Mediating Role of Entrepreneurship in Explaining the Association Between Income Inequality and Regional Economic Performance

Hyejin Jung¹, Inseok Seo², and Kyujin Jung³

Abstract
This research aims to examine whether income inequality affects economic performance at the regional level, which is mediated by entrepreneurship. By considering hierarchical preferences in consumption, it assumes that income inequality has a negative influence on regional economic growth because it lowers the incentive to innovate. Using a structural equation model, the effect of income inequality on regional economic performance, as well as the mediating effect of entrepreneurship, is tested. The results show that income inequality negatively affects both entrepreneurship and economic growth. This result suggests that insufficient demand for new products/services hampers entrepreneurial activities as well as regional economic performance. The findings contribute to the field, highlighting that entrepreneurship mediates between income inequality and economic performance based on demands.

Keywords
income inequality, entrepreneurship, economic performance

Since the beginning of the Great Recession in December 2007, income inequality has become an important issue in developed countries (Castells-Quintana, Ramos, & Royuela, 2015; Meyer & Sullivan, 2013). For instance, income inequality in the United States has received considerable attention from economists and social scientists as the United States has become one of the most unequal countries (Bitler & Hoynes, 2015; Gottschalk & Smeeding, 2000). This is quite a different trend to that suggested by certain existing research focusing on the effects of economic growth on income distribution by comparing the determinants of income distribution in developed and developing countries based on the Kuznets model.

The reasons for the increased academic interest in income distribution in the United States are twofold: On one hand, income inequality was one cause of the recession (Kumhof, Rancière, & Winant, 2015; Stockhammer, 2012), and on the other hand, it also raised concerns about a slowdown in economic growth resulting from increasing inequality (Ostry & Berg, 2011). Although whether increased income inequality was a trigger or the result of the recession remains controversial, the slowdown issue is a fascinating topic through which one can examine whether unequal regions are likely to experience weak economic growth attributable to obvious regional disparities in income across the states (Atems & Jones, 2015; Frank, 2009).

Beyond the linear relation between inequality and economic growth, a few economists have attempted to shed light on the impact of income distribution on innovation that leads to long-term economic growth (Foellmi & Zweimüller, 2006; Tselios, 2011). In other words, this strand of literature posits that income inequality matters to economic growth because it largely affects incentives for innovation from the demand side. The argument is based on the hierarchical preference of consumers, which was disregarded in the Schumpeterian model assuming homothetic preferences (Zweimüller, 2000).

Under hierarchical preferences, the needs of different income groups range from basic (e.g., food) to high (e.g., luxury goods) (Schefold, 1997). When consumers buy goods based on the order of priority, the income distribution can influence the price and market size of new products. This indicates that the distribution of income affects the profit of entrepreneurs who introduce new products in the market. By

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combining the endogenous theory emphasizing the importance of technology and innovation with hierarchical preferences, one can argue that income distribution should be considered because it affects the incentives to innovate (Foellmi & Zweimüller, 2006; Frid, Wyman, & Coffey, 2016; Murphy, Shleifer, & Vishny, 1989).

However, even the previous literature examining the relation between income distribution and innovation has neglected economic agents who implement innovation: entrepreneurs. It is puzzling that existing studies have not provided much room for entrepreneurs who can mediate between income inequality and economic growth. To the best of our knowledge, only a few studies have examined the relationship between income distribution and economic growth by considering the role of entrepreneurship (Gutiérrez-Romero & Méndez-Errico, 2015; Tselios, 2011).

This study employs structural equation modeling (SEM) to explore the effects of income inequality on economic performance through entrepreneurial activities based on metropolitan statistical area data. This study is differentiated from previous studies in the following aspects. First, entrepreneurship is employed as an important variable mediating the relationship between income inequality and regional economic performance through a structural equation model. Second, the study offers advantages by the data employed herein; it uses regional data, which can overcome systematic differences in data collection with respect to cross-country comparisons (Panizza, 2002). Finally, the study focuses on the influence of income inequality on entrepreneurial activities, whereas other studies have dealt with the role of entrepreneurship in resolving poverty or enlarging income inequality (Aghion, Akcigit, Bergeaud, Blundell, & Hémous, 2015; Jones & Kim, 2014; Kim, 2010).1

This study begins with an introduction to the relationship between income inequality and regional economic performance by considering the role of entrepreneurship. Next, several strands of literature are reviewed to explain what entrepreneurs contribute to economic performance and why income distribution matters to entrepreneurship. We then describe our empirical data and model specification, using a structural equation model. On the basis of the estimation, results are discussed. Finally, implications of the results and limitations of the study are suggested.

