproductive (or destructive) wealth redistribution, we investigate the relationship between state-level immigrant shares of the population—authorized and unauthorized—and entrepreneurial outcomes. The entrepreneurship measures used here cover a wide scope of entrepreneurial activity to eliminate concerns about single-variable measures misrepresenting entrepreneurship.¹

Our focus is not immigrant entrepreneurship exclusively. Rather, we question whether immigrants are associated with entrepreneurship, generally. We also question whether unauthorized immigration is related to entrepreneurial outcomes in different ways than its authorized counterpart.²

Our first hypothesis is that immigrants, authorized or unauthorized, will have a positive effect on productive entrepreneurship for several reasons. First, immigrants bring with them a local knowledge foreign to many US natives. Immigrants who see new opportunity may be motivated to try, in the United States, business ventures and ideas that have been successful elsewhere.

Second, and related, since immigrants are consumers, we expect that migration to the United States puts upward pressure on demand for goods and services sold in the United States, in turn motivating natives and immigrants alike to find new, innovative ways to satisfy the higher and now more diverse demands of the population. As immigrants enter, they add to the host country's mix of ideas, its ingenuity.³ In addition to direct increases in productive activity, immigrants also free up productive native resources to engage in

¹ See, for example, Hurst and Pugsley (2010). The authors demonstrate that self-employment, as a single-variable measure of entrepreneurship, does not represent entrepreneurial activity very well. Specifically, the self-employed do not appear to be especially innovative, nor do their businesses tend to grow at significantly high rates.

² Our study is unable to differentiate between migrants, who move temporarily, and immigrants, who move permanently. As such, we use the terms interchangeably, because our study focuses on the impacts of the foreign born, regardless of how long they stay in the United States.

³ For a fuller discussion on the growth-enhancing effects of migration, and population increases in general, see Simon (1981).

more entrepreneurial activity. Alex Tabarrok writes, in his defense of open borders, “The immigrant who mows the lawn of the nuclear physicist indirectly helps to unlock the secrets of the universe” (2015).

What are the possible relationships between immigration and unproductive entrepreneurship? Our expectations are a bit ambiguous. We start our analysis with authorized immigration. One hypothesis is that authorized immigration will lead to a decrease in unproductive entrepreneurship. It may be that upward pressure on demand for local goods and services from new migrants distracts both immigrants and natives from pursuing unproductive ends.

It may also be that it is simply more difficult for immigrants to navigate the political realm as lobbyists; immigrants may be less accustomed to political rules and norms and have less access to mechanisms that allow one to engage in unproductive entrepreneurship. Padilla and Cachanosky (2019) support this theory. The authors demonstrate that any negative effects of low-skilled immigrants on economic freedom are likely trivial. In a study of corruption and immigration (we consider corruption a form of unproductive activity), Pavlik et al. (2019) find that immigration relates negatively to corruption in destination countries already experiencing low levels of corruption or high levels of economic freedom. Otherwise, immigration is not generally related to corruption.

Alternatively, studies point to immigrants placing stress on social welfare programs, which results in large fiscal burdens on US taxpayers (Rector and Richwine 2013; Borjas and Hilton 1995). If true, we should expect the share of authorized immigrants in state populations to be positively related to lobbying and other unproductive activity—whether authorized migrants themselves are lobbying or natives are lobbying in favor of expanding social programs to cover larger populations inclusive of immigrants.

Yet, immigration may be related to unproductive entrepreneurship if natives are lobbying *against* immigrants rather than *for* immigrants. For example, Padilla and Cachanosky (2018) show that immigration is related positively to minimum wages and union density. The authors suggest that their findings result not from immigrant lobbying activity, but native lobbying activity aimed to restrict immigrants in the labor market. Mayda et al. (2018) lend support to this theory. They show that US citizens are more likely to vote Republican (presumably to support an anti-immigration stance)

in areas where low-skilled immigration is perceived to threaten the jobs of low-skilled native workers—particularly in low-income, rural communities. In this paper, we test the immigration and unproductive entrepreneurship relationship with these possibilities in mind, using various single-variable measures of unproductive entrepreneurship.

Finally, we address the possible association between unauthorized immigration and unproductive entrepreneurship. Like their authorized counterparts, unauthorized immigrants could lead to an increase in unproductive entrepreneurship if either they themselves or natives are lobbying in favor of expanding social programs to cover larger populations inclusive of immigrants. Alternatively, unauthorized immigrants may have little or no impact on unproductive entrepreneurship if they have little or no access to the mechanisms required to engage in unproductive activity. Indeed, this statement may be truer for unauthorized migrants than for their authorized counterparts, as unauthorized migrants face concerns of detection and greater legal constraints. Further, unauthorized immigration may be positively related to unproductive entrepreneurial activity if natives are lobbying against immigrants because of perceived or real competitive threats in the labor market.

In the next section of this paper, we discuss related literature. In section 3, we provide descriptions of the data. In section 4, we introduce our empirical strategy and provide results. Section 5 concludes the study.

II. Related Literature

In this section, we discuss the related literature on immigration and on Baumolian entrepreneurship.

