Regulation and Income Inequality

The Regressive Effects of Entry Regulations

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Abstract

We examine the relationship between entry regulations and income inequality. Entry regulations increase the cost of legally starting a business relative to the alternatives—working for someone else, entering illegally, or exiting the labor force. We hypothesize that such regulations may cause greater income inequality, because entrepreneurs at the bottom rungs of the income distribution may have relatively greater difficulty surmounting costly barriers to entry. Combining entry regulations data from the World Bank Doing Business Index with various measures of income inequality, including Gini coefficients and income shares, we examine a pooled cross-section of 175 countries and find that countries with more stringent entry regulations tend to experience higher levels of income inequality. An increase by one standard deviation in the number of procedures required to start a new business is associated with a 1.5 percent increase in the Gini coefficient and a 5.6 percent increase in the share of income going to the top 10 percent of earners. Although we cannot eliminate the possibility of reverse causality, we are unaware of any theory that posits that income inequality causes entry regulations. We therefore offer several simple recommendations designed to minimize regulations' adverse effect on income inequality.

JEL codes: D31, J38, K20

Keywords: income inequality, regulation, regulations, entry regulations, Doing Business, Gini coefficient

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1. Introduction

Income inequality is a complex phenomenon determined by several factors and has long been a topic of interest among economists. One such factor is regulatory policy surrounding the formation of new businesses. Regulations that inhibit the ability of entrepreneurs to start new businesses can increase income inequality by creating costly barriers to entry that disproportionately affect entrepreneurs with lower incomes or capital bases. Conversely, such regulations may be accompanied by other policies designed to offset regulations' negative effect on start-ups. Thus, the direction and magnitude of the effect of regulations on income inequality remain an open empirical question. The aim of this paper is to empirically assess the relationship between entry regulations and income inequality.

Entry regulations can increase income inequality in at least two ways. First, when entrepreneurs cannot legally enter the market because of the cost of obtaining necessary licensing or approval, they may abandon their first-choice profession, opting instead to work in another, unlicensed profession where their talents may not be used as well, resulting in a lower income. Second, if entrepreneurs cannot legally enter the market, they may choose to operate illegally, which will reduce producer surplus relative to legally operating businesses, all else held equal. For example, if an entrepreneur opens a pest control business illegally, she must use real resources to enforce contracts and to hide from legal enforcement.

We empirically test the relationship between the number of procedures required to start a business and income inequality. Previous research on the determinants of income inequality has

focused primarily on gross domestic product (GDP) growth, the relative returns on capital and labor, economic freedom, and ethnic heterogeneity, but little research has examined the relationship between regulations and inequality. We offer the first cross-country test of this relationship. Examining a cross-section of 175 countries, we find that a greater number of steps required to open a business is associated with higher levels of income inequality. Specifically, we find that an increase of one standard deviation in the number of steps necessary to legally open a business is associated with a 1.5 percent increase in the Gini coefficient and a 5.6 percent increase in the share of income going to the top 10.0 percent of earners.

The remainder of this paper proceeds as follows. We first provide a brief theoretical explanation of the regressive effects of entry regulations, followed by a review of previous literature surrounding the empirical determinants of income inequality. We then describe the data and use the data to evaluate the relationship between entry regulations and income inequality. We conclude with a discussion of policy implications.

2. The Regressive Effects of Entry Regulations

Entry regulations can increase income inequality through two mechanisms. First, entry regulations can increase the costs of entry by requiring minimum educational or training attainments. For example, for a person to obtain a license to legally sell hair-braiding services in Pennsylvania, that person would have to train for 300 hours at a licensed school, have a 10th-grade education, and pass both a theory and a practical exam (McLaughlin 2013). Such costly requirements may deter would-be entrepreneurs, who may instead enter a profession that is not licensed and potentially face lower producer surplus and lower wages. Gittleman and Kleiner (2016) compare the wages of licensed and unlicensed workers across the United States using the

National Longitudinal Survey of Youth and find that obtaining an occupational license is associated with higher pay. Recent studies that incorporate national estimates show that occupational licensing improves the wages of licensed workers by between 15 percent and 19 percent (Kleiner and Krueger 2010, 2013).