Theoretical Considerations

Entrepreneurship in Regional Economies

Entrepreneurship is regarded as an important factor for economic growth in the theory of knowledge spillover entrepreneurship (Acs, Braunerhjelm, Audretsch, & Carlsson, 2009; Audretsch & Keilbach, 2008). The theory addresses a limitation of new growth theory arguing that knowledge and human capital lead to economic growth. However, the theory assumes that knowledge itself is a necessary and sufficient condition for economic growth, which neglects the difference between new knowledge and economic knowledge (Arrow, 1962). Entrepreneurship theory addresses problematic new growth theory by explicating the role of entrepreneurs, who transfer new knowledge to economic value in the form of new firms and innovative products.

To be specific, the theory of knowledge spillover entrepreneurship explains that entrepreneurs commercialize new ideas and knowledge created in research and development laboratories or by incumbents but not commercialized because of uncertainty (Acs et al., 2009). When entrepreneurs start new firms based on their experience and knowledge obtained from previous workplaces and laboratories, this new firm formation is one way to explain how knowledge spillover effects occur, which is not explained by new growth theory (Audretsch & Keilbach, 2004). Thus, entrepreneurship is recognized as a mechanism of commercialization for new knowledge and ideas.

Entrepreneurship benefits not only through the positive externality of knowledge spillover effects but also through regional economic outputs because it can increase the level of competition that leads to enhanced productivity (Audretsch & Keilbach, 2004). Given that the number of firms increases with entrants, incumbents are motivated to improve their productivity to remain competitive. The increasing level of competition has a stronger effect on regional innovative activities than competition among exiting firms (Aghion & Howitt, 2006; Sternberg, 2009). It is notable that the threat of entrants is especially critical to firms near the technological frontier (Aghion, Blundell, Griffith, Howitt, & Prantl, 2009). Therefore, the virtue of entrepreneurship is that it can compel incumbents to increase their productivity and performance through elevated competition (Disney, Haskel, & Heden, 2003).

Moreover, entrepreneurship can also increase economic outputs as it facilitates industrial diversity. Desrochers and Leppälä (2011) argued that entrepreneurship begets diversified economies. This is because many small firms and entrants mean an increase in firms pursuing different innovations and strategies (Cohen & Klepper, 1992). In a similar vein, Audretsch and Keilbach (2004) also suggested that entrepreneurship increases regional diversity because it transforms knowledge into economic knowledge in the form of commercialized products and services.

Because of such positive aspects of entrepreneurship, several studies have tried revealing the factors influencing entrepreneurial activities at the regional level. First, regional knowledge is an essential element that helps explain regional disparities in entrepreneurship and innovation (Acs et al., 2009; Acs & Armington, 2006; Qian & Acs, 2013). In other words, regions with more human capital and knowledge stocks tend to have more active innovation and entrepreneurs than other regions (Faggian &
McCann, 2006). This is because people exhibiting higher levels of human capital are more likely to perceive profitable opportunities than others (Davidsson & Honig, 2003). Indeed, new firms prefer to locate in places with a high level of human capital because an educated labor force can increase productivity.

Second, regional factors, including agglomeration and urbanization, have received much attention from regional scholars because these help in understanding the spatial positioning of new firms (Andersson, 2005; Qian & Acs, 2013). Agglomeration provides favorable conditions for entrepreneurs such as high demand for products and transmission of tacit knowledge through face-to-face interactions (Desrochers, 1998). By the same token, it is reasonable to expect that knowledge flows would be faster in dense areas (e.g., large cities) than in rural areas. Hence, urban areas are associated with more entrepreneurial activities than less scarcely populated areas (Stemberg, 2009).

In summary, entrepreneurs play a positive role in the regional economy by increasing knowledge spillover effects, regional productivity, and industrial diversity. As the importance of entrepreneurship has emphasized empirical evidence, several factors, including human capital, knowledge stock, and agglomeration, are used to explain regional variations in entrepreneurial activities and economic growth.

The Impact of Income Inequality on Entrepreneurship

In the previous section, we explained the importance of entrepreneurship in the regional economy and the regional environments affecting entrepreneurial activities. In this study, we additionally suggest that income inequality has potential effects on entrepreneurial activities under the assumption of hierarchical consumer preferences that determine the profitability of innovation (Bertola, 2000; Foellmi & Zweimüller, 2006; Murphy et al., 1989; Tselios, 2011; Zweimüller, 2000).