A. Immigration

Several studies document relationships between immigrant populations and entrepreneurship. Maré, Fabling, and Stillman (2011) find a positive relationship between innovation outcomes and average workforce characteristics, such as the proportion of the workforce consisting of migrants or high-skilled workers. However, this relationship does not hold for all innovation outcomes, and this relationship all but disappears after controlling for firm characteristics such as firm size, industry, and research and development expenditures. However, the authors admit this finding could represent distinctive features of the immigration patterns or

innovation system of New Zealand. New Zealand is relatively small with a low population density, which may limit the possible scope for potential knowledge spillovers and networks of innovators to which immigrants could contribute.

In contrast, Hunt and Gauthier-Loiselle (2010) find that a 1.3 percentage-point increase in the share of the population of immigrant college graduates has the effect of a 20 percentage-point increase in patents per capita, while a 0.7 percentage-point increase in the share of post-college immigrants leads to a 21 percentage-point increase in patents per capita. Furthermore, a 0.45 percentage-point increase in the amount of immigrant engineers and scientists explained a 22 percentage-point increase in patents per capita.

These figures also include positive spillover effects, suggesting that instead of being crowded out by immigrants, native innovators are being aided by the presence of their immigrant counterparts. Without these positive spillover effects, the direct effects of all three skill groups on patents per capita rest between eight and nine percentage points.

Ozgen, Nijkamp, and Poot (2010) find that regions with a relatively high number of immigrants do not exhibit correspondingly high levels of patents per capita. The authors also find that the diversity of immigrants may have beneficial and complementary effects on native workers, though effects are not present in all measures of diversity.

In a cross-country study, Li et al. (2017) find that the immigrant share of the population relates positively to the creation, growth, and export activities of new firms through knowledge spillover between migrants and natives. These authors also find that these effects are mitigated by unfavorable native attitudes toward migrants.

Finally, Cebula et al. (2020) use the Kaufmann indices of entrepreneurial activity to investigate relationships between entrepreneurial activity and domestic in-migration, particularly whether this relationship is causal and runs in both directions. The authors find that while in-migration rates positively affect productive entrepreneurial activity, productive entrepreneurial activity does not seem to induce more in-migration.

We add to this literature by focusing on the relationship between immigration and both productive and unproductive entrepreneurial outcomes, as well as by using multiple proxies for each. Moreover, we focus not on high-skilled immigrants exclusively, but on immigrant populations generally. We do distinguish between

unauthorized workers and authorized workers, because we suspect that the two populations have different impacts on entrepreneurial outcomes.

B. Baumolian Entrepreneurship

Joseph Schumpeter's (1934) theory positions the entrepreneur as the individual in society responsible for the "carrying out of new combinations"—or "creative destruction." William Baumol, in 1990, re-examined Schumpeter's theory and concluded it was lacking an explanation of the full scope of entrepreneurial possibilities. Baumol (1990) first questions Schumpeter's definition of the entrepreneur: "If entrepreneurs are defined, simply, to be persons who are ingenious and creative in finding ways that add to their own wealth, power, and prestige, then is it not to be expected that not all of them will be overly concerned with whether an activity that achieves these goals adds much or little to the social product or, for that matter, even whether it is an actual impediment to production?"

Baumol is the first to point out that Schumpeter's definition of the entrepreneur overlooks the possibility of wealth redistribution (or destruction) in the entrepreneurial "carrying out of new combinations." Schumpeter's theoretical shortcoming is nowhere more evident than in Schumpeter's (1934) assertion that "entrepreneurial profit is the expression of the value of what the entrepreneur contributes to production."

Baumol's (1990) extension of the Schumpeterian framework is a powerful theoretical contribution. Under the amended framework, Schumpeter's entrepreneurs behave in much the same way, except that institutions determine the allocation of entrepreneurial resources. That is, according to Baumol, entrepreneurs channel their resources into either productive or unproductive activities depending on which activities local institutional frameworks make most rewarding. In Baumol's (1990) light, productive entrepreneurs are those whose activities generate wealth; unproductive entrepreneurs are those who seek to either lawfully or unlawfully redistribute it.

Baumol even includes a third type of entrepreneur, those who destroy wealth (including criminals), rather than simply redistributing it, when entrepreneurially chasing profit opportunities. However, to save time and space, to limit the scope of our current research, and because the differences between unproductive and destructive entrepreneurship dwindle significantly after considering opportunity

cost, we choose to focus only on productive and unproductive activity.

Recent studies of productive and unproductive entrepreneurship focus almost exclusively on Baumol's (1990) central hypothesis: the assertion that entrepreneurial talent is ubiquitous across geographic regions and that distributions of entrepreneurial talent depend on institutional environments. In other words, when an institutional nexus rewards productive entrepreneurship, more individuals engage in productive activity; when the institutional nexus rewards unproductive entrepreneurship, more individuals engage in unproductive activity. There are also numerous empirical studies that support Baumol's prediction. Most relevant to our study, Sobel (2008), Hall and Sobel (2008), Wiseman (2013), and Wiseman and Young (2014) all provide evidence using US data.

We focus more on how demographic changes, specifically changes in immigrant share of the population, are related to the distribution of entrepreneurial talent. To our knowledge, we are the first to evaluate the relationship between immigration and Baumolian entrepreneurship in the United States using our current proxies of unproductive activity. However, there have been studies on the relationship between immigration and other measures of unproductive, or redistributive, activity, including corruption (Padilla and Cachanosky 2018; Mayda et al. 2018).

III. Data

We now turn to the data on entrepreneurship and immigration.

