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Barriers to entry, entrepreneurship and income inequality within the USA

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Abstract

Purpose – Cross-country studies have shown that higher costs to starting a business tend to reduce entrepreneurship (Chambers and Munemo, 2019) and that an unfavorable environment for business can increase poverty and income inequality (Chambers *et al.*, 2019a; Djankov *et al.*, 2018). Building on the current literature, the authors test whether barriers to starting a business at the state and city level in the USA are associated with changes in entrepreneurship and income inequality.

Design/methodology/approach – Measures of entrepreneurship (establishment entry rate and exit rate) are regressed on measures of barriers to entry in a cross-section of 50 states as well as a cross-section of 73 cities in the USA. Further, the authors regress measures of income inequality on measures of barriers to entry using the same two cross-sections. State level data on barriers to entry are from Teague (2016), published in the Journal of Entrepreneurship and Public Policy. City level data on barriers to starting a business are from the Doing Business in North America (DBNA) dataset.

Findings – Results show that there is a negative and significant association between barriers to starting a business and the rate of firm exit. A standard deviation increase in barriers to entry is associated with a five percent decrease in the firm exit rate at the state level. The authors find only limited evidence that barriers to entry are associated with income inequality.

Originality/value – Despite a large volume of scholarship on how regulation and barriers to entry influence entrepreneurship, no study (to the authors' knowledge) has investigated how general entry regulation affects the entry or exit rate of establishments at the state or municipal level in the USA.

Keywords Barriers to entry, Cost of starting a business, Regulation, Entrepreneurship, Income inequality

Paper type Research paper

1. Introduction

The costs of regulatory compliance can accumulate, eventually becoming so large that they discourage entrepreneurs from entering the market. The tollbooth theory posits that entrepreneurship is discouraged by politicians and bureaucrats who use regulation to extract rent from entrepreneurs, raising their costs (Djankov, 2009; Shleifer and Vishny, 1993). Alternatively, the rulemaking process can be captured by incumbent firms or skilled professions who erect new regulations to protect themselves from competition rather than to serve the public interest (Stigler, 1971). Regardless, these regulatory barriers to entry can limit competition and inhibit aspects of entrepreneurship – specifically the entry and exit of firms from the market. Raising barriers to entry can create economic rents for incumbent firms (or politicians and bureaucrats) at the expense of new entrants, which may also exacerbate income inequality. In this study, we test if barriers to entry at the state and city

JEL Classification — D63, D73, L26, L51

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level in the USA are associated with entrepreneurship (measured by the establishment entry rate and the establishment exit rate) and income inequality.

Rooted in the work of De Soto (1989), a rich literature study has studied the effects of entry regulation and the costs of starting a business. Across countries, the regulation of entry is associated with both higher levels of corruption and a larger informal economy (Djankov, 2002). The World Bank Doing Business dataset quantifies many of these barriers to starting a business across a wide set of countries and has been used extensively in empirical studies [1]. In Djankov's (2009) survey of the literature, most studies find that the entry regulation has costs and that streamlining such regulation can yield economic benefits. More recently, cross-country studies using the World Bank data have shown that having more procedures start a business tends to slow new firm entry (Chambers and Munemo, 2019) and that entry regulation reduces entrepreneurship among those possessing business skills (Ardagna and Lusardi, 2010).

A related strand of the literature finds that the level of federal regulation influences entrepreneurship within the USA. These studies use the RegData industry level database of all federal regulation. Industries subject to greater federal regulation tend to have less new firm formation (Bailey and Thomas, 2017; Chambers *et al.*, 2020). Using similar measures, Goldschlag and Tabarrok (2018) question the negative association between regulation and dynamism in the USA. Chambers *et al.* (2020) reconcile these competing results, showing that differences in specification lead to different results. Federal regulation is also associated with a smaller share of both output and employment by small firms (Chambers and Guo, 2021). Similarly, Gutiérrez and Philippon (2019) suggest that regulatory barriers to entry in the US reduced the number of small firms relative to large firms. Dove (2020) finds that states exposed to more federal regulations tend to have less so-called opportunity entrepreneurship [2].

Related work by Bailey *et al.* (2021) and Law and McLaughlin (2022) finds that the extent of state level regulation, as measured by the State RegData database, is associated with the size of the polity and the size industry. Their results are consistent with Mulligan and Shleifer (2005) who argue that as population increases, the average cost of regulation declines causing more regulation to be supplied. Law and McLaughlin (2022) speculate that an alternative explanation for this association is that larger industries may generate more rents and therefore attempts to extract these rents through regulation.

The literature on state and regional regulation in the USA focuses either on particular industries or particular types of regulation rather than general entry regulations that affect all firms. For example, Bagchi and Sivadasan (2017) find that reforms to cable franchising at the state level that lowered barriers to entry are associated with more entry into the industry. Helland and Matsuno (2003) study the effect of environmental compliance costs on Tobin's Q at the firm level and conclude that more stringent regulation raises barriers to entry. A large literature studies the effects of occupational licensure on wages and labor supply. In the USA, stringent licensure requirements has been found to reduce labor supply in many occupations, including cosmetology (Timmons and Konieczny, 2018; Zapletal, 2019) medical services (Schaumans and Verboven, 2008) as well as a broad set of other occupations (Blair and Chung, 2019). Despite this large volume of scholarship, no study (to our knowledge) has investigated how general entry regulation affects entrepreneurship at the state or municipal level in the USA. We fill this gap in the literature by testing whether barriers to starting a business at the state and city level in the USA are associated with firm entry and exit.

In addition to influencing entrepreneurship, regulation may have distributional effects depending on the relative power of interest groups (Stigler, 1971). See Chambers and O'Reilly (2022) for a discussion and review of the literature. Restricted entry can simultaneously create an economic rent for incumbent firms (Gutiérrez and Philippon, 2019) or individuals (Ingram, 2019; Kleiner and Krueger, 2013) and block opportunities for potential entrants. If incumbent firms or license holders tend to earn more than potential entrants, "captured" regulations can exacerbate income inequality. Melo and Miller (2022) show that rent seeking is associated with income inequality at the state level in the USA. Alternatively, well intended regulations designed to overcome information asymmetries, mitigate externalities or otherwise increase efficiency can have unintended consequences. Indeed, regulations may come with significant compliance costs can that raise prices, disproportionately affecting low-income families (Chambers *et al.*, 2019c; Gorry and Thomas, 2017).

Studying federal regulation in the USA, Bailey *et al.* (2019) and Mulholland (2019) find that increased regulation is associated with greater wage inequality. Moreover, these same federal regulations also tend to increase poverty and income inequality at the state level (Chambers *et al.*, 2019b; Chambers and O'Reilly, 2022). Studies of state and local regulation in the USA have either studied more broad measures of economic freedom with mixed results (Apergis *et al.*, 2014; Krieger and Meierrieks, 2016) or focused specifically on occupational licensure. For example, Kleiner and Vorotnikov (2017) find that occupational licensure is associated with greater wage inequality in the USA though the effect is heterogenous across US states.

Cross-country evidence on the association between regulation and the distribution of income is mixed. For example, De Haan and Sturm (2017) find that financial regulation decreases income inequality though Manish and O'Reilly (2019, 2020) question this association. The mixed results for regulation in general may potentially reflect the fact that the effect is dependent on the context of the country or the type of regulation (Bergh and Nilsson, 2010; De Haan *et al.*, 2017; Sturm and De Haan, 2015). Results from studies focusing specifically on barriers to starting a business are more consistent. Djankov *et al.* (2018) finds that limited access to credit and weak contract enforcement as measured by the World Bank Doing Business indices are associated with a higher poverty headcount in a large panel of countries. Chambers *et al.* (2019a) find that countries requiring more steps to start a business tend to have higher income inequality. The only subnational evidence using the World Bank Doing Business data is from Chambers and O'Reilly (2019) who find that cost of starting a business is associated with higher income inequality in provinces in Italy, Mexico, Poland and Spain [3].