The essence of hierarchical preferences is that the most basic needs are ranked first and the more luxurious needs are ranked lower (Foellmi & Zweimüller, 2004). Hierarchical preferences posit that (a) some goods might not be purchased because of affordability and (b) additional income is used to consume high priority goods (Foellmi & Zweimüller, 2008). With these assumptions, one can infer that high-income consumers induce high-quality and differentiated products with high acquisition costs, whereas low-income consumers stimulate products with relatively low price and low acquisition costs (Kale, 2011; Kaplinsky, 2011). Thus, this pattern creates heterogeneity in the income elasticity of demand (Faigelbaum, Grossman, & Helpman, 2011).

How does income distribution affect innovation in the market? This is explained by market size and price effects. The market size effect refers to the negative effect of inequality on innovation, as the market size for new products is limited to only affluent people (Bertola, 2000; Foellmi & Zweimüller, 2006; Zweimüller, 2000). A small market for new products is unfavorable to entrepreneurs because few consumers can buy the new goods. Entrepreneurs’ perceptions about future profits and demands affect their decisions to exploit new opportunities (Casson & Wadeson, 2007). If entrepreneurs believe that insufficient demand exists, they will cease to innovate. Consequently, the market size effect means less innovation and fewer entrepreneurs.

In contrast, the price effect refers to the positive effect of inequality on innovation because wealthy people are willing to pay for new products (Bertola, 2000; Foellmi & Zweimüller, 2006; Zweimüller, 2000). It is reasonable to expect that the first users of new products are likely to be high-income consumers, and this type of consumer is frequently able to afford the risks from innovation (Dickerson & Gentry, 1983). Hence, the price effect demonstrates that inequalities generate incentives and competition that promote economic growth (Rodríguez-Pose & Tselios, 2010). When the incentive for a novel innovation is significant, motivation based on financial profit leads to more entrepreneurship. In this regard, the price effect implies that income inequality increases the number of entrepreneurs.

However, of the two, which effect prevails? From a theoretical perspective, Bertola, Foellmi, and Zweimüller (2006) suggested that it depends on the relative population and relative income of the rich versus the poor. In a society with a larger affluent population, the price effect is always stronger than the market size effect because innovators can set high prices with monopoly profits. In this case, inequality promotes growth. In contrast, in a society where the relative income of affluent people is lower, the market size effect dominates the price effect because only a small percentage of people can purchase the new products. As a result, inequality impedes economic growth.

Empirical evidence of the contrasting effects of inequality on innovation is ambiguous and limited. Rodríguez-Pose and Tselios (2010) and Tselios (2011) stated that the price effect outweighs the market size effect with European Union regional data. This result suggests that innovators can increase their profits through rich consumers’ willingness to pay for new products. It implies that income inequality may foster economic growth when incentives from the advantage of price setting benefit entrepreneurs. By contrast, a meta-analytic review (Mueller, Rosenbusch, & Bausch, 2013) demonstrated that equal income distribution is an important moderator of the relation between exploratory innovation (radical adoptions of new products or services) and firm performance, as well as of the relation between exploitative innovation (minor changes in existing products) and firm performance. In other words, income inequality can lower firm performance derived from both exploratory and exploitative innovations.
Based on theoretical and empirical studies, it is uncertain whether which effect dominates the other. Nonetheless, having several segmented consumers below the threshold can lead to slow growth of innovation even in wealthy countries like the United States, which means that the market size effect may outweigh the price effect (Mueller et al., 2013; Stremersch & Tellis, 2004). In this case, we can expect that regions with unequal income distribution are likely to have fewer entrepreneurs. Consequently, income inequality can be a substantive obstacle to economic performance because of insufficient entrepreneurial activities (Gordon, 2012). From the discussions that link income inequality and economic performance through entrepreneurship, the following hypothesis is derived:

**Hypothesis 1:** Income inequality negatively affects regional economic performance by decreasing entrepreneurial activities.