A. Entrepreneurship Data

Appendix table 1 provides data descriptions and sources for our single-variable measures of productive and unproductive entrepreneurship. We collected data for thirty-four of the contiguous US states for which we could find data on authorized and unauthorized immigration and for the years 1990, 1995, 2000, 2005, 2007, 2008, 2010, 2012, and 2013. These variables capture a wide range of entrepreneurial activity.

For productive entrepreneurship, our variables include per capita venture capital investments (a type of entrepreneurship popularized by shows like *Shark Tank*, where venture capitalists like Mark Cuban decide which new and exciting start-up businesses to invest in), utility patents per capita (patents designated for the creation of new or improved inventions), the sole proprietorship growth rate (the

growth rate in the percentage of the total employed population that is made up of sole proprietors, or individuals who own their own businesses without partners), total establishment birth rates (including sole proprietorships and other newly formed businesses), and large (500 employees or more) establishment birth rates.

Analysis of productive entrepreneurship based on several indicators differentiates this analysis from the broader, more general body of entrepreneurship and immigration literature. Focusing on multiple indicators of profit-seeking, innovative activity characterized by risk captures a broad range of productive entrepreneurial activity (Wiseman and Young 2014). For example, variables like sole proprietorship rates capture a broad range of activity, yet many sole proprietors do not grow at high rates; venture capitalist investment and utility patents represent more innovative activity, but these variables do not capture the entrepreneurial contributions of many sole proprietors and establishment owners (Hurst and Pugsley 2010).

We also refrain from using indices of entrepreneurship to better determine exactly how immigration is associated with different measures of entrepreneurial activity. Similarly, unproductive entrepreneurship variables incorporate three measures of per capita political lobbying establishments in a state's capital. These are based on the number of establishments in (1) SIC code 8650 (political organizations), (2) SIC codes 8650 and 8690 (political organizations and membership organizations), and (3) SIC codes 8650, 8690, and 8390 (political organizations, membership organizations, and social services organizations) (Sobel and Garret 2002).

We also analyze a fourth variable based on the Harris Poll,⁴ an index of judicial quality on a 100-point scale. Our variable is 100 minus the Harris Poll value so that a lower value is associated with less rent-seeking behavior (like the rest of our unproductive entrepreneurship variables). States that have relatively low Harris Poll scores tend to have high rates of legal fraud and abuse in the areas of workers' compensation, class-action lawsuits, and medical malpractice.

Additionally, we use the percent of the total employed population composed of state, local, and total (state plus local) public sector employees as a proxy for unproductive entrepreneurship, because governments, though sometimes charged with the production of

⁴ The Harris Poll is published by the Institute for Legal Reform and the US Chamber of Commerce in its State Liability Systems Ranking.

public goods, are also in the business of transferring resources (an unproductive activity). While government employees typically do not attempt to transfer resources from others to themselves, they do expend labor resources on unproductive transfers instead of productive uses.

Finally, we take advantage of state-level per capita lobbying data provided by the National Institute of Money in State Politics (Leech 2020). It could be convincingly argued that immigration increases unproductive activity even if immigration is uncorrelated or negatively correlated with per capita political lobbying establishments. Even if the number of per capita political lobbying establishments stays the same or decreases, total lobbying expenditures could increase, especially if political lobbying establishments in a state increase in size. Therefore, we also take advantage of state-level changes in per capita lobbying expenditures, in dollars, as a dependent variable proxying for unproductive activity to gain a fuller understanding of the relationship between immigration and different measures of unproductive entrepreneurship.

All these measures attempt to gauge the level of state resources being expended in legal and political processes rather than in productive market activities, regardless whom these efforts are intended to benefit. Because of a lack of available data, data for political organizations, membership organizations, social services organizations, and the Harris Poll are only collected for the years 2005, 2007, and 2008. For the same reason, data on lobbying expenditures per capita are only collected for nine states and the years 2005, 2007, 2008, 2010, 2012, and 2013.

B. Immigration Data

Immigration data come from the Census Bureau and the Department of Homeland Security. Immigration data are split into authorized and unauthorized populations and measured as a share of total state population. Unauthorized immigrant estimates are based on a “residual” approach. The residual for each state is calculated by first identifying authorized immigrants among the total immigrant population using data on legal admissions from the Department of Homeland Security. This population is then subtracted from total foreign-born resident data collected by the Census Bureau. The difference—or residual—proxies for the population of unauthorized foreign-born residents.

C. Controls

We control for several state-level variables commonly identified in the literature as impacting entrepreneurship: a state's (log) GDP per capita (to consider business cycle fluctuations) and several common demographic variables—median age, percent of a state's population with a bachelor's degree or more, percent male, and population density. Intuitively, areas tend to be more entrepreneurial where the population is younger (Lévesque and Minniti 2011), better educated (Bedi et al., forthcoming), and has a higher proportion of males (Marlow and McAdam 2013). We include population density to control for the possibility that entrepreneurs are simply attracted to densely populated areas.

Finally, because of the centrality of institutions in Baumol's hypothesis, we control for institutions by using the Fraser Institute's Economic Freedom of North America index. This index measures institutional quality on a 1–10 scale, with higher values indicating greater degrees of institutional quality that promote more productive forms of entrepreneurial activity (Wiseman and Young 2014; Wiseman 2013; Sobel 2008; Sobel and Garrett 2002). Appendix table 2 provides a list of these variables and their sources as well as a list of our dependent variables and their sources.