Entry regulations can particularly limit labor market opportunities for low-income earners. In the United States, for example, licensing requirements may make entry prohibitively difficult for workers in entry-level occupations such as bus driving, cosmetology, and pest control (de Rugy 2014). Licensing requirements (such as fees, education and training, and exams) are particularly difficult for low-income workers to meet because the costs of these requirements are higher relative to their income. Because low-income earners have fewer resources than high-income earners and receive income that is well below the national average, entry regulations such as licensing requirements can act as a significant barrier to entry for this group and may induce some individuals to quit the labor force altogether.

The second mechanism by which entry regulations can increase income inequality involves the upper and lower ends of the income distribution. Occupational licensing has the effect of rendering the production of some goods and services illegal, if it is done without appropriate license. When a good or service is entirely prohibited by law, producers of that illicit good or service will receive higher prices because supply is severely limited and competition is reduced.[1] However, when goods are produced by both legal (i.e., licensed) and illegal (i.e., unlicensed) producers, the law of one price suggests that producers who operate illegally will tend to receive the same price as legally competing producers if all else is equal (Mankiw 2014). Entrepreneurs who are potentially constrained from legally entering the

[1] For a discussion of the Bootleggers and Baptists theory of regulation, see Yandle (1983).

market may choose to operate illegally. These entrepreneurs will tend to be from the lower end of the income distribution, because the constraint on receiving an occupational license often is an educational requirement that is too expensive for those with low incomes. Workers in legal, unlicensed professions will tend to receive lower wages relative to the licensed professions, all else held equal. Additionally, illegal producers will face higher costs than legal producers because they must use real resources to hide from law enforcement and provide their own contract enforcement.

At the same time, workers who are able to obtain licenses will receive a premium for providing licensed goods or services, for multiple reasons. For one, occupational licensing requirements limit the supply of labor to an occupation. And in the converse of the low-income workers, individuals with relatively high incomes will be more able to afford the cost of schooling or training or may already have received that schooling or training before the enactment of rules requiring it. Furthermore, a license may affect the perception of quality, even if the license does not actually improve quality. This effect can increase demand for the licensed product or service.

Whereas entry regulations diminish opportunities to supply labor, proponents might argue that entry regulations improve the quality of services. Indeed, the main rationale for entry regulations, such as occupational licensing, is to ensure quality providers and service as well as to protect the health and safety of consumers (McLaughlin, Ellig, and Shamoun 2014). If so, any income inequality that entry regulations cause from either diminishing opportunities for entrepreneurship or unlicensed supply of labor could be offset by increases in quality of the goods and services consumed. Empirical evidence, however, indicates that occupational

licensing regulations, at least, usually do not improve the quality of service.[2] Milton Friedman argues that regulations give incumbent producers the opportunity to restrict supply, create monopoly rents, and maximize profits and incomes (Friedman 1962, chap. 9). Moreover, incumbent producers, protected from new competition by entry regulations, do not necessarily have the incentive to provide higher-quality service. Friedman points toward medical licensing and argues that it decreases the availability of medical services and encourages individuals to substitute less reliable medical services (Friedman 1962). Early studies find little empirical support of a relationship between occupational licensing and quality.[3] For example, Carroll and Gaston (1981) find evidence that restrictive licensing of electricians actually lowers the quality of service. They also discover an unfortunate unintended consequence: a positive relationship between the licensing of electricians and the rate of death from accidental electrocutions across states because people do electrical work themselves rather than hiring a professional (Carroll and Gaston 1981). More recently, Dick Carpenter finds that there is little difference between the quality of floral arrangements in Louisiana, where florists are licensed, and in Texas, where florists are not licensed (Carpenter 2012). McLaughlin, Ellig, and Shamoun (2014) review 16 empirical studies on the effects of licensing on quality of service and find that only 3 studies observe a positive correlation between licensing and quality, whereas 13 studies observe a neutral or negative correlation or find mixed or unclear results.[4]

[2] We review some studies of the effects of occupational licensing regulations on quality; however, the evaluation of the benefits of all entry regulations lies far beyond the scope of this study.

[3] For a literature review of the early empirical research surrounding the relationship between occupational licensing and quality, see Gross (1986).

[4] McLaughlin, Ellig, and Shamoun (2014) review three studies that observe a positive relationship between licensing and quality. Feldman and Begun (1985) find that occupational restriction in optometry increases the quality of eye exams, Martin (1982) discovers a positive correlation between reciprocal licensing and quality, and Holen (1978) finds that entry requirements for dentists are associated with a lower rate of dental neglect. The authors reviewed 13 studies that observe a neutral or negative relationship between licensing and quality, including the electrician study by Carroll and Gaston (1981).