Despite the cross-country evidence, the effect of barriers to entry on entrepreneurship and the distribution of income within the USA remains an open question. The effects may be context dependent. For example, regulation may be more benign in countries with high institutional quality or low levels of corruption like the USA. Furthermore, the variation in barriers to entry may be much larger between countries than within countries.

To fill the gap in the literature, we test if barriers to entry are associated both with aspects of entrepreneurship and income inequality at the state and city level in the USA. Measures of barriers to entry are from two recent data sources: (1) measures of barriers to entry from Teague (2016) for US states and (2) the Doing Business North America dataset on the cost of doing business for US cities. Our results show that barriers to starting a business are associated with less entrepreneurship at the state level, specifically the exit rate of establishments. City level correlations run in the same direction but are not statistically significant. We find only weak evidence that barriers to entry are associated with income inequality at the state or city level. Our state level findings complement the existing literature on barriers to entry and entrepreneurship.

2. Estimation methods

Chambers and Munemo (2019) estimate the effect of barriers to starting a business on entrepreneurship in a panel as well as a cross-section of countries. We estimate a state and city level version of their cross-sectional model described by Equation (1). Subscript j indexes geographic entities (i.e. states or cities) in the USA. Entrepreneurship, E_j, is regressed on barriers to starting a business, S_j, and set of control variables, X_j. Panel studies exploit both cross-sectional and temporal variation to identify their model. Because we are limited to estimating a cross-sectional regression, our identification strategy must rely on appropriate control variables. Chambers and Munemo (2019) include controls for living standards, economic growth, institutional quality and the availability of credit. Following them, our set of control variables includes the log of income per capita and a measure of state level economic policy. There is no need to include a measure of access to credit due to the highly developed, national-level credit markets in the USA. Our remaining control variables include measures of educational attainment and the population.

$$E_j = \alpha + \theta S_j + \lambda X_j + \varepsilon_j \quad (1)$$

Equation (1) describes a simple cross-section regression estimated using ordinary least squares (OLS) with robust standard errors.

Similarly, to test the hypothesis that barriers to entry are associated with aggregate measures of income inequality, we regress measures of income inequality, I_j, onto various measures of the cost of starting a business and a set of control variables, W_j.

$$I_j = a + \theta S_j + \lambda W_j + \varepsilon_j \quad (2)$$

Again, Equation (2) is a simple cross-section regression estimated using OLS with robust standard errors. Following the identification strategy of Chambers and O'Reilly (2019), we control for the log of income per capita, the log of income per capita squared (to account for a possible Kuznets curve), the log of population and the level of educational attainment.

The data used to estimate these equations are fairly new and are only available for a few cross-sections. Because we are limited to a cross-sectional identification strategy, the contribution of this study is to provide expository evidence about economically important questions.

3. Measuring barriers to entry and inequality

(1) Barriers to entry

From as early as 2004 until 2020, the World Bank has maintained the Doing Business dataset which includes barriers to entry and the cost of starting a business for over 100 countries. However, data at the subnational level is only available for a few dozen countries. The Doing Business dataset includes data for only two US cities: New York and Los Angeles. A recent internal investigation revealed that in some cases, World Bank officials succumbed to pressure to change scores on the Doing Business dataset (Zumbrun, 2021). Though the extent of this data corruption is not known, the concerns were great enough to lead to World Bank to discontinue the index. Despite the controversy, we believe that the World Bank Doing Business dataset is still a valuable source of information about obstacles to starting a business. However, the controversy increases the importance of validating findings based on this World Bank data with data from other sources. In this study, we rely on two alternative sources for subnational data on barriers to entry the USA.

Teague (2016) constructs a dataset of nine barriers to starting a business for US states in 2011. The nine measures fall into two broad categories: explicit costs and bureaucratic difficulties. The measures of explicit costs are the number of pages and the number of forms required to register a business. The measure also includes whether the secretary of state, the department of revenue and the department of labor require paper applications to register. Finally, explicit costs include the total time and total fees required to register a business. The bureaucratic difficulties category includes two measures of occupational licensure (the number of occupations licensed and the number of licensing agencies). Teague produces two summary indexes of barriers to entry, a simple additive index and an index constructed as the first principal component of the nine variables. In this study, we use the principal component summary index and, for comparability to previous studies, the explicit cost index.

An alternative measure of barriers to starting a business is the Doing Business in North America (DBNA) project conducted by the Center for the Study of Economic Liberty at Arizona

State University (Doing Business in North America, 2020). Available for three cross-sections of US cities, the database includes six measures related to the ease of doing business: starting a business, employing workers, getting electricity, land and space, taxes and resolving insolvency. The starting a business measure is an equally weighted index of the following three subcomponents:

(1) The number of procedures, which is calculated based on eight common steps required to start a business in the USA [4].

(2) The number of days, which is calculated based on the assumption that each procedure takes one day to complete.

(3) The cost of starting a business in dollars, including all fees and fees for legal services that are required or common practice (as a proportion of income per capita).

The starting a business index is scaled so that larger values correspond to jurisdictions where it is easier to start a business. Our analysis uses this measure and, for comparability with past studies, the cost of starting a business as a proportion of per capita income measure. After matching the DBNA data with measures of establishment entry and exit, data are available for 63 US cities in 2019, 73 US cities in 2020 and 74 cities in 2021. Our primary specification uses the 2020 sample because the most recent data measuring establishment entry and exit is from 2020. Summary statistics are for both measures are in Table 1.

	Mean	Standard deviation	Min	Max	*N*
State level					
Barrier to entry index	0.08	0.03	0.02	0.13	50
Explicit costs	0.22	0.10	0.06	0.52	50
Log entry rate	2.22	0.13	2.01	2.58	51
Log exit rate	2.25	0.12	2.00	2.52	51
Log Gini	−0.51	0.05	−0.60	−0.37	50
Log top 10 share	3.79	0.10	3.54	4.04	50
Log income per capita	10.84	0.18	10.52	11.22	50
Log population	15.12	1.04	13.25	17.44	51
College education	0.20	0.04	0.14	0.30	50
EFNA	5.62	0.88	3.76	7.72	50
City level					
Start business index	0.86	0.04	0.71	0.89	73
Cost as % income	0.01	0.00	0.00	0.02	73
Log entry rate	2.218	0.170	1.807	2.545	73
Log exit rate	2.224	0.106	2.020	2.493	73
Log top1/bottom 99	3.05	0.30	2.52	4.13	73
Log top10/bottom 90	2.04	0.25	1.57	2.85	73
Log income per capita	10.32	0.20	9.91	10.99	73
Log population	14.21	1.05	11.51	16.77	73
College education	34.10	5.45	22.80	49.20	73
EFNA	6.80	0.68	5.38	8.28	73

Note(s): The Barrier to entry index is the principal component version of the barriers to entry index from and Explicit costs is the subindex of explicit costs from Teague (2016). Log entry rate and Log exit rate measure the entry and exit rate of establishments from the Statistics of US Businesses dataset. Start business index is the starting a business composite index, and the Cost as % income is the costs of starting a business relative to average income from the DBNA dataset. Log Gini is the log of the Gini coefficient, and Log top 10 share is the log of the share of income paid to the top 10% of the income distribution from Frank (2009). Log top 10/bottom 90 and Ln top 1/bottom 99 are the logs of the share of income paid to the top 10 or 1% divided by share paid to the bottom 90 or 99% of the income distribution from Sommeiller *et al.* (2016). Definitions of all other control variables are described in Section 3

Table 1.
Summary statistics

Before proceeding with our analysis, we ask a basic but important question: Do these indexes, derived from different sources, measure the same concept? To compare the Teague and DBNA measures, we map the city level data from DBNA to the state level data using population weighted scores for states that have more than one city in the sample. The correlation between the Teague barriers to entry index and the DBNA starting a business index is negative as expected, but the correlation of −0.18 is weak and is not statistically significant (see Table 2). Similarly, the correlation between the explicit cost measure from Teague and the cost as a proportion of income measure from DBNA is positive (0.17) but insignificant. These correlations show the limited degree to which these different measures move together. The concept of convergent validity, often measured by Cronbach's alpha, measures the extent that two variables are measuring the same concept. The low alphas in Table 2, both less than 0.03, suggest that these variables are not measuring the same underlying concept. Either these indexes are measuring different dimensions of entry barriers, or one index is measuring entry barriers more accurately.