**Research Design and Data**

**Model Specification**

To test the hypothesis stipulated in the previous section, the present study employs SEM using AMOS Version 14.0. One of the most important advantages of SEM is that it can specify and estimate path models by considering variables that mediate independent and dependent variables (Hox & Bechger, 1998). Moreover, it minimizes the multicollinearity problem because structural equations can reduce several observed variables with a small number of latent variables (Jöreskog, 1973). For instance, using a sole measurement of income distribution (e.g., Gini coefficient) can lead to the capture of a relatively unimportant average effect of income inequality on the regional economy when we use a sole measurement of income distribution.

As stated in the hypothesis, we explore the effect of income inequality on regional economic performance through entrepreneurship. Apart from income inequality, therefore, it is required to include regional conditions affecting entrepreneurial activities that are localized activities (Audretsch & Lehmann, 2005). Hence, we include two control variables – regional knowledge capital and agglomeration – known to affect entrepreneurship. Based on this discussion, two equations are specified as follows:

\[
\text{Entrepreneurship} = \alpha_1 \text{Income inequality} + \alpha_2 \text{Regional knowledge capital} + \alpha_3 \text{Agglomeration} + \epsilon_1
\]  

\[
\text{Economic performance} = \beta_1 \text{Income inequality} + \beta_2 \text{Regional knowledge capital} + \beta_3 \text{Agglomeration} + \beta_4 \text{Entrepreneurship} + \epsilon_2
\]

As shown in the equations, entrepreneurship and economic performance are endogenous variables determined by exogenous variables, including income inequality, regional knowledge capital, and agglomeration. Figure 1 presents a path diagram describing the relationship among the variables.

**Data**

This study uses U.S. metropolitan statistical areas (MSAs) to examine the hypothesis suggested above. MSAs consist of counties associated with at least one urbanized area with a population of at least 50,000 and adjacent counties having a high degree of social and economic integration with the core
as measured by commuting ties (Office of Management and Budget, 2013). According to the 2010 standards of MSAs, there were 366 metro areas in the United States, except for 8 metro areas in Puerto Rico (U. S. Census Bureau, 2012). Of these, we exclude 3 MSAs located in Alaska and Hawaii; hence, we have 363 observations of MSAs.

Regarding the period of the study, all exogenous variables pertain to 2010, which seems to be appropriate to mitigate against the adverse effects of the financial crisis that started in December 2007; entrepreneurship is for 2011 and economic performance is for 2012. Time lags are applied to prevent potential endogeneity effects.

**Income Inequality.** The observed variables for income inequality include the Gini coefficient, unemployment, and poverty rate. Popular income inequality indicators are the Gini, the Theil, and the Atkinson indices; however, the Gini coefficient is the only available data at the MSA level in 2010. We also employ unemployment rate to measure the income inequality. Although it is admitted that unemployment reflects one dimension of labor market conditions, we presume that unemployment is highly associated with income inequality, as several studies have empirically shown that the increase in unemployment attributed to structure changes or economic crises is positively related to income inequalities and vice versa (Mocan, 1999; Xue & Zhong, 2003). The close relationship between unemployment and income inequality can be explained by the fact that household wages and salaries represent the largest portion of income (Lerman & Yitzhaki, 1985). Hence, it can be conjectured that higher unemployment results in more income inequality. Moreover, unemployed people are prone to have lower incomes and fall easily into poverty, which means that poverty is very sensitive to unemployment (Xue & Zhong, 2003). Unemployment and poverty are the main sources of income inequality. In this aspect, the percentage of households below the poverty level is also used as an income inequality construct of income inequality. We utilize the data of the Gini coefficient and poverty from the U.S. Census Bureau and retrieve the unemployment data from the Bureau of Labor Statistics in 2010, respectively.

**Regional Knowledge Capital.** To reflect the differences in regional knowledge capital, patents standardized by 1,000 labor force and the percentage of people with a bachelor’s degree or higher are measured for 2010. Patents have been used as a proxy for the result of efforts in innovation. Moreover, patents scarcely benefit other regions, indicating that the positive externality of innovation is limited to a certain distance (Bottazzi & Peri, 2003). Educational attainment is one of the most popular measurements of regional human capital (Stroombergen, Rose, & Nana, 2002). These variables are derived from the U.S. Patent and Trademark Office and the Census Bureau, respectively.

**Agglomeration.** As mentioned earlier, numerous studies have shown that regional agglomeration has a positive effect on entrepreneurship (Audretsch, 1998; Audretsch & Lehmann, 2005). The observed variables for agglomeration include the percentage of households in urban areas and firm density in 2010. Both variables are assumed to be simple basic measurements of agglomeration. The percentage of households in urban areas is measured by the ratio of households in urbanized areas as well as urban clusters. Firm density is calculated by the number of established firms divided by the population aged 15 to 64 years. All data sets for agglomeration are available from the Census Bureau.