3. Determinants of Income Inequality

Besides entry regulations, there are several potential determinants of income inequality. We reviewed literature on the topic to identify other determinants of varying levels of income inequality across countries and to develop an appropriate set of control variables for our analysis. Much research has focused on the relationship between economic development and inequality since Kuznets (1955) argued that income inequality increases during early stages of economic development and eventually decreases as countries become richer and demand more equality. Most research uses GDP per capita as a measurement of development, but Chang and Ram (2000) also examine the effect of growth rates on income inequality. While their evidence on GDP levels supports the Kuznets hypothesis, they find that their income-growth term is associated negatively with income inequality, suggesting that economic growth is an equalizer. Alderson, Beckfield, and Nielsen (2005) and Mahler and McKeever (2009) find a negative relationship between GDP per capita and income inequality across countries. Mahler and McKeever (2009) incorporate relevant controls when measuring the relationship between GDP and income inequality across countries, including ethnic fractionalization and trade. Barro (2000) finds empirical support for the Kuznets hypothesis and shows that higher inequality slows growth in poor countries and encourages growth in rich countries. However, he points out that rates of growth do not explain much of the variation in inequality across countries.

Although little research directly examines the relationship between regulation and income inequality, some scholars have focused on the relationship between economic freedom and income inequality. Carter (2007) finds a positive relationship between economic freedom and income inequality using data from the United Nations University World Institute for

Development Economics Research (UNU-WIDER) World Income Inequality Database[5] and the *Economic Freedom of the World Annual Report*,[6] which incorporates an index of regulatory freedom. Carter points out that theory does not give us a clear idea of the effect of economic freedom on income inequality. On the one hand, economic freedom may provide more opportunities for upward mobility. On the other hand, economically free nations also have the lowest levels of redistribution.

Although we are unaware of research surrounding the effect of entry regulations on income inequality, Calderón, Chong, and Valdés (2004) examine the relationship between labor market regulations and income inequality. They examine cross-country data on de jure regulations on paper and de facto regulations that are put into practice, and they find that de facto labor market regulations are associated with reductions in income inequality. However, this relationship is weak, and they find no evidence that de jure regulations affect income inequality. Calderón, Chong, and Valdés (2004) look at specific labor market regulations such as the minimum wage, union membership, and regulations surrounding the worker environment and find that the de facto labor regulations are associated with reductions in income inequality.

Other scholars have focused on the relationship between other components of economic and political freedom and income inequality besides regulations, including political openness, trade openness, and financial market development. Subrick (2007) finds evidence that financial development and openness to trade reduces income inequality. Some scholars argue that trade leads to economic development and benefits all income earners, but others argue that it benefits those with certain skills at the expense of people with other skills. As globalization increases,

[5] The database can be accessed at https://www.wider.unu.edu/project/wiid-world-income-inequality-database.
[6] The reports and datasets are available from the Fraser Institute at http://www.freetheworld.com/reports.html.

some argue that the *skill premium*, or the gap between college-educated and non-college-educated workers, increases. Mahler and McKeever (2009) find evidence that trade exacerbates income inequality in countries using the KOF Index of Globalization,[7] an index that incorporates economic flows and restrictions, as an independent variable and the Gini coefficient as a dependent variable. They control for varying GDP levels, ethnic fractionalization, political democracy, and government expenditures on education. To measure the effect of ethnic fractionalization on inequality, Mahler and McKeever (2009) use an index compiled by James Fearon (2003) that attempts to measure the ethnic homogeneity within a country, and they find a strong positive relationship between ethnic fractionalization and posttax and pretax inequality. Mahler and McKeever (2009) argue that heterogeneous countries find it more difficult to redistribute income than homogeneous countries. Overall, research suggests that GDP per capita, political openness, and ethnic heterogeneity may affect income inequality in different ways. In our empirical analysis, we control for the other determinants of income inequality revealed in our review in an effort to reduce the possibility of omitted variables influencing our estimation of the relationship between entry regulations and income inequality.

4. Data

For our analysis, we use two measures of income inequality. The first is the Gini coefficient, a standard measure of a country's income distribution. The data for the Gini coefficient come from Frederick Solt's Standardized World Income Inequality Database (SWIID) of Gini coefficients (Solt 2009). Solt provides an expansive data set as well as Gini coefficients for pretax, pretransfer and posttax, posttransfer incomes. We use the posttax, posttransfer Gini coefficient to

[7] The KOF Index of Globalization is available at http://globalization.kof.ethz.ch/.

account for redistributive policies.[8] We also use the World Top Incomes Database (WTID), which provides data on top income shares across countries over an expansive time period.[9] Whereas the Gini coefficient provides an aggregate measure of inequality, top income shares provide information on the top of the distribution. As alternatives to the Gini coefficient and for robustness, we use the share of income going to the top 10 percent of earners, the share of income going to the top 5 percent of earners, and the share of income going to the top 1 percent of earners.