IV. Empirical Methodology and Results

Our baseline model takes the following form:

$$ES_{i,t} = \beta_0 + \beta_1 * AutMigrantShare_{i,t} + UnautMigrantShare_{i,t} \\ + lGDP_{i,t} + PerBach_{i,t} + MedAge_{i,t} + SexRat_{i,t} \\ + PopDen_{i,t} + Institutions_{i,t} + \varepsilon_{i,t}$$

Where $ES_{i,t}$ is an entrepreneurial outcome—either productive or unproductive—in state i at time t ; $AutMigrantShare_{i,t}$ is the percent of state i 's population that is foreign born and authorized at time t ; $UnautMigrantShare_{i,t}$ is the percent of state i 's population that is foreign-born and unauthorized at time t ; $lGDP_{i,t}$ is (log) GDP in state i at time t ; $PerBach_{i,t}$ is the percent of state i 's population that has a bachelor's degree or higher at time t ; $MedAge_{i,t}$ is the median age of state i at time t ; $SexRat_{i,t}$ is the sex ratio of state i at time t ; $PopDen_{i,t}$ is the population density of state i at time t ; $Institutions_{i,t}$ is our proxy for institutions as measured by the Economic Freedom of North America index; and $\varepsilon_{i,t}$ is the error term for state i at time t . We also include time fixed effects and robust standard errors. Because we lack enough yearly observations, we refrain from running state fixed effects.

However, there is reason to believe reverse causality is a problem within this standard OLS model. It could be that migrants are not randomly selecting states as their homes but are instead choosing systematically to live in areas that are more productive or that provide fewer or greater opportunities for unproductive entrepreneurship. Indeed, Cebula and Clark (2011) find that migrants are attracted to US states with greater degrees of economic freedom.

We attempt to address this issue by using lagged variables. Since the effects of immigrants on entrepreneurship are likely not immediate, we lag our RHS variables by five years to allow for immigrants to settle into the economy. Five-year lags are included for all productive entrepreneurship regressions as well as regressions using public employment (local, state, and total) as dependent variables. Lagged regressions for measures of lobbying and the Harris Poll are not included due to lack of sufficient and available data. The lagged regressions take the following form:

$$\begin{aligned}
 ES_{i,t} = & \beta_0 + \beta_1 * AutMigrantShare_{i,t-5} + UnautMigrantShare_{i,t-5} \\
 & + lGDP_{i,t-5} + PerBach_{i,t-5} + MedAge_{i,t-5} \\
 & + SexRat_{i,t-5} + PopDen_{i,t-5} + Institutions_{i,t-5} \\
 & + \varepsilon_{i,t}
 \end{aligned}$$

where the variables are the same as in our baseline regression, except our RHS variables are lagged by five years to control for reverse causality and to account for lagged effects.

We begin the analysis of our results by focusing on productive entrepreneurial outcomes, the results of which can be found in appendix tables 3 and 4. To save space, we either gloss over or completely exclude statistically insignificant relationships. We also only discuss our modified, lagged model if results are different.

We first look at relationships between authorized migration and productive entrepreneurship, which largely vindicate our priors—indeed, every measure of productive entrepreneurship, at least in our baseline regressions, is associated positively and significantly with authorized migration.

To begin, a one percentage-point increase in the share of a state's population composed of authorized immigrants is associated with a \$15.22 per capita rise in venture capital investment, significant at the 5 percent level. When we utilize our lagged model, the magnitude of the relationship increases to \$21.54, suggesting that a one percentage-point increase in the share of the population of a state like Virginia composed of authorized immigrants is associated with an increase in venture capital investment of around \$130 million.

This increase in magnitude that we see when we lag our dependent variable suggests that the effects of an increase in authorized immigration on venture capital investment per capita increase over time. It also suggests that the relationships we see are not simply the result of reverse causality—indeed, as found by Cebula et al. (2020), it does not seem that authorized immigrants are migrating to places with systematically more entrepreneurship, at least as measured by venture capital investment per capita.

The positive association between utility patents per capita and authorized migration is significant at the 5 percent level and appears to be economically significant, too. Specifically, a one percentage-point increase in the share of a state's population composed of authorized migrants is associated with an increase in patents per million of 12.1. This suggests that a one percentage-point increase in the share of Virginia's population is associated with almost 103 additional patents. However, reverse causality seems to be a concern for this relationship, as the magnitude decreases to 9.39 patents per million, and the relationship loses its significance, when we use our lagged model.

To continue, a one percentage-point increase in the share of a state's population composed of authorized migrants is associated with a 0.126 percentage-point increase in the sole proprietorship growth rate. Further, the relationship and significance of this relationship increase when using lagged independent variables. With our lagged specification, a one percentage-point increase in the share of a state's population composed of authorized immigrants is associated with a 0.162 percentage-point increase in the sole proprietorship growth rate, and the significance of this relationship increases to the 1 percent level, heavily suggesting lagged effects of immigration on sole proprietorship growth rates and downplaying concerns over reverse causality.