**Entrepreneurship.** We define entrepreneurship as the entry rate and the number of new firms in high-tech industries, which are common ways to commercialize opportunities that have not been discovered by incumbent firms (Acs & Armington, 2006; Renski, 2011). We measure the entry rate with the ratio of new firms to the lagged number of established firms in all industries. Regardless of the levels of technology and innovation, the entry rate represents the propensity to start a new business in a certain region. However, it should be noted that the entry rate is heterogeneous with innovative entrepreneurs being found together with noninnovative entrepreneurs who take a large portion of new firms (Acs, 2006). Under this situation, we cannot successfully examine whether the market size effect is dominant over the price effect, which is our main interest. Put differently, it is necessary to include the number of entrepreneurs who introduce frontier technology to examine the relationship between income inequality and entrepreneurs contributing to regional economic performance. In this aspect, this study considers new firms started in the high-tech industries suggested by Hecker (2005). He further classified high-tech industries into three groups according to the proportion of employees in technology-oriented occupations (Levels I, II, and III). Of these subgroups of high-tech industries, Level I (the group with the highest percentage of high-tech employees) comprises 14 industries wherein high-tech occupations represent at least five times the average of total industries. The number of new firms in the Level I high-tech industries is standardized by per 1,000 labor force for 2011 and obtained from Business Dynamics Statistics (BDS) of the Census Bureau, which provides data sets for firm establishment and dissolution. All new firms used to measure the entry rate and new firms in Level I high-tech industries are regarded as de novo establishments, and only single-unit start-ups are considered. It is possible to eliminate agents that seldom contribute to regional economic growth because the BDS data exclude self-employed individuals.

**Economic Performance.** Two observed indicators gauge economic performance: the growth of per capita income and wages for 2012. Per capita income is a popular measurement.
of economic development and indirectly represents the proportion of the middle class (Easterly, 2001). In addition to per capita income, wages per worker is an appropriate indicator to estimate regional economic performance and standard of living (Acs & Armington, 2004; Porter, 2003). Hence, we calculate the change of per capita income and wage per employee compared with the previous year and take a natural logarithm. Data for the change of per capita income are available from the Census Bureau, whereas the wage data are accessible from the Bureau of Labor Statistics.

### Analysis Results and Discussion

First, we examine the hypothesis employing a maximum-likelihood estimator. The aim of maximum-likelihood estimation is to generate a vector of model parameter values that minimizes the distance between the model and the observed covariance matrix (Audretsch, Bönte, & Keilbach, 2008; Moshagen, 2012). Descriptive statistics of observed variables are reported in Table 1.

A correlation matrix of the latent variables used in the model is illustrated in Table 2; all correlations therein are significant at the 0.001 level. Interestingly, the correlations between income inequality and each latent variable are significantly negative except for entrepreneurship, which illustrate that income inequality may be one of obstacles of a regional economy. In contrast, the positive relationships among regional capital, agglomeration, and regional economic growth are consistent with previous studies from the perspective of endogenous economic growth. In contrast, the negative correlation for entrepreneurship and economic performance does not meet our expectation; however, the correlation matrix gives a hint about the relationships among the latent variables, not a causal relationship. Consequently, we have an in-depth discussion after examining the goodness of fit and the consistency of the model.

Table 3 shows several indices representing goodness of fit. First, the relative chi-square ($\chi^2$) fit index divided by degrees of freedom is 3.261, which is slightly higher than the acceptable range of between 1 and 3 (Carmines & McIver, 1981). The value of the root mean square error of approximation, based on residual analysis, also satisfies the acceptable level of 0.08. Other fit indices including the goodness-of-fit index, adjusted goodness-of-fit index, normed fit index, and

<table>
<thead>
<tr>
<th>Table 1. Descriptive Statistics ($N = 363$).</th>
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<tr>
<td><strong>Latent variables</strong></td>
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<tr>
<td>Inequality (2010)</td>
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<td></td>
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<tr>
<td>Regional capital (2010)</td>
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<td></td>
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<tr>
<td>Agglomeration (2010)</td>
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<td></td>
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<tr>
<td>Entrepreneurship (2011)</td>
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<td>Economic growth (2012)</td>
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<th>Table 2. Correlation Matrix of Latent Variables.</th>
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<tr>
<td><strong>Inequality</strong></td>
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<tr>
<td>Inequality</td>
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<td>Regional capital</td>
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<td>Industrial structure</td>
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<td>Entrepreneurship</td>
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<td>Economic growth</td>
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***p < .001.