The variables of interest relate to entry regulation and come from the World Bank's Doing Business dataset.[10] The dataset includes variables that measure the ease of doing business, including the number of procedures and the length of time required to start a new business. We gathered data for 175 countries between 2003 and 2011, which is the latest year in which we have data on income shares and Gini coefficients. Procedures are defined as any interaction between an entrepreneur and outside parties that is required to legally start the business, and the number of procedures ranges from 1 to 19 in our sample. The Doing Business dataset exhibits significant variation across countries in requirements and time cost for legally opening a business. For example, in 2004, an entrepreneur who wanted to open a new business in Colombia needed, on average, to complete 19 steps, to spend 28.0 percent of his or her income, and to wait 60 days. In the same year, an entrepreneur who wanted to open a new business in the United States needed only to complete six steps, to spend 0.7 percent if his or her income, and to wait six days.

[8] The Gini coefficient is a measure of income inequality where the numerator is the area between the Lorenz curve and the line of perfect equality and the denominator is the area under the line of perfect equality.
[9] The WTID was developed by Facundo Alvaredo, Anthony B. Atkinson, Thomas Piketty, and Emmanuel Saez and can be accessed at http://topincomes.g-mond.parisschoolofeconomics.eu/. As of October 2015, the WTID became the World Wealth and Income Database.
[10] The Doing Business database is available at http://www.doingbusiness.org/data.

In addition to the variables of interest, we use control variables, including credit market development, GDP per capita, ethnic heterogeneity, trade openness, and democratization. We chose these controls because existing literature, as mentioned in the previous section, has suggested they are important determinants of income inequality. Data for credit market development come from the World Bank and are measured as domestic credit to the private sector as a percentage of GDP. We expect that countries with more developed credit markets will have lower levels of income inequality because low-income individuals are more likely to have access to credit. Data for GDP per capita comes from the Center for International Comparisons of Production, Income, and Prices at University of Pennsylvania Penn World Table (Heston, Summers, and Aten 2006). Data for ethnic fractionalization come from an indicator compiled by Fearon (2003) that quantifies ethnic heterogeneity across countries. This variable ranges from 0 to 1, where a higher value represents more ethnic fractionalization.[11] The data for the variable for trade openness come from the World Bank[12] and are measured as the ratio of the sum of exports and imports to GDP. The data for democratization come from the Freedom House ratings of civil liberties (Freedom House 2014). The ratings range from 1 to 7, where 1 represents the highest level of civil liberties and 7 represents the lowest level of civil liberties. The variables used in our study are summarized in table 1.

[11] The data for ethnic fractionalization are calculated only for the early 1900s, so we extrapolate the data and use them for the years we have entry regulation data under the assumption that ethnic fractionalization is slow to change.
[12] The data are from the World Development Indicators database at http://data.worldbank.org/data-catalog/world-development-indicators.

Table 1. Descriptions of Variables

Variable	Description
Gini	Measure of posttax income inequality
Top_ten	Share of income going to the top 10 percent of earners
Top_five	Share of income going to the top 5 percent of earners
Top_one	Share of income going to the top 1 percent of earners
Steps	Number of procedures required to start a new business
GDPC	Purchasing power parity–adjusted GDP per capita
Trade	Ratio of the sum of exports and imports to GDP
Ethnic	Indicator that quantifies ethnic heterogeneity across countries and ranges from 0 to 1
Private	Domestic credit to the private sector as a percentage of GDP
Democracy	Rating of civil liberties that ranges from 1 to 7

Table 2 reports the summary statistics from the variables used in the regressions. The WTID, from which we took the income shares variables, consists primarily of Organisation for Economic Co-operation and Development countries, whereas Gini coefficient data cover more countries. For the Gini coefficient data, the highest Gini coefficient in the sample is 80.41, which belongs to Maldives in 1998. In the same year, the United States had a Gini coefficient of 36.97. A Gini coefficient of 0 represents perfect income equality, while a Gini coefficient of 100 represents maximum income inequality. By 2004, Maldives' Gini coefficient had dropped to 44.63. South Africa is a notable outlier with consistently high levels of measured income inequality. Between 1995 and 2014, South Africa had Gini coefficients that varied from 55.42 to 60.87. In the other sample—the WTID—the United States had the highest share of income going to the top 10 percent and 5 percent of earners in 2011. Between 1985 and 2011, the average share of income going to the top 10 percent of earners in the United States was 41.53. Colombia, in