Finally, a one percentage-point increase in the share of a state's population composed of authorized migrants is associated with a 0.128 percentage-point increase in total establishment birth rates and a 0.042 percentage-point increase in large establishment birth rates, with these relationships significant at the 1 percent and 10 percent levels, respectively. When we use our lagged model, a one percentage-point increase in the share of a state's population composed of authorized migrants is associated with a 0.162 percentage-point increase in total establishment birth rates, significant at the 1 percent

level, and a 0.037 percentage-point increase in large establishment birth rates, no longer significant.

The differences between our baseline and lagged regressions provide evidence that there are, indeed, lagged effects of migration on total establishment birth rates, and these effects may increase in magnitude over time. However, this is not the case for large establishment birth rates, indicating that while authorized immigrants may be associated with increases in establishment birth rates, this increase in entrepreneurship is limited to smaller, more newly established businesses. This finding is also consistent with the positive and significant relationships we find between authorized immigration and sole proprietorship growth rates, as sole proprietorships are often smaller than other business forms.

We continue our analysis by examining the relationships between unauthorized migration and productive activities. In contrast to their authorized counterparts, a one percentage-point increase in the share of a state's population composed of unauthorized migrants is associated with a decrease of \$34.76 in per capita venture capital investment, significant at the 10 percent level. However, this relationship loses any significance when using our lagged model, though the magnitude of the relationship increases to \$48.31, suggesting this relationship may suffer from reverse causality and not be causal.

The relationship between unauthorized migration and utility patents per capita mimics the relationship between unauthorized immigrants and venture capital investment: it is statistically significant and negative at the 1 percent level, with a one percentage-point increase in the share of a state's population composed of unauthorized immigrants associated with a decrease in patents per million of 42.7. When using our lagged model, this relationship decreases in magnitude to 35.4 patents per million, and the statistical significance drops to the 5 percent level. Like the negative relationship between unauthorized immigration and venture capital investments, this correlation seems to decrease over time. Differences in our baseline and lagged results suggest reverse causality is driving these results.

Finally, while unauthorized immigration is not significantly related to sole proprietorship growth rates, a one percentage-point increase in unauthorized migrants as a share of a state's population is related to a 0.241 percentage-point increase in total establishment growth rates, significant at the 1 percent level. Using our lagged

model, this magnitude drops to a 0.148 percentage-point increase, indicating that there may be concern for reverse causality in this case, and significance drops to the 5 percent level, suggesting that this positive correlation is at least partially driven by reverse causality. Like the relationship we see between authorized immigration and large establishment growth rates, the relationship between unauthorized immigration and large establishment growth rates is positive but statistically insignificant.

What do we make of the negative relationship between venture capital investment and utility patents and unauthorized migration? Though this result seems to contradict our earlier hypotheses, it makes sense that unauthorized migration is negatively associated with venture capital investment and patents per capita, variables representing formal activity. It seems, in large part, that authorized immigration is positively associated with productive entrepreneurship, with limited evidence of unauthorized immigration being associated with productive entrepreneurship, at least after taking reverse causality concerns into account.

We now turn our attention to relationships between unproductive activity and migration, the results of which can be found in appendix tables 5, 6, and 7. We begin our analysis with the relationship between authorized migration and unproductive activities. Authorized migration is associated with a decrease of 4.075 membership organizations per ten thousand and a decrease of 5.384 social services organizations per ten thousand, both significant at the 10 percent level. For a state like Virginia, this means a one percentage-point increase in authorized immigration is associated with around 3,400 fewer membership organizations and around 4,500 fewer social services organizations.

Authorized migrants are also associated with a 0.094 percentage-point decrease in the percent of the population employed in state government, significant at the 1 percent level; when we use our lagged specification, this relationship decreases in magnitude to 0.091 percentage points and significance drops to the 5 percent level, suggesting reverse causality is partially at play. However, a one percentage-point (or about 1/5 of a standard deviation) increase in authorized migration as a share of a state's population is also related to a 1.851 point (or 1/7 of a standard deviation) *increase* in our measure of the Harris Poll, meaning that these migrants are associated with a deterioration in the quality of state court systems.

What could be an explanation for this seemingly contradictory result? One may wish to examine the impact of the legalization process on our court systems. The road to legalization often takes years, and there are a variety of visa programs and immigrant work restrictions that incentivize individuals to take advantage of the court system. Two glaring examples include marriage visas and U visas. Marriage visa fraud is a widely known phenomenon. U visas, given to immigrants who become victims of a crime within the host country, are also subject to manipulation and incentivize the falsification of police reports. This is exactly what happened in Jackson, Mississippi, in 2016 when Officer Ivory Lee Harris admitted to being paid cash to falsify police reports that were submitted in support of fraudulent U visa applications (Department of Justice 2016). Opportunities and incentives to commit fraud in the process of becoming a citizen are numerous, and this area is understudied.

We end our analysis by looking at relationships between unauthorized migration and unproductive activity. The only significant relationship seen here is that between unauthorized migration and lobbying expenditures per capita, with a 1 percentage-point increase in the share of a state's population composed of unauthorized migrants associated with a \$1.11 increase in lobbying expenditures per capita, significant at the 1 percent level. In other words, for a state like Virginia, a one percentage-point increase in the share of the state's population composed of unauthorized migrants is associated with an increase in total lobbying expenditures of more than \$9.35 million.