Though we cannot compare the Teague measures to the widely used World Bank Doing Business measures, we can compare the DBNA measures to the World Bank measures for a small set of subnational observations [5]. The World Bank measures and the DBNA measures overlap for up to 28 regions in Mexico. As shown in Figure 1, the correlation between the two cost of starting a business measures is actually negative, though insignificant, for the 22 regions in Mexico where the data are available from both sources. Figure 1 also plots the correlation for an alternative measure, the number of days needed to start a business.

Teague barriers to entry and Doing Business in North America

		Barrier to entry index	Explicit cost	Starting a business index	Cost/ Income
Barrier to entry index	Correlation	1			
	p-value				
	N	50			
Explicit cost	Correlation	0.7767	1		
	p-value	0.000			
	N	50	50		
Starting a business index	Correlation	−0.179	−0.116	1	
	p-value	0.215	0.422		
	N	50	50	51	
	Cronbach's alpha	0.005			
Cost/Income	Correlation	−0.038	0.173	0.037	1
	p-value	0.793	0.230	0.797	
	N	50	50	51	51
	Cronbach's alpha		0.021		

World Bank Doing Business and Doing Business in North America

Correlations	Cost of starting a business	Log days to start a business
Correlation	−0.206	0.037
p-value	0.358	0.851
Observations	22	28
Cronbach's alpha		
Scale reliability coefficient	0.030	0.022

Note(s): See notes for Table 1. The bottom panel is analysis between data collected by the World Bank for the Doing Business Report and data collected from the Center for the Study of Economic Liberty

Table 2. Correlations and Cronbach's alpha

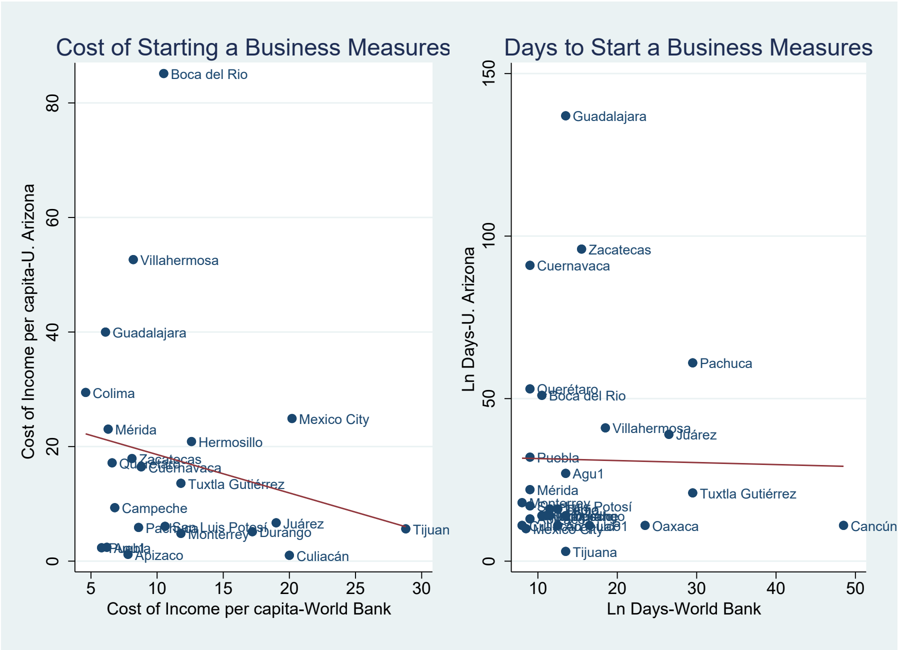

Figure 1.
Correlations between DBNA and World Bank measures of barriers to entry

Note(s): The left panel show a scatter plot between the cost of starting a business relative to income as measured by DBNA and the World Bank. The right panel shows a scatter plot between the days to start a business as measured by DBNA and the World Bank

The correlation between the World Bank measure and the DBNA measure is close to zero but statistically insignificant (see Table 2). Cronbach's alpha for both the cost of starting a business and the days to start a business measures are reported in Table 2. Alphas of 0.03 and 0.02, respectively, indicate that the two data sources are not capturing the same concept or dimension of barriers to starting a business.

The fact that the DBNA measures are not correlated with either the Teague measures or the World Bank measures is either because of data quality issues or because the DBNA is measuring a different dimension of barriers to starting a business. Given this concern and the higher quality income inequality data at the state level discussed in subsection (c) below, our preferred specifications uses the state level Teague data.

(2) Entrepreneurship

In their cross-country study of barriers to starting a business and entrepreneurship, Chambers and Munemo (2019) measure entrepreneurship as new business density. The recent literature on entrepreneurship and dynamism in the USA has used measures from the US Census Bureau's Statistics of US Businesses. Bailey and Thomas (2017) measure entrepreneurship as the number of firm births (entry), firm deaths (exit) and new hires, whereas Goldschlag and Tabarrok (2018) use the rate of entry, the rate of exit and the job creation rate. Chambers *et al.* (2020) discusses, in detail, the relationship between these different approaches. To measure entrepreneurship and dynamism, we use the establishment entry rate and the establishment exit rate from the Statistics of US Businesses (US Census Bureau, 2011), taking the natural log of each variable [6].

(3) Income inequality

An advantage of studying US states is the higher data quality on income inequality relative to cross-country datasets. The Frank (2009) data on income inequality derived from Internal Revenue Service (IRS) tax data is widely used in the literature. Using IRS tax data helps to mitigate the problem of top coding in survey data, which is particularly important for high incomes. To measure income inequality in 2011 at the state level, we use the Frank's (2009) measures of the Gini coefficient and the share of income paid to the top 10%. Top income shares measure income inequality by focusing on the top of the income distribution, whereas the Gini coefficient measures inequality across the full distribution of income.

Though high-quality state level datasets measuring income inequality are readily available, high quality city level inequality data are sparser. Sommeiller *et al.* (2016) estimate average income levels for different ranges of income at the county level using data from the IRS on income ranges. These county level measures are then used to calculate measures for top incomes at the metropolitan level. See Appendix A in Sommeiller *et al.* (2016, pp. 46–56) for additional methodological details. The Economic Policy Institute periodically publishes updates to the dataset, the most recent of which is available for 2015. We use their data on inequality measuring the ratio of the share of income paid to the top ten percent to the share of income paid to the bottom 90% of the income distribution and the ratio of the top one percent to the bottom 99%.