1996, has the highest share of income going to the top 1 percent of earners. The dataset does not include data on the share of income going to the top 10 percent and 5 percent of earners in Colombia. The country with the lowest share of income going to the top 10 percent of earners was Mauritius in 2005. The data for top income shares cover a much smaller range of countries than do the data for the Gini coefficients. Data for the share of income going to the top 10 percent, 5 percent, and 1 percent of earners cover 23 countries over many years with up to a total of 451 observations. Data for the Gini coefficients cover more than 100 countries over many years, totaling 3,995 observations. In our regressions, we pool all data for which we have observations on either the Gini coefficient or the shares of incomes and data on entry regulations. Thus, our pooled cross-section includes 3,995 observations for regressions using the Gini coefficient as the dependent variable and 451 observations for regressions using the shares of income as the dependent variable.

Table 2. Summary Statistics

Variable	Mean	Standard deviation	Minimum	Maximum
Gini	38.12	10.75	15.37	80.41
Top_ten	31.87	6.29	13.96	46.63
Top_five	20.78	5.15	8.93	33.98
Top_one	9.06	3.61	2.65	21.30
Steps	8.73	3.52	1.00	19.00
Cost	55.71	143.13	0.00	1,540.20
GDPC	9,724.27	11,491.37	207.47	95,540.91
Trade	82.37	53.43	10.95	447.06
Ethnic	0.43	0.25	0.01	1.00
Credit	49.85	47.31	0.82	319.46
Democracy	3.24	1.72	1.00	7.00

Note*:* GDPC = GDP per capita adjusted for purchasing power parity.

For the entry regulations data from the World Bank's Doing Business database, Colombia had the highest number of steps necessary to open a business in 2004. Uganda has the second-highest number of steps necessary to open a business. From 2004 to 2009, it took 18 steps to open a business in Uganda. In 2004, it took an entrepreneur, on average, 168 days to open a business in Indonesia, but by 2012 that number had dropped to 48. Between 2009 and 2012, it took an entrepreneur in New Zealand, on average, half a day to open a business. Entrepreneurs in Sierra Leone in 2004 faced the highest costs to open a business in the sample. On average, an entrepreneur in Sierra Leone had to spend 1,540.2 percent of his or her income to open a business in 2004. During the same year, an entrepreneur in Denmark had to spend on average 0 percent of his or her income to open a business.

5. Model

To investigate whether entry regulations are associated with higher levels of income inequality, we estimate ordinary least squares (OLS) models of the posttax Gini coefficient and top income shares as functions of entry regulations. At the same time, we include a number of possible control variables that might explain cross-country differences in income inequality. The OLS model takes the following forms:

$$Income\_inequality_i = \alpha + \beta Steps_i + \boldsymbol{\gamma}\mathbf{X_i} + \varepsilon_i, \quad (1)$$

where *Income_inequality* will be measured by the Gini coefficient, *Top_ten*, *Top_five*, or *Top_one*; *i* indicates the country; α is the intercept; *Steps* is the independent variable of interest that is measured by the number of steps it takes to open a business, ***X*** is a vector of country characteristics, and ε is the error term. β and the vector **γ** are parameters to be estimated.

The first control variable in the vector ***X*** is the natural log of GDP per capita adjusted for purchasing power parity (*ln(GDPC)*). Because few countries are preindustrial, we expect that—following Kuznets's hypothesis—economic growth is associated with lower levels of income inequality and that the estimated coefficient will be negative.

A second control variable is openness to trade (*Trade*). The relationship between openness to trade and income inequality is ambiguous. Some argue that openness to trade benefits those with certain skills and increases the income gap between college-educated and non-college-educated workers (Mahler and McKeever 2009). Others argue that nations that engage in international trade also have better technology and economic growth than do nations that engage relatively less in international trade. Hence, they argue that trade can lead to an increased demand for redistribution and lower levels of inequality.