These results indicate that authorized immigration is associated with a decrease in lobbying organizations per capita, while unauthorized immigration is associated with an increase in lobbying expenditures per capita. Further, these results are largely consistent with Mayda et al. (2018), who find that increases in low-skilled immigration, which is highly correlated with unauthorized immigration, encourage voters to vote Republican to curb labor market competition. These authors also find that high-skilled immigration, which is more correlated with authorized immigration, leads to voters being less likely to vote Republican.

V. Conclusion

We investigate the association between immigration and entrepreneurship in the United States, giving special attention to both authorized and unauthorized immigrant populations and focusing on

broad measures of wealth creation and redistribution. Our basic question is: *are immigrants associated with entrepreneurship?* Our results provide somewhat mixed conclusions, but they provide support for our hypotheses as well as for earlier, related studies.

Our first hypothesis, that immigrants in general would have a positive effect on entrepreneurship, seems to hold partially given our data and results. However, we see different entrepreneurial outcomes associated with authorized and unauthorized migrants. Unauthorized migrants seem to be associated with lower levels of productive entrepreneurial outcomes, like venture capital investment and utility patents. At the same time, authorized migrants are related positively and significantly with these same measures of productive entrepreneurship.

Our second finding is that authorized migration seems to be negatively correlated or not significantly correlated with most unproductive activity, while unauthorized immigration is positively and significantly related to lobbying expenditures per capita. This finding is largely consistent with Mayda et al. (2018), who find that increases in low-skilled immigration encourage voters to vote Republican to curb labor market competition, while increases in high-skilled immigration lead to voters being less likely to vote Republican. This finding indicates that unproductive activity increases with migration when natives are more likely to view immigrants as competitors in the labor market. The last significant relationship we found between immigration and unproductive entrepreneurship was the relationship between authorized migration and the Harris Poll, a result that may be explained by the legal process migrants must navigate on their path to citizenship or legal work.

Our results are also relevant to one of La Porta and Schleifer's (2014) facts about informality: the informal sector is less productive than its formal counterpart. Further, if US immigration policy is encouraging individuals to enter illegally, as Massey and Pren (2012) suggest, our results suggest that the informal sector of the US economy is being artificially propped up and represents an untapped reservoir of productivity being underutilized because of barriers to entry (de Soto 1989). If this analysis is correct, granting legal status to unauthorized migrants would increase the productive capacities of the United States.

Finally, our results partially support evidence provided by Wang and Lofstrom (2020), who use 9/11 as a natural experiment to show that immigration restrictions have the unintended consequence of

driving immigrants into forms of necessity-driven entrepreneurship, or entrepreneurship undertaken because no other viable forms of employment are available, and pushing immigrants away from forms of opportunity-driven entrepreneurship, or entrepreneurship undertaken to increase income or take advantage of a perceived profit opportunity.

While we do not directly test the theory that immigration restrictions push immigrants into necessity-driven entrepreneurship, we do find that unauthorized immigrants are negatively related to venture capital investment and utility patents per capita, proxies generally associated with opportunity-driven entrepreneurship. Authorized immigrants are associated positively with more productive, opportunity-driven forms of entrepreneurship.

There is much more research to be done. This analysis represents a start, but a valid and relevant instrument or natural experiment would help tease out causality. Further, the definitions of productive and unproductive entrepreneurship can change results substantially, and the effects of authorized and unauthorized migrants on entrepreneurship are significantly different. Authorized immigration seems to be associated with more productive entrepreneurship and less unproductive entrepreneurship, while unauthorized immigration is associated with less productive entrepreneurship and more unproductive entrepreneurship.

Additionally, this analysis only observes general relationships, but more research on the mechanisms behind these relationships would clear murky waters. Finally, it would be useful to analyze the long-term effects of immigration on productive and unproductive entrepreneurship. Such analysis could shed light on the debate on immigrants' impact on host institutions in the long run, a debate that has become increasingly popular among academics (Clark et al. 2015) and is highly relevant to Baumol's hypothesis on the institutional determinants of entrepreneurship and how these institutional determinants may change with migration.

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Appendix

Table 1. Data descriptions and sources for dependent variables used to proxy entrepreneurship

<i>Productive Entrepreneurship</i>		
Variable	Description	Source
<i>Venture Capital Investment per Capita</i>	Average annual venture capital investment (all sources, including non-US) per capita	US Department of Commerce, Bureau of Economic Analysis, <i>State and Local Area Data</i>
<i>Patents per Capita</i>	Average annual number of utility patents granted per capita	US Patent and Trademark Office, <i>Utility Patent Counts by County/ State and Year</i>
<i>Sole Proprietorship Growth Rate</i>	Percent of change in nonfarm proprietor employment as a percent of the labor force	Office of Advocacy, US Small Business Administration, US Census Bureau, <i>Statistics of US Business</i>
<i>Total Establishment Birth Rate</i>	100*average annual number of new establishment births as a percent of existing firms	Office of Advocacy, US Small Business Administration, US Census Bureau, <i>Statistics of US Business</i>
<i>Large Firm Establishment Birth Rate</i>	100*average annual number of new 500+ employee establishment births as a percent of existing large firms	Office of Advocacy, US Small Business Administration, US Census Bureau, <i>Statistics of US Business</i>