Ideally, measures of income inequality would be available for the same year as the Doing Business data in 2020. However, a cross-sectional analysis is still possible if income inequality and the costs of starting a business are stable over time. Due to methodological changes in the Doing Business dataset, we are hesitant to compare the 2019 wave directly to the 2020 wave. With this qualification in mind, between city variation in the cost of starting a business (as a percentage of income per capita) is much greater than within city variation. The inequality series from Sommeiller *et al.* (2016) is constructed to make accurate comparisons over time. Figure A1 in the Appendix presents estimates of the share of income paid to the top ten percent of the income distribution by city between 2005 and 2015. The top income share is fairly stable over the period. See Table 1 for summary statistics for the measures of entrepreneurship, income inequality and the control variables.

(4) Control variables

State level control variables measuring income per capita and educational attainment are from Frank (2009). We measure educational attainment as the proportion of the population with a bachelor's degree or higher. Population data are collected from the US Census Bureau. To measure state level institutional quality, we follow Lucas and Boudreaux (2020) and use the Economic Freedom of North America dataset from Stansel *et al.* (2021). At the city level, the income per capita control variable is from the DBNA dataset. Population data and educational attainment, measured as the proportion of the population with a college degree, is collected from the US Census Bureau.

4. The association between barriers to entry and entrepreneurship

First, we test if the cost of starting a business is associated with measures of entrepreneurship at the state and city level in the USA. Simple scatter plots in Figure 2 show that at the state level, both barriers to entry and the explicit cost of starting a business have a negative correlation with the entry rate and the exit rate of establishments. The correlations at the city level in Figure 3 are less clear.

State level regressions of the establishment entry rate on barriers to entry are presented in Table 3. In the first column, the estimate of a simple bivariate regression shows a negative

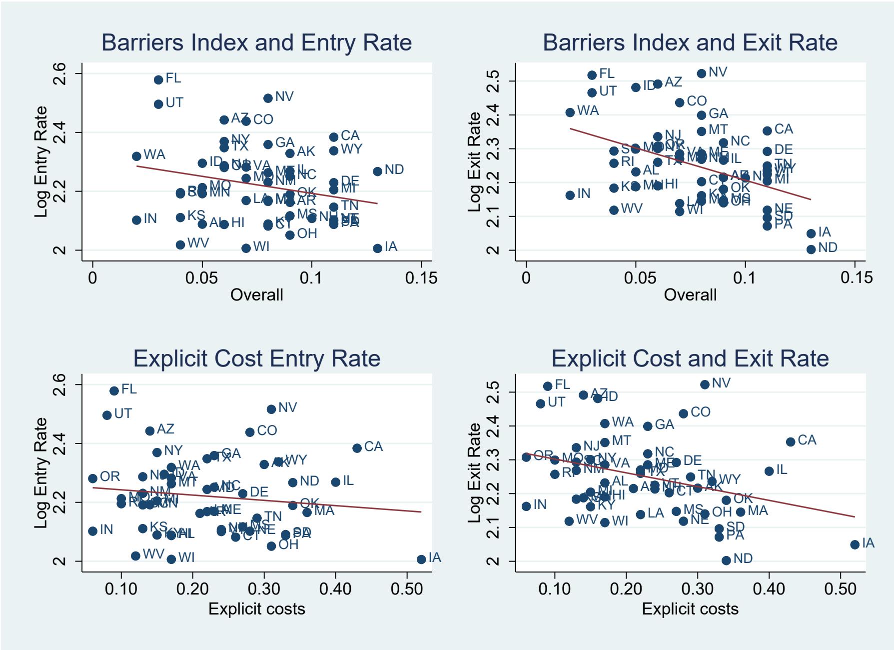

Figure 2.
Correlations barriers to entry (Teague) and entrepreneuship

Note(s): Panels on the left show scatter plots of the log entry rate and the Teague (2016) measures of barriers to entry. The right panel show the same scatter plots for the log exit rate

correlation between the barriers to entry index and the log establishment entry rate, but the effect is not statistically significant. Though the negative correlation is significant in second column which controls for average income, the estimate loses significance once additional controls are included in the third column. Estimates that use the explicit cost measure also find a negative but insignificant effect as shown in Columns 4–6. Entry barriers are negatively correlated with entry, but the relationship is not robustly statistically significant.

The results of regressing the log of the establishment exit rate on barriers to entry are shown in Table 4. The barriers to entry index has a negative and highly significant correlation with the exit rate in the bivariate specification in Column 1. The negative correlation is still significant at the five percent level even after including the full set of control variables in Column 3. In the most complete specification, a one standard deviation increase in the barriers to entry index is associated with about a 5% decrease in the firm exit rate [7]. If the explicit cost measure of barriers to entry is used, the association with the firm exit rate is also negative and statistically significant – see Columns 4–6. Together the results show that barriers to entry have a negative association with measures of entrepreneurship at the state level in the USA.

Given the modest sample, it is possible that a small number of observations have an outsized influence on the state level results. We take two steps to assess the robustness of state level results. First, the results in Tables 3 and 4 are replicated using jackknife standard errors. The results of this exercise are presented in Tables A4 and A5 and are nearly identical to the results in the main text.

The second robustness check focuses on the core empirical results in the paper, the association between barriers to entry and establishment exit rates. We test if the coefficient

Note(s): Panels on the left show scatter plots of the log entry rate and the DBNA measures of barriers to entry. The right panel show the same scatter plots for the log exit rate

Figure 3. Correlations barriers to entry (DBNA) and entrepreneuship

	Barriers to entry			Explicit costs		
	(1)	(2)	(3)	(4)	(5)	(6)
Barriers to entry	−1.157	−1.331*	−1.109	–	–	–
	(0.757)	(0.720)	(0.750)			
Explicit costs	–	–	–	−0.179	−0.278	−0.281
				(0.220)	(0.226)	(0.227)
Log income		0.139	0.143		0.155	0.181
		(0.095)	(0.143)		(0.099)	(0.150)
Log income sq			−0.031			−0.121
			(0.637)			(0.650)
Population			0.026			0.033*
			(0.017)			(0.017)
EFNA			−0.000			−0.001
			(0.021)			(0.021)
Constant	2.309***	0.810	0.358	2.261***	0.599	−0.154
	(0.065)	(1.033)	(1.358)	(0.053)	(1.062)	(1.431)
Observations	50	50	50	50	50	50
R-squared	0.057	0.089	0.126	0.018	0.054	0.114

Note(s): See notes for Table 1 for variable descriptions. The table reports OLS regressions of the log establishment entry rate on measures of barriers to entry and sets of control variables
Robust standard errors in parentheses
***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$

Table 3. Establishment entry rate on barriers to entry – US state level

	Barriers to entry (1)	(2)	(3)	Explicit costs (4)	(5)	(6)
Barriers to entry	−1.909*** (0.621)	−1.874*** (0.607)	−1.616** (0.645)	–	–	–
Explicit costs	–	–	–	−0.407** (0.177)	−0.405** (0.183)	−0.342* (0.184)
Log income		−0.028 (0.075)	−0.124 (0.105)		−0.003 (0.078)	−0.091 (0.114)
Log income sq			0.679 (0.531)			0.609 (0.540)
Population			0.012 (0.015)			0.022 (0.014)
EFNA			0.002 (0.014)			0.001 (0.015)
Constant	2.398*** (0.053)	2.699*** (0.823)	3.387*** (1.048)	2.343*** (0.042)	2.374*** (0.847)	2.851** (1.103)
Observations	50	50	50	50	50	50
R-squared	0.192	0.193	0.236	0.113	0.113	0.178

Note(s): See notes for Table 1 for variable descriptions. The table reports OLS regressions of the log establishment exit rate on measures of barriers to entry and sets of control variables
Robust standard errors in parentheses
***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$

Table 4. Establishment exit rate on barriers to entry – US state level

estimates are sensitive to omitting observations that may have an outsized influence on our estimates. For the parameter of interest, we calculate the standardized "dfbeta" for each state. The dfbeta is the difference between the beta coefficient from the primary estimate and the beta coefficient when one observation (state) is omitted. The standardized dfbetas are plotted for estimates where the exit rate is regressed on the barriers to entry index in Figure A2 and the explicit cost index in Figure A3.