Another control variable is ethnic fractionalization (*Ethnic*). Theory suggests that ethnically heterogeneous societies will have higher income inequality than relatively homogeneous societies. The reasoning is that heterogeneous societies may find it relatively more difficult to redistribute and provide public goods that help low-income workers because of a larger number of competing special-interest groups (Subrick 2007). If this relationship holds, the expected sign on the estimated coefficient is positive.

Credit market development (*Credit*) is another independent control variable. Countries with more developed credit markets have lower levels of income inequality because low-income individuals are more likely to have access to credit. Credit market development is measured as domestic credit to the private sector as a percentage of GDP. In this case, the estimated coefficient is expected to be negative.

A final variable of interest is democratization (*Democracy*). Theoretically, more democratic countries should experience lower levels of income inequality. Citizens in democratic countries are better able to place political pressure on the government to redistribute income and wealth relative to countries with lower levels of democratization. The ratings range from 1 to 7, where 1 represents the highest level of civil liberties and 7 represents the lowest level of civil liberties.

6. Results

In table 3, we report our regressions of the Gini coefficient on our primary variable of interest—*Steps*—and our control variables. Each column reports a single regression, and all regressions include *Steps*. Control variables are added in stepwise fashion in columns 2 through 6. Finally, column 7 includes only those variables that are statistically significant in all other regressions in which they are included. Each regression includes 3,995 observations. All estimations include robust standard errors.

Our primary variable of interest, *Steps*, is positive and statistically significant at the 1 percent level in all regressions. The estimated coefficient on *Steps* ranges from 0.38 (column 2) to 0.80 (column 1). In our preferred specification (column 7), the estimate on *Steps* is 0.44, which means that a one-step increase in the number of steps necessary to open a business is associated with a 0.44 increase in the Gini coefficient. The magnitude of the coefficient on entry regulation is notable. Consider the average country in this dataset. The average country had a Gini coefficient of 38.12 and entrepreneurs faced 8.73 steps to open a business. What if the average country increased the required amount of steps to open a business by one standard deviation? The results suggest that, all else equal, the 3.52 increase in the number of steps required to open a business would have resulted in an estimated increase in the Gini coefficient

of 1.5. Because the Gini coefficient ranges from 0 to 100, the country's Gini coefficient would be an estimated 1.5 percent higher.

How does this estimation compare with the other estimated coefficients? The log of GDP per capita (*ln(GDPC)*) has a negative and statistically significant relationship with inequality in all regressions that include it. In column 7, for example, our estimate shows that a 1 percent increase in per capita income is associated with a 1.02 reduction in the Gini coefficient, all else held equal ($p < 0.01$). Ethnic fractionalization (*Ethnic*) has a consistently positive and statistically significant ($p < 0.01$) relationship with inequality. In our preferred specification, a one-unit increase in the measure of ethnic fractionalization is associated with a 6.996 increase the Gini coefficient, all else equal. The measure of ethnic fractionalization ranges from 0 to 1, where 1 represents the highest level of fractionalization. To understand the magnitude of the coefficient, consider the average country. The average country has an ethnic fractionalization measure of 0.43. What if that country sees an increase of one standard deviation in its measured ethnic fractionalization? The regression results suggest that this 0.25 increase in measured ethnic fractionalization is associated with a 1.70 increase in the Gini coefficient. The estimated coefficient on democratization (*Democracy*) is also positive and statistically significant ($p < 0.01$). The results in column 7 suggest that a one-unit increase in the civil liberty rating is associated with a 0.9997 increase in the Gini coefficient, all else equal. The control variables openness to trade (*Trade*) and credit market development (*Credit*), when included in the model, are rarely statistically significant, and the estimated coefficients are small in magnitude.

To investigate whether entry regulations contribute to higher levels of income inequality, we also regress the share of income going to the top 10 percent of earners on *Steps* and include similar control variables that might explain cross-country differences in income inequality. The

Table 3. OLS Regression Results; Dependent Variable: Gini Coefficient

Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Steps	0.7985984*** (0.000)	0.3750152*** (0.000)	0.4185527*** (0.000)	0.5076215*** (0.000)	0.4874048*** (0.000)	0.4308272*** (0.000)	0.4356867*** (0.000)
ln(GDPC)		−2.527023*** (0.000)	−2.622934*** (0.000)	−1.799097*** (0.000)	−1.498925*** (0.000)	−0.8594474** (0.042)	−1.025867*** (0.004)
Trade			0.0143062*** (0.009)	0.0021325 (0.761)	0.003594 (0.591)	−0.0009599 (0.878)	
Ethnic				6.2025*** (0.000)	6.776973*** (0.000)	7.021226*** (0.000)	6.996472*** (0.000)
Credit					−0.0051902 (0.502)	−0.0016666 (0.825)	
Democracy						0.961159*** (0.001)	0.9974908*** (0.000)
R^2	0.0994	0.20	0.21	0.2385	0.2281	0.2432	0.2594

* = significant at the 10% level, ** = significant at the 5% level, *** = significant at the 1% level.