Unproductive Entrepreneurship		
Variable	Description	Source
<i>Lobby Measure 1</i>	Number of establishments in NAICS code 813940 (Political Organizations) in state capitals per 1,000,000 population	Sobel (2008) and <i>Country Business Patterns</i> , US Census Bureau
<i>Lobby Measure 2</i>	Number of establishments in NAICS codes 813940, 813410, 813312, 561599, 813910, and 813990 (Political Organizations and Membership Organizations) in state capitals per 1,000,000 population	Sobel (2008) and <i>Country Business Patterns</i> , US Census Bureau
<i>Lobby Measure 3</i>	Number of establishments in NAICS codes 813940, 813410, 813312, 561599, 813910, 813990, 813212, 813219, 813311, 813312, and 813319 (Political Organizations, Membership Organizations, and Social Service Organizations) in state capitals per 100,000,000 population	Sobel (2008) and <i>Country Business Patterns</i> , US Census Bureau
<i>Unproductive Legal Entrepreneurship</i>	100 minus the Harris Poll score. The Harris Poll score measures the quality of each state's liability system on a 100-point scale. By our conversion, a score of 100 now represents a "poor quality" judicial system	Institute for Legal Reform and US Chamber of Commerce, <i>State Liability System Ranking</i>
<i>Local Employees</i>	Percent of total employed working in local government	US Census Bureau, <i>Total Local and State Government Payrolls</i>
<i>State Employees</i>	Percent of total employed working in state government	US Census Bureau, <i>Total Local and State Government Payrolls</i>
<i>Public Employees</i>	Percent of total employed working in state and local government	US Census Bureau, <i>Total Local and State Government Payrolls</i>
<i>Lobbying Expenditures per Capita</i>	Total recorded lobbying expenditures per capita	<i>National Institute on Money in Politics</i>

Table 2. Independent variables, controls, and sources

Variable	Source
<i>Percent Authorized Immigrants in State Population</i>	Department of Homeland Security
<i>Percent Unauthorized Immigrants in State Population</i>	Department of Homeland Security and Census Bureau
<i>Percent Population with Bachelor's Degree or Higher</i>	Census Bureau
<i>Sex Ratio (Male/Female)</i>	Census Bureau
<i>Median Age</i>	Census Bureau
<i>GDP per Capita</i>	Bureau of Economic Analysis
<i>Economic Freedom of North America</i>	Fraser Institute

Table 3. Productive entrepreneurship regressions with no lag

Dependent Variables:	Venture Capital Investment per Capita	Utility Patents per Million	Percent of Workforce Composed of Sole Proprietors Growth Rate	Total Establishment Growth Rate	Large Establishment Growth Rate
<i>Authorized Migrants as Percent of Population</i>	15.219** (2.412)	12.1** (3.59)	0.126* (0.055)	0.128*** (0.016)	0.042* (0.021)
<i>Unauthorized Migrants as Percent of Population</i>	-34.757* (15.841)	-42.7*** (8.22)	0.112 (0.109)	0.241*** (0.042)	0.022 (0.045)
<i>log(GDP)</i>	30.134 (16.146)	-30.8 (97.7)	2.901* (1.360)	-3.586*** (0.302)	-0.874** (0.341)
<i>Percent of Population with Bachelor's or Higher Median Age</i>	11.431** (4.375)	14.7*** (1.92)	-0.183*** (0.045)	0.034** (0.012)	0.008 (0.013)
<i>Sex Ratio</i>	-10.856** (3.249)	0.812 (2.38)	-0.197 (0.111)	-0.109*** (0.019)	0.024 (0.015)
<i>Population Density</i>	16.237 (9.771)	46.2*** (9.42)	-0.278** (0.108)	0.204*** (0.037)	0.048 (0.031)
<i>Institutions</i>	0.077 (-0.045)	0.138*** (0.036)	0.001*** (0.000)	-0.000* (0.000)	-0.000 (0.000)
<i>Constant</i>	42.641 (27.554)	-51.4*** (11.6)	0.999* (0.435)	0.602*** (0.085)	0.057 (0.128)
	-2016.84 (1036.214)	-3898*** (726.5)	4.406 (12.258)	27.006*** (4.614)	3.956 (5.303)
<i>N</i>	272	272	272	272	272

Note: *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels, respectively. Robust standard errors are reported in parentheses.

Table 4. Productive entrepreneurship regressions with lag

Dependent Variables:	Venture Capital Investment per Capita	Utility Patents per Million	Percent of Workforce Composed of Sole Proprietors Growth Rate	Total Establishment Birth Rate	Large Establishment Birth Rate
<i>Authorized Migrants as Percent of Population</i>	21.535** (7.427)	9.39 (5.71)	0.199*** (0.073)	0.162*** (0.016)	0.037 (0.024)
<i>Unauthorized Migrants as Percent of Population</i>	-48.314 (24.347)	-35.4** (9.32)	-0.045 (0.115)	0.148** (0.045)	0.030 (0.064)
<i>log(GDP)</i>	-200.399 (182.283)	28.6 (121.8)	6.089*** (2.736)	-3.783** (0.866)	-0.777 (0.684)
<i>Percent of Population with Bachelor's or Higher</i>	19.594 (12.391)	17.6*** (1.31)	-0.273** (0.068)	0.033** (0.013)	0.006 (0.017)
<i>Median Age</i>	-10.831*** (0.904)	4.86* (2.13)	-0.351 (0.180)	-0.068 (0.038)	0.029 (0.029)
<i>Sex Ratio</i>	25.000 (15.442)	50*** (5.71)	-0.411** (0.145)	0.232** (0.075)	0.032 (0.049)
<i>Population Density</i>	0.098 (0.047)	0.125** (0.033)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
<i>Institutions</i>	52.425 (43.534)	-68*** (13.4)	2.025** (0.700)	.598*** (0.109)	0.119 (0.124)
<i>Constant</i>	-663.751 (448.971)	-4953** (1253)	-15.775 (22.989)	24.530*** (3.238)	4.049 (7.308)
<i>N</i>	170	170	170	170	170

Note: *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels, respectively. Robust standard errors are reported in parentheses.