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<th>Table 3. Goodness-of-Fit Statistics.</th>
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<tr>
<td><strong>Statistics</strong></td>
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<tr>
<td>$\chi^2/\text{df}$</td>
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<td>Root mean square error of approximation</td>
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<td>Goodness-of-fit index</td>
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<td>Adjusted goodness-of-fit index</td>
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<td>Normed fit index</td>
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<td>Comparative fit index</td>
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comparative fit index meet the respective cutoff criteria for each model fit index. Overall, the goodness-of-fit indices suggest that the model perfectly fits the data.

To determine the internal consistency of the model, convergent validity and discriminant validity tests are performed. Results in terms of convergent validity, measured by composite reliability and average variance extracted, are reported in Table 4. The desirable value for composite reliability is 0.6 (Bagozzi & Yi, 1988); hence, the values satisfy the acceptance levels. In addition, we also examine discriminant validity by comparing the $\chi^2$ values of the constrained model with those of the unconstrained model. For all pairs of constructs, the value is significantly different for the unconstrained model, which suggests discriminant validity.

Table 4. Construct Validity.

<table>
<thead>
<tr>
<th>Latent variable</th>
<th>Observed variable</th>
<th>Standard coefficients</th>
<th>Error variance</th>
<th>Composite reliability</th>
<th>Average variance extracted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income inequality</td>
<td>Gini coefficient</td>
<td>-0.189</td>
<td>0.964</td>
<td>.348</td>
<td>0.415</td>
</tr>
<tr>
<td></td>
<td>Unemployment</td>
<td>0.873</td>
<td>0.238</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Poverty</td>
<td>0.495</td>
<td>0.755</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regional knowledge capital</td>
<td>Patent</td>
<td>0.522</td>
<td>0.728</td>
<td>.671</td>
<td>0.786</td>
</tr>
<tr>
<td></td>
<td>Human capital</td>
<td>1.034</td>
<td>-0.069</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agglomeration</td>
<td>Urban population</td>
<td>0.902</td>
<td>0.186</td>
<td>.500</td>
<td>0.640</td>
</tr>
<tr>
<td></td>
<td>Firm density</td>
<td>0.431</td>
<td>0.814</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entrepreneurship</td>
<td>Core high-tech entrepreneurship</td>
<td>0.984</td>
<td>0.032</td>
<td>.559</td>
<td>0.681</td>
</tr>
<tr>
<td></td>
<td>Entry rate</td>
<td>0.388</td>
<td>0.849</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic growth</td>
<td>Income growth</td>
<td>0.62</td>
<td>0.616</td>
<td>.413</td>
<td>0.585</td>
</tr>
<tr>
<td></td>
<td>Employment</td>
<td>0.665</td>
<td>0.558</td>
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Figure 2. Model path coefficients.

$^* p < .05. \quad ** p < .01. \quad *** p < .001.$

Figure 2 illustrates a standardized path diagram showing the set of relations among the latent variables. We find a negative and direct effect of income inequality on entrepreneurship, estimated at $-0.487$ (with a $t$ statistic of $-2.397$). This illustrates that smaller market size resulting from income inequality leads to fewer entrepreneurs and fewer new business opportunities (Audretsch & Keilbach, 2008). This result is consistent with the previous literature arguing that income inequality lowers the incentives of entrepreneurs who can introduce new technology because of few consumers under hierarchical preferences of consumption (Bertola, 2000; Foellmi & Zweimüller, 2006; Zweimüller, 2000). Therefore, we can accept the hypothesis arguing for a negative effect of inequality on economic performance because it hampers entrepreneurship.

The negative effect of income inequality on U.S. entrepreneurship and economic performance contrasts with European regions where entrepreneurship incentives result in active innovation due to the advantage from price setting.
(Rodriguez-Pose & Tselios, 2010; Tselios, 2011). The contrasting results indicate that the ratio of rich to poor consumers is critical to determine economic incentives. Leaving income inequality out may be a simple way to increase economic growth in Europe where the price effect outweighs the market-size effect. However, reducing the extent of income inequality seems to be a critical challenge in the