Note: *p* values are in parentheses.

regressions are reported in table 4. The regressions in table 4 each include 451 observations. All estimations include robust standard errors. As in table 3, we add control variables in a stepwise fashion. Unlike table 3, there is no column 7, because a regression including only statistically significant variables from column 6 would be identical to column 2. We therefore discuss the coefficient estimates from column 2.

In column 2, both of the variables (*Steps* and *ln(GDPC)*) are statistically significant at the 1 percent level. The estimated coefficient on entry regulation is 1.59, which means a one-step increase in the number of steps necessary to open a business is associated with a 1.59 increase in the share of income going to the top 10 percent of earners. The magnitude of the coefficient on entry regulation is again notable in this model. Consider the average country in this dataset. In the average country, 31.87 percent of income goes to the top 10 percent of earners, and entrepreneurs face 8.73 steps to open a business. What if the average country increases the required amount of steps to open a business by one standard deviation? The results suggest that, all else being equal, the 3.52 increase in the number of steps required to open a business would result in an estimated increase in the share of income going to the top 10 percent of earners by 5.6 percent. Adding additional control variables does not change the statistical significance of the coefficient on entry regulation and does not have a notable effect on the size of the coefficient.

We also consider the share of income going to the top 5 percent and 1 percent of earners and include similar control variables that might explain variations in cross-country differences in income inequality. The results are in table 5 and table 6. Coefficient estimates on our variable of interest, *Steps*, remain positive and significant in every specification, and coefficient estimates on other covariates are remarkably similar in sign and statistical significance to those in tables 3 and 4. For the sake of brevity, we report only the results here and dispense with further discussion.

Table 4. OLS Regression Results; Dependent Variable: Share of Income Going to Top 10 Percent of Earners

Independent variables	(1)	(2)	(3)	(4)	(5)	(6)
Steps	0.8157735*** (0.000)	1.592129*** (0.000)	1.606395*** (0.000)	1.435213*** (0.000)	1.500973*** (0.000)	1.372834*** (0.000)
ln(GDPC)		9.24049*** (0.000)	9.183916*** (0.000)	9.527141*** (0.000)	11.57721*** (0.000)	11.71863*** (0.000)
Trade			0.0033084 (0.500)	0.0024919 (0.655)	−0.0002636 (0.963)	−0.0102227 (0.300)
Ethnic				1.493245 (0.661)	0.8533234 (0.783)	0.6647955 (0.818)
Credit					−0.0065343 (0.727)	−0.0041137 (0.842)
Democracy						1.290083 (0.279)
R^2	0.1037	0.31	0.31	0.3018	0.3762	0.3895

* = significant at the 10% level, ** = significant at the 5% level, *** = significant at the 1% level.

Note: *p* values are in parentheses.

Table 5. Regression Results; Dependent Variable: Share of Income Going to Top 5 Percent of Earners

Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Steps	1.059505*** (0.000)	0.6123488*** (0.000)	1.150698*** (0.000)	1.183129*** (0.000)	1.117789*** (0.000)	1.340096*** (0.000)	1.214167*** (0.000)
ln(GDP)	7.741427*** (0.000)		6.683652*** (0.000)	6.635765*** (0.000)	7.550144*** (0.000)	10.54851*** (0.000)	11.23107*** (0.000)
Trade				0.0074577* (0.081)	0.0048903 (0.321)	−0.0018362 (0.720)	−0.0187294** (0.012)
Ethnic	4.307801 (0.104)				4.689531 (0.115)	6.352909** (0.022)	6.618022*** (0.008)
Credit						−0.0328574* (0.058)	−0.0339845* (0.055)
Democracy	1.017763** (0.023)						2.019667** (0.018)
R^2	0.3996	0.0848	0.34	0.358	0.3742	0.4613	0.5035

* = significant at the 10% level, ** = significant at the 5% level, *** = significant at the 1% level.

Note: *p* values are in parentheses.