We select the states suspected of having an outsized influence on our regression results following the convention from Belsley *et al.* (1980) [8]. Regression results omitting each of these states individually are presented in Tables 5 and 6. In Table 5, the effect of the barriers to entry index on the exit rate is statistically significant regardless of which observation is omitted. In Table 6, the effect of the explicit cost index on the exit rate is significant if California, Indiana or Nevada are omitted, but the effect is not significant if Iowa or Utah are omitted. The final column in each table omits all observations suspected of having an outsized influence. For both the measures of barriers to entry, the results are statistically significant and of a similar magnitude as the main results. Taken together, these exercises are evidence of the robustness of the negative association between barriers to entry and the establishment exit rate.

Estimates using city level measures are less conclusive. In Table 7, the DBNA starting a business index has the expected positive correlation with the establishment entry rate (higher scores mean fewer barriers). However, the estimates are not significant in any specification. Similarly, the cost of starting a business measure has a negative but insignificant correlation with entry. Estimates in Table 8 show a positive but insignificant correlation between the starting a business index and the exit rate. The correlation between the cost of starting a business and the exit rate is also positive and insignificant. The correlations between barriers to entry and entrepreneurship run in the same direction at the city level as at the state level, but relationship at the city level is not significant in any specification. The null results at the city level may be because no relationship exits or because our test lacks the statistical power to detect a relationship.

Table 5. Establishment exit rate on barriers to entry – omit influential observations

Variables	(1) California	(2) Florida	(3) Idaho	(4) Indiana	(5) Pennsylvania	(6) Utah	(7) All
Barriers to entry	−1.857***	−1.439**	−1.409**	−1.940***	−1.439**	−1.376**	−1.691***
	(0.663)	(0.643)	(0.623)	(0.626)	(0.646)	(0.643)	(0.612)
Log income	−0.151	−0.105	−0.128	−0.113	−0.124	−0.142	−0.158
	(0.106)	(0.103)	(0.111)	(0.103)	(0.105)	(0.108)	(0.113)
Log income sq	0.720	0.653	0.808	0.504	0.663	0.759	0.764
	(0.527)	(0.512)	(0.549)	(0.516)	(0.534)	(0.547)	(0.550)
Population	0.002	0.008	0.017	0.013	0.017	0.015	0.011
	(0.015)	(0.014)	(0.014)	(0.015)	(0.014)	(0.015)	(0.014)
EFNA	0.010	−0.006	0.001	0.005	0.001	0.003	0.013
	(0.015)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Constant	3.783***	3.282***	3.311***	3.289***	3.306***	3.501***	3.701***
	(1.053)	(1.025)	(1.074)	(1.049)	(1.037)	(1.062)	(1.100)
Observations	49	49	49	49	49	49	46
R-squared	0.260	0.195	0.247	0.277	0.229	0.222	0.287

Note(s): Each column omits one influential observation indicated by the label of the column. Column 7 omits all observations deemed to be influential. See notes for Table 1 for variable descriptions. Robust standard errors in parentheses
***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$

Variables	(1) California	(2) Indiana	(3) Iowa	(4) Nevada	(5) Utah	(6) All
Explicit costs	−0.421**	−0.408**	−0.283	−0.414**	−0.269	−0.492**
	(0.190)	(0.182)	(0.214)	(0.167)	(0.179)	(0.200)
Log income	−0.101	−0.072	−0.095	−0.072	−0.122	−0.093
	(0.114)	(0.111)	(0.112)	(0.118)	(0.117)	(0.118)
Log income sq	0.610	0.447	0.582	0.709	0.727	0.658
	(0.541)	(0.530)	(0.536)	(0.553)	(0.556)	(0.565)
Population	0.014	0.025*	0.022	0.024	0.023	0.018
	(0.014)	(0.014)	(0.014)	(0.015)	(0.014)	(0.014)
EFNA	0.008	0.003	−0.000	0.000	0.003	0.012
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.016)
Constant	3.056***	2.650**	2.892**	2.615**	3.121***	2.887**
	(1.094)	(1.082)	(1.088)	(1.122)	(1.121)	(1.113)
Observations	49	49	49	49	49	45
R-squared	0.197	0.201	0.137	0.252	0.174	0.255

Note(s): Each column omits one influential observation indicated by the label of the column. Column 6 omits all observations deemed to be influential. See notes for Table 1 for variable descriptions. Robust standard errors in parentheses
***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$

Table 6.
Establishment exit rate on barriers to entry – omit influential observations

	Starting a business index			Cost/Income		
	(1)	(2)	(3)	(4)	(5)	(6)
Starting a business index	0.031	0.032	−0.148	–	–	–
	(0.549)	(0.546)	(0.442)			
Costs/Income	–	–	–	−2.095	5.643	−2.306
				(6.655)	(6.813)	(7.163)
Log income		0.285***	0.273***		0.323***	0.256**
		(0.075)	(0.080)		(0.086)	(0.102)
Log income sq			−0.003			−0.002
			(0.004)			(0.004)
Population			0.065***			0.066***
			(0.022)			(0.022)
EFNA			0.086***			0.086***
			(0.023)			(0.024)
Constant	2.191***	−0.754	−1.896***	2.231***	−1.149	−1.858**
	(0.475)	(0.871)	(0.647)	(0.045)	(0.910)	(0.832)
Observations	73	73	73	73	73	73
R-squared	0.000	0.108	0.372	0.002	0.118	0.372

Note(s): See notes for Table 1 for variable descriptions. The table reports OLS regressions of the log establishment entry rate on measures of barriers to entry and sets of control variables
Robust standard errors in parentheses
***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$

Table 7.
Establishment entry rate on barriers to entry – US city level (2020)

We consider two alternative specifications of the city level data as robustness checks. Though DBNA data is available for 2021, data on firm exit and entry rate are not available for 2021 which prevents a full replication of our 2020 analysis with more recent data. Instead, in Appendix Tables A1 and A2, we reestimate the analysis in Tables 7 and 8 using the updated 2021 DBNA data, keeping all other variables the same. This exercise produces results similar to those in the main text.

	Starting a business index			Cost/Income		
	(1)	(2)	(3)	(4)	(5)	(6)
Start business index	0.257 (0.281)	0.257 (0.284)	0.210 (0.230)	–	–	–
Costs/Income	–	–	–	−1.688 (3.369)	2.165 (3.793)	−2.297 (3.680)
Log income		0.146*** (0.049)	0.140** (0.057)		0.161*** (0.057)	0.126* (0.068)
Log income sq			−0.002 (0.002)			−0.002 (0.002)
Population			0.047*** (0.015)			0.048*** (0.015)
EFNA			0.017 (0.017)			0.020 (0.017)
Constant	2.004*** (0.239)	0.494 (0.574)	−0.117 (0.552)	2.235*** (0.026)	0.552 (0.606)	0.187 (0.597)
Observations	73	73	73	73	73	73
R-squared	0.008	0.081	0.295	0.003	0.077	0.294

Note(s): See notes for Table 1 for variable descriptions. The table reports OLS regressions of the log establishment exit rate on measures of barriers to entry and sets of control variables
Robust standard errors in parentheses
***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$

Table 8. Establishment exit rate on barriers to entry – US city level (2020)

In a second exercise, we build a two-period panel for 2019 and 2020 of firm exit and entry rates and the DBNA data. The panel allows us to conduct a better identified set of analysis by regressing the change in log establishment entry (exit) rates on the change in the DBNA measures of barriers to entry. By differencing the data, this two-period analysis mitigates omitted variable bias by differencing out all time invariant city specific effects that were imperfectly accounted for using control variables in the cross-sectional analysis. The drawback of this approach is that it relies exclusively on variation over time within cities, forgoing the more substantial variation between cities. Further, this approach relies on within city variation from 2019 to the anomalous year of 2020. For this reason, we treat the cross-sectional estimates as our preferred results and this panel analysis as supplementary.

The panel estimates are presented in Table A3. Similar to the city level cross-section estimates, the relationship between barriers to entry and entry rates is not significant. Similarly, the effect of the cost of starting a business on exit rates is not significant. Counter to expectations, the estimated effect of the starting a business index on the firm exit rate is negative and statistically significant though the effect size is quite small. A standard deviation increase in the starting a business index corresponds to less than a one percent decrease in the establishment exit rate. Again, we interpret this result with caution given that other factors likely influenced the firm exit rate in 2020.

5. The association between barriers to entry and income inequality

As noted earlier, if barriers to entry influence entrepreneurship, these same barriers may influence the distribution of income. The state level results of regressing income inequality on measures of barriers to entry are presented in Tables 9 and 10. Neither measure of barriers to entry has a significant association with the Gini coefficient in Table 9. In Table 10 inequality is measured by the share of income paid to the top 10%. Other than in the bivariate specification, we do not find significant effect between barriers to entry and income inequality.

	Barriers to entry (1)	(2)	(3)	Explicit costs (4)	(5)	(6)
Barriers to entry	−0.173	−0.285	−0.062	–	–	–
	(0.275)	(0.273)	(0.227)			
Explicit costs	–	–	–	0.036	−0.018	0.001
				(0.095)	(0.100)	(0.082)
Log income		0.089**	−2.536		0.084*	−2.595
		(0.043)	(5.419)		(0.047)	(5.299)
Log income sq			0.120			0.123
			(0.250)			(0.245)
College			0.087			0.098
			(0.227)			(0.216)
Population			0.024***			0.024***
			(0.007)			(0.007)
EFNA			0.004			0.004
			(0.009)			(0.009)
Constant	−0.494***	−1.455***	12.466	−0.515***	−1.416***	12.794
	(0.023)	(0.462)	(29.330)	(0.021)	(0.502)	(28.663)
Observations	50	50	50	50	50	50
R-squared	0.008	0.088	0.287	0.004	0.069	0.286

Table 9.
Income inequality (Gini coefficient) on barriers to entry – US state level

Note(s): See notes for Table 1 for variable descriptions. The table reports OLS regressions of the log Gini coefficient on measures of barriers to entry and sets of control variables
Robust standard errors in parentheses
***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$

	Barriers to entry (1)	(2)	(3)	Explicit costs (4)	(5)	(6)
Barriers to entry	−0.824*	−0.778	−0.078	–	–	–
	(0.478)	(0.494)	(0.320)			
Explicit costs	–	–	–	−0.151	−0.128	0.001
				(0.162)	(0.180)	(0.126)
Log income		−0.038	−19.763*		−0.035	−19.832*
		(0.105)	(11.338)		(0.112)	(11.354)
Log income sq			0.903*			0.906*
			(0.524)			(0.524)
College			0.844**			0.856**
			(0.403)			(0.399)
Population			0.058***			0.059***
			(0.011)			(0.011)
EFNA			0.000			−0.000
			(0.015)			(0.015)
Constant	3.857***	4.260***	110.823*	3.827***	4.206***	111.205*
	(0.039)	(1.115)	(61.278)	(0.035)	(1.187)	(61.384)
Observations	50	50	50	50	50	50
R-squared	0.048	0.052	0.475	0.021	0.024	0.475

Table 10.
Income inequality (top income share) on barriers to entry – US state level

Note(s): See notes for Table 1 for variable descriptions. The table reports OLS regressions of the log the share of income paid to the top 10% on measures of barriers to entry and sets of control variables
Robust standard errors in parentheses
***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$

Next, we test if barriers to entry are associated with income inequality in US cities. The cross-section regression results in Table 11 show a negative but insignificant association between the starting a business index and the ratio of the top to bottom income share. The results using the cost of starting a business measure are presented in columns 4 through 6. The effect of the cost of starting a business on income inequality is positive and significant in the bivariate specification. The positive association is robust to accounting for the Kuznets curve by controlling for the log of income per capita and the square of the log of income per capita [9]. This specification is the strongest evidence that we find in support of the hypothesis that higher costs of starting a business are associated with greater income inequality. However, accounting for the size of the city in terms of population in Column 6 reduces the magnitude of the coefficient on the cost of starting a business by close to half, thereby rendering the effect statistically insignificant. These regressions are replicated in Table 12 using the ratio of income paid to the top 1% to the bottom 99%, and the results are similar to those in Table 11. The null results for these specifications indicate an absence of evidence for the hypothesis, not necessarily evidence against the hypothesis. Despite the significant correlation between the cost of starting a business and income inequality in some specifications, overall, we find only limited evidence of an association between the cost of starting a business and income inequality.

6. Discussion and implications

Cross-country studies have found that barriers to starting a business inhibit entrepreneurship. We extend this line of research by studying the same relationship at the state and city level in the USA. Our main contribution is to show that barriers to entry measured at the US state level are associated with less entrepreneurship, particularly

	Start business index			Cost/Income		
	(1)	(2)	(3)	(4)	(5)	(6)
Start business index	−0.009	−0.007	−0.008	–	–	–
	(0.008)	(0.008)	(0.006)			
Cost/Income	–	–	–	13.83**	13.10*	4.283
				(6.609)	(7.387)	(7.800)
Log income		−24.30***	−15.28***		−23.15***	−15.21***
		(6.676)	(5.146)		(6.374)	(5.437)
Log income sq		1.173***	0.732***		1.121***	0.730***
		(0.318)	(0.244)		(0.303)	(0.258)
Population			0.125***			0.121***
			(0.025)			(0.0255)
College			0.0035			0.00412
			(0.0091)			(0.00894)
EFNA			0.0203			0.0134
			(0.038)			(0.0423)
Constant	2.808***	128.5***	80.36***	1.950***	121.4***	79.30***
	(0.720)	(34.77)	(26.88)	(0.0545)	(33.56)	(28.53)
Observations	73	73	73	73	73	73
R-squared	0.018	0.109	0.378	0.032	0.123	0.368

Note(s): See notes for Table 1 for variable descriptions. The table reports OLS regressions of the log of the share of income paid to the top 10% divided by the share paid to the bottom 90% on measures of barriers to entry and sets of control variables
Robust standard errors in parentheses
***p < 0.01, **p < 0.05 and *p < 0.1

Table 11. Income inequality (top 10/bottom 90) on barriers to entry – US city level

	Start business index			Cost/Income		
	(1)	(2)	(3)	(4)	(5)	(6)
Start business index	−0.007	−0.005	−0.006	–	–	–
	(0.008)	(0.008)	(0.006)			
Cost/Income	–	–	–	22.10**	23.04**	10.83
				(8.601)	(9.316)	(10.49)
Log income		−27.69***	−18.40***		−24.74***	−17.12**
		(8.027)	(6.271)		(8.141)	(6.682)
Log income sq		1.337***	0.880***		1.202***	0.822**
		(0.381)	(0.298)		(0.386)	(0.316)
Population			0.149***			0.142***
			(0.0299)			(0.0304)
College			0.00640			0.00723
			(0.0112)			(0.0109)
EFNA			0.0793*			0.0679
			(0.0465)			(0.0505)
Constant	3.675***	146.8***	96.77***	2.910***	130.2***	89.36**
	(0.709)	(42.09)	(32.90)	(0.0674)	(42.93)	(35.12)
Observations	73	73	73	73	73	73
R-squared	0.008	0.090	0.393	0.057	0.137	0.398

Note(s): See notes for Table 1 for variable descriptions. The table reports OLS regressions of the log of the share of income paid to the top 1% divided by the share paid to the bottom 99% on measures of barriers to entry and sets of control variables
Robust standard errors in parentheses
***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$

Table 12.
Income inequality (top 1/bottom 99) on barriers to entry – US city level

the establishment exit rate. Cross-sectional estimates at the US city level have the expected sign but are not statistically significant.

Similarly, cross-country evidence finds that the number of steps to start a business is associated with greater income inequality. Sub-national evidence from Italy, Spain, Poland and Mexico confirms the negative relationship between the cost of starting a business and income inequality. Yet, we find only limited evidence of these relationships within the USA at the city or state level. The null results in cross-country city level estimates may be because no relationship exits or because our test lacks the statistical power to detect a relationship.

The extent to which regulation inhibits entrepreneurship or exacerbates inequality may depend on the quality of governance or corruption. Regulation may be a tool to extract rents in a corrupt society (Frye and Shleifer, 1997), but may align better with the public interest in a less corrupt or better governed context. Chambers and Munemo (2019) and Klapper *et al.* (2006) find evidence that the regulation of entry has a negative effect on entrepreneurship even after controlling for institutional quality. Lucas and Boudreaux (2020) show that institutional quality at the US state level moderates the effect of federal regulation on job creation. In relative terms, the USA has high-quality institutions and minimal corruption, which may explain the absence of a significant association between barriers to entry and both entrepreneurship and income inequality at the city level. However, our state level results suggest that even in the relatively high-quality institutional context of the USA, barriers to starting a business can still inhibit entrepreneurship. One explanation is that state governments may be more susceptible to corruption than the governments of large cities. Campante and Do (2014) find that state capital cities that are more isolated from the population of a state tend to be more corrupt than less isolated ones [10]. They find evidence that isolation from population centers may reduce accountability, for example by less coverage of state politics by newspapers. If true, states with isolated capitals may be subject to corruption in ways that large cities in our city level dataset are not.

An alternative explanation for the null results at the city level is insufficient data quantity or quality. The analysis in Section 3 calls into question how well the DBNA measures are capturing barriers to starting a business. Measures of income inequality are also notoriously noisy and subject to measurement error, which could account for the null result. Though Chambers and O'Reilly (2019) do find an association between the cost of starting a business and income inequality in a similarly sized subnational cross-section, the analysis in this study is conducted on a modestly sized cross-section of 73 cities, which limits the power of our statistical tests. Given the possible explanations discussed here, we do not interpret the null results regarding income inequality as evidence that inequality is orthogonal to the cost of starting a business. Rather, the results presented here point to two lines of future research related to the importance of entry regulation. First, as discussed above, it is possible that corruption or institutional quality at various levels of governance may moderate the effects of regulation. Despite some empirical evidence for this possibility, it remains poorly understood. Future research should study whether the adverse effect of barriers to entry on entrepreneurship is conditional on the quality of governance or the level of corruption. Second, despite the great progress in measuring barriers to entry within the USA by Teague (2016) and the DBNA project, improvements can still be made. Ensuring the validity of the existing data and extending the existing measures to panels would allow for better identified and more efficient estimation.

Notes

1. See Section 3 for a discussion of the recent controversy regarding the World Bank Doing Business dataset.
2. Necessity entrepreneurship occurs due to a lack of other options. In contrast, opportunity entrepreneurship is "associated with growth-oriented, procyclical activity" (Dove, 2020).
3. This study uses the subnational World Bank Doing Business data.
4. The steps are as follows: reserving or registering the name of the LLC, assigning a registered agent, filing the articles of incorporation, completing state LLC publication requirements, filing the initial statement of information, creating a state LLC operating agreement, obtaining an employment identification number, additional county or city level requirements.
5. https://subnational.doingbusiness.org/en/reports/subnational-reports
6. Primary results use the 2020 data and panel estimates use both the 2019 and 2020 data.
7. To calculate the effect of a standard deviation increase in the barriers to entry index multiply the coefficient estimate (−1.616) by the standard deviation of the barriers to entry index (0.280), $-1.616 \times 0.280 = 0.045$ or 4.5%.
8. Values of dfbeta greater in absolute value than $2\sqrt{n}$ are an indication of observations with substantial influence on the coefficient estimate.
9. The results in Table 11 show evidence of an inverted Kuznets curve.
10. Although distance from population centers may exacerbate corruption, Bailey *et al.* (2021) find that larger polities in the USA, Australia and Canada tend to be more regulated.

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Appendix

	Starting a business index (1)	(2)	(3)	(4)	Cost/Income (5)	(6)
Starting a business index	0.407	0.360	0.169	–	–	–
	(0.541)	(0.561)	(0.440)			
Costs/Income	–	–	–	−5.173	2.700	−5.082
				(7.783)	(7.491)	(7.564)
Log income		0.296***	0.258***		0.309***	0.237**
		(0.059)	(0.078)		(0.067)	(0.091)
Log income sq			−0.003			−0.003
			(0.004)			(0.004)
Population			0.060***			0.063***
			(0.021)			(0.021)
EFNA			0.079***			0.083***
			(0.023)			(0.024)
Constant	1.877***	−1.160	−1.904***	2.248***	−1.006	−1.572**
	(0.458)	(0.763)	(0.633)	(0.048)	(0.713)	(0.682)
Observations	74	74	74	74	74	74
R-squared	0.007	0.158	0.381	0.008	0.155	0.386

Note(s): See notes for Table 1 for variable descriptions. The table reports OLS regressions of the log establishment entry rate on measures of barriers to entry and sets of control variables
EFNA is the Economic Freedom of North America index Stansel *et. al.* (2021). Robust standard errors in parentheses
***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$

Table A1. Establishment entry rate on barriers to entry – US city level (2021)

	Starting a business index (1)	(2)	(3)	(4)	Cost/Income (5)	(6)
Start business index	0.456*	0.432	0.354	–	–	–
	(0.268)	(0.279)	(0.245)			
Costs/Income	–	–	–	−3.354	0.618	−3.734
				(3.899)	(4.091)	(3.972)
Log income		0.151***	0.130**		0.156***	0.116*
		(0.042)	(0.055)		(0.048)	(0.060)
Log income sq			−0.002			−0.002
			(0.002)			(0.002)
Population			0.043***			0.046***
			(0.015)			(0.015)
EFNA			0.015			0.018
			(0.017)			(0.017)
Constant	1.842***	0.288	−0.081	2.244***	0.603	0.334
	(0.223)	(0.531)	(0.509)	(0.027)	(0.514)	(0.484)
Observations	74	74	74	74	74	74
R-squared	0.021	0.123	0.304	0.008	0.104	0.299

Note(s): See notes for Table 1 for variable descriptions. The table reports OLS regressions of the log establishment exit rate on measures of barriers to entry and sets of control variables
EFNA is the Economic Freedom of North America index Stansel *et. al.* (2021). Robust standard errors in parentheses
***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$

Table A2. Establishment exit rate on barriers to entry – US city level (2021)

Table A3.
Panel analysis of establishment entry and exit rate – US city level

Variables	(1) Entry rate	(2) Entry rate	(3) Exit rate	(4) Exit rate
D.Start business index	0.017		−0.088**	
	(0.058)		(0.038)	
D.Cost/Income		58.922		−13.977
		(98.763)		(96.558)
Constant	−1.230*	−0.990	10.247***	9.752***
	(0.701)	(0.695)	(0.711)	(0.719)
Observations	63	63	63	63
R-squared	0.001	0.006	0.037	0.000

Note(s): See notes for Table 1 for variable descriptions. The table reports regressions in first differences from 2019 to 2020. The change in the log establishment entry or exit rate is regressed on the change in the starting a business index or the change in the cost of starting business as a proportion of income. The log entry rate and log exit rate are multiplied by 100 to facilitate interpretation of the coefficients. Robust standard errors in parentheses
***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$

Table A4.
Establishment entry rate on barriers to entry – US state level

Variables	(1) Entry	(2) Entry	(3) Entry	(4) Entry	(5) Entry	(6) Entry
Barriers to entry	−1.157	−1.331*	−1.109			
	(0.790)	(0.749)	(0.804)			
Explicit costs				−0.179	−0.278	−0.281
				(0.236)	(0.241)	(0.247)
lninc		0.139	0.143		0.155	0.181
		(0.099)	(0.166)		(0.104)	(0.173)
College			−0.031			−0.121
			(0.729)			(0.745)
lnpopulation			0.026			0.033*
			(0.019)			(0.019)
EFNA overall			−0.000			−0.001
			(0.024)			(0.024)
Constant	2.309***	0.810	0.358	2.261***	0.599	−0.154
	(0.068)	(1.082)	(1.569)	(0.056)	(1.109)	(1.630)
Observations	50	50	50	50	50	50
R-squared	0.057	0.089	0.126	0.018	0.054	0.114

Note(s): See notes for Table 1 for variable descriptions. The table reports OLS regressions of the log establishment entry rate on measures of barriers to entry and sets of control variables. EFNA is the Economic Freedom of North America index Stansel *et. al.* (2021). Jackknife standard errors in parentheses
***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$

Variables	(1) Exit	(2) Exit	(3) Exit	(4) Exit	(5) Exit	(6) Exit
Barriers to entry	−1.909***	−1.874***	−1.616**			
	(0.650)	(0.635)	(0.693)			
Explicit costs				−0.407**	−0.405**	−0.342*
				(0.186)	(0.193)	(0.199)
lninc		−0.028	−0.124		−0.003	−0.091
		(0.078)	(0.124)		(0.081)	(0.130)
College			0.679			0.609
			(0.604)			(0.613)
lnpopulation			0.012			0.022
			(0.017)			(0.016)
EFNA overall			0.002			0.001
			(0.016)			(0.017)
Constant	2.398***	2.699***	3.387***	2.343***	2.374***	2.851**
	(0.055)	(0.856)	(1.218)	(0.043)	(0.872)	(1.245)
Observations	50	50	50	50	50	50
R-squared	0.192	0.193	0.236	0.113	0.113	0.178

Note(s): See notes for Table 1 for variable descriptions. The table reports OLS regressions of the log establishment exit rate on measures of barriers to entry and sets of control variables. EFNA is the Economic Freedom of North America index Stansel *et. al.* (2021). Jackknife standard errors in parentheses
***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$

Table A5. Establishment exit rate on barriers to entry – US state level

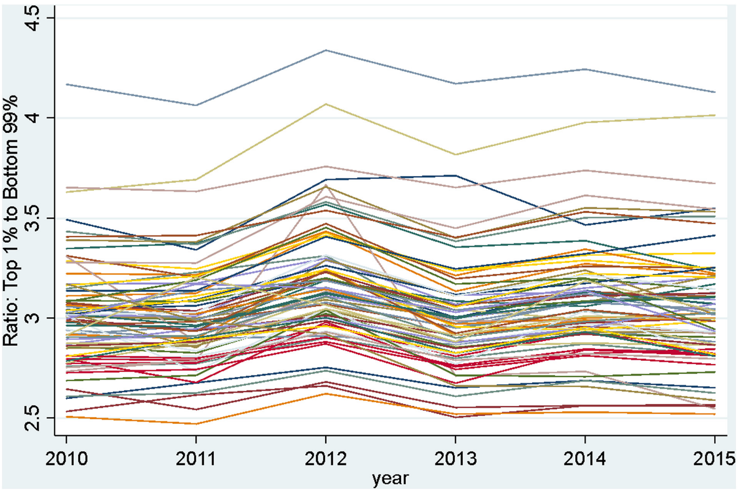

Figure A1. City level income inequality top 1% to bottom 99% (2010–2015)

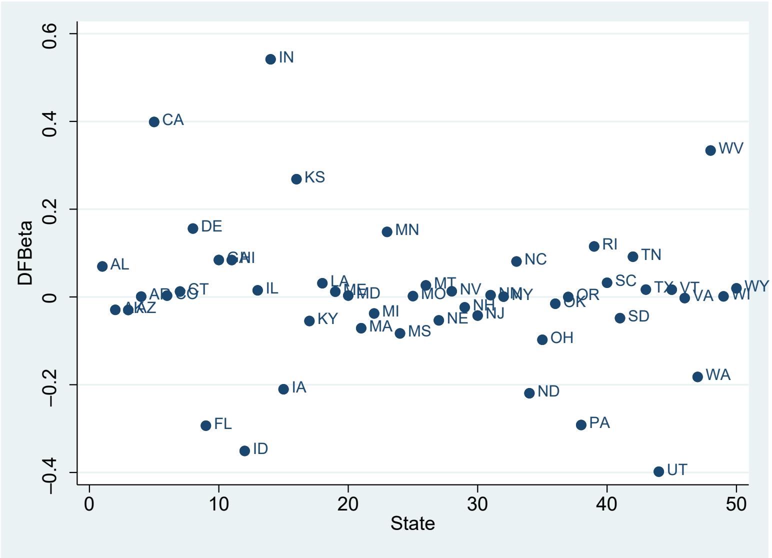

Figure A2.
Detection of influential points – the exit rate on barriers to entry index

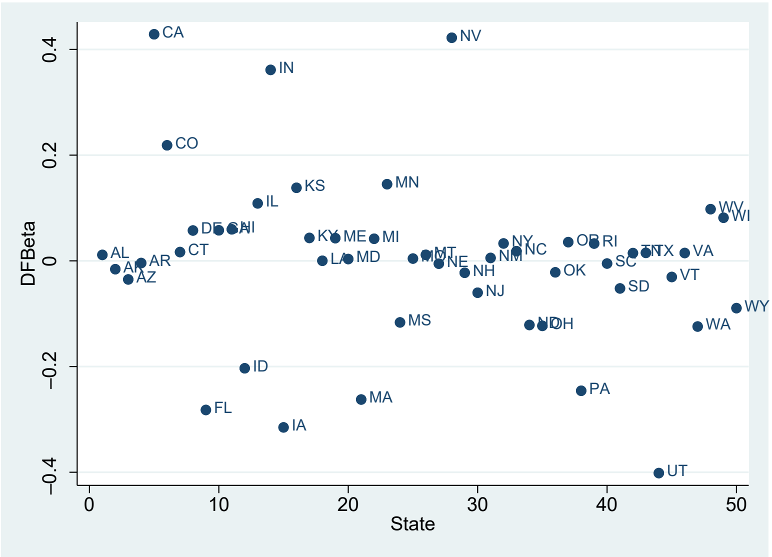

Figure A3.
Detection of influential points – the exit rate on explicit costs

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