Table 5. Unproductive entrepreneurship regressions with no lag

Dependent Variables:	Percent of Population Employed in Local Government	Percent of Population Employed in State Government	Percent of Population Publicly Employed
<i>Authorized Migrants as Percent of Population</i>	0.155 (0.125)	-0.094** (0.015)	0.061 (0.116)
<i>Unauthorized Migrants as Percent of Population</i>	-0.097 (0.182)	0.049 (0.039)	-0.048 (0.149)
<i>log(GDP)</i>	0.705 (1.018)	-1.097*** (0.216)	-0.391 (1.012)
<i>Percent of Population with Bachelor's or Higher</i>	0.019** (0.007)	0.025*** (0.006)	0.044*** (0.007)
<i>Median Age</i>	-0.214 (0.140)	-0.085*** (0.018)	-0.299* (0.135)
<i>Sex Ratio</i>	-0.344** (0.115)	-0.023 (0.017)	-0.366** (0.131)
<i>Population Density</i>	-0.003** (0.001)	0.001*** (0.000)	-0.003** (0.001)
<i>Institutions</i>	-0.261 (0.202)	-0.597*** (0.038)	-0.858*** (0.185)
<i>Constant</i>	42.758*** (5.236)	23.938*** (2.733)	66.696*** (5.955)
<i>N</i>	272	272	272

Note: *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels, respectively. Robust standard errors are reported in parentheses.

Table 6. Unproductive entrepreneurship regressions with lag

Dependent Variables:	Percent of Population Employed in Local Government	Percent of Population Employed in State Government	Percent of Population Publicly Employed
<i>Authorized Migrants as Percent of Population</i>	-0.017 (0.107)	-0.091** (0.022)	-0.108 (0.093)
<i>Unauthorized Migrants as Percent of Population</i>	0.413 (0.556)	0.039 (0.057)	0.452 (0.532)
<i>log(GDP)</i>	4.952 (5.705)	-1.091*** (0.059)	3.854 (5.727)
<i>Percent of Population with Bachelor's or Higher</i>	0.008 (0.013)	0.030** (0.008)	0.038 (0.019)
<i>Median Age</i>	-0.121*** (0.021)	-0.089** (0.030)	-0.210** (0.047)
<i>Sex Ratio</i>	-0.531 (0.360)	-0.011 (0.020)	-0.542 (0.360)
<i>Population Density</i>	-0.005 (0.003)	0.001*** (0)	-0.004 (0.002)
<i>Institutions</i>	-0.230 (0.170)	-0.594*** (0.059)	-0.824** (0.214)
<i>Constant</i>	12.129 (25.829)	22.787*** (1.422)	34.916 (25.405)
<i>N</i>	170	170	170

Note: *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels, respectively. Robust standard errors are reported in parentheses.

Table 7. Other unproductive entrepreneurship regressions with no lag

Dependent Variables:	Political Organizations per Million	Membership Organizations per Million	Social Services Organizations per Million	100 Minus Harris Poll	Lobbying (Dollars) per Capita
<i>Authorized Migration as Percent of Population</i>	-0.092 (0.057)	-4.075* (1.390)	-5.384* (1.720)	1.851** (0.257)	0.125 (0.093)
<i>Unauthorized Migration as Percent of Population</i>	-0.099 (0.188)	0.587 (5.680)	0.039 (6.965)	0.647 (0.675)	1.114** (0.433)
<i>log(GDP)</i>	0.178 (2.723)	-14.007 (30.689)	-27.004 (46.779)	-18.345 (7.246)	15.080*** (3.102)
<i>Percent of Population with Bachelor's or Higher</i>	0.338 (0.119)	2.929 (1.134)	4.677 (1.700)	-1.336** (0.299)	0.131** (0.046)
<i>Median Age</i>	-0.092** (0.014)	-3.561** (0.732)	-5.147** (0.761)	-1.010* (0.329)	1.646*** (0.301)
<i>Sex Ratio</i>	-0.049 (0.154)	4.145 (2.148)	5.455 (2.869)	-2.579* (0.659)	-0.334** (0.100)
<i>Population Density</i>	0.001 (0.001)	0.109*** (0.008)	0.157*** (0.01)	-0.001 (0.003)	-0.010*** (0.001)
<i>Institutions</i>	0.851 (0.928)	-0.359 (7.412)	-0.652 (10.137)	1.304** (0.291)	1.029** (0.352)
<i>Constant</i>	-4.940 (25.151)	-146.415 (444.412)	-100.957 (644.664)	523.675** (97.607)	-199.448*** (50.716)
<i>N</i>	102	102	102	102	32

Note: *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels, respectively. Robust standard errors are reported in parentheses.