Table 6. Regression Results; Dependent variable: Share of Income Going to Top 1 Percent of Earners

Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Steps	0.3892394*** (0.005)	0.3959242*** (0.000)	0.3563039*** (0.007)	0.375776*** (0.004)	0.4565014*** (0.003)	0.5884958*** (0.000)	0.3645827** (0.011)
ln(GDP)	1.841895* (0.066)		−0.3462619 (0.737)	−0.4025514 (0.703)	1.423784 (0.224)	4.05569*** (0.001)	4.886498*** (0.000)
Trade				0.0038859 (0.291)	0.0000631 (0.986)	−0.0046332 (0.185)	−0.0195606*** (0.000)
Ethnic	6.229424*** (0.001)				7.708205*** (0.000)	9.057802*** (0.000)	7.724658*** (0.000)
Credit						−0.0311738*** (0.001)	−0.0233417** (0.016)
Democracy	1.121199*** (0.001)						2.10891*** (0.000)
R^2	0.3126	0.0957	0.1014	0.1096	0.243	0.3239	0.4369

* = significant at the 10% level, ** = significant at the 5% level, *** = significant at the 1% level.

Note: *p* values are in parentheses.

7. Discussion

Our results suggest that entry regulations are highly correlated with the levels of income inequality across countries. These results obtain in simple bivariate regressions, and when we control for several other possible determinants of income inequality, including ethnic fractionalization, credit market development, openness to trade, GDP per capita, and levels of civil liberties. In our preferred specification, we find that an increase of one standard deviation (3.52 steps) in the number of steps necessary to open a business is associated with an increase in the Gini coefficient of 1.5 percent. Although we cannot demonstrate causality, the results of this paper may indicate that reducing the stringency of entry regulations could help countries avoid larger levels of income inequality. Furthermore, we cannot think of a plausible alternative theory that would explain our results or would point to reverse causality. Nonetheless, we hope that future research will help determine the directions of causality in this relationship.

Public choice theory suggests that entry regulations will be difficult to remove because entrenched interests will lobby for the restrictions. Nonetheless, as far as policy options go, it may be easier for policymakers to remove entry regulations than to reduce ethnic fractionalization or to increase the level of civil liberties in their country.

Three broad policy goals could help mitigate the effects of entry regulation on inequality. First, entry regulations that do not solve a demonstrable social problem should be avoided. Before implementing an entry barrier, regulators should identify the social problem that they hope to solve and provide evidence that the social problem is widespread or systemic.[13] McLaughlin, Ellig, and Shamoun (2014) point out that performing this analysis can direct

[13] In fact, this is supposed to be the first step undertaken by a regulatory agency when performing an economic analysis of a proposed rule. See Ellig and McLaughlin (2012) and Ellig, McLaughlin, and Morrall (2013).

attention toward actual systemic social problems and prevent regulation in cases where it is likely to be ineffective.

Second, legislators and regulators should evaluate a broad suite of alternative policies when considering intervention to solve a social problem. By examining alternative policies, regulators may discover that it is optimal to implement a less restrictive form of entry regulation. Many entry regulations are justified as tools that protect consumer safety and reduce information asymmetries. However, it is possible to provide consumers with adequate information through other regulations, such as mandatory labeling or information disclosure. McLaughlin, Ellig, and Shamoun (2014) point toward three alternatives to occupational licensing: registration, certification, and titling. By examining these less restrictive forms of occupational licensing, countries and states may be able to mitigate barriers to entry that limit opportunities for low-income workers.

Third, legislators and regulators should examine current licensing restrictions for effectiveness and unintended regressive effects. By conducting retrospective reviews of current occupational licensing restrictions, policymakers can attempt to discover whether the regulation resulted in any reductions in the relevant market failure or social problem. If entry regulations turn out to be ineffective, this analysis may encourage legislators to remove burdensome entry barriers that hurt low-income earners.

8. Conclusion

We have examined the relationship between income inequality and entry regulations. In a pooled cross-section of 175 countries, we find that countries with more stringent entry regulations tend to experience higher levels of income inequality.

The results also are consistent with the public choice theory that incumbent producers benefit from entry regulations such as occupational licensing, which skew income toward politically connected producers and away from individuals who lack the resources necessary to navigate the legal and regulatory framework. We propose three broad policy goals aimed to mitigate the effects of entry regulation on inequality. First, legislators and regulators should avoid ineffective entry regulations. Second, they should consider alternative policies to address relevant social problems. Third, legislators and regulators should examine current licensing restrictions for unintended regressive effects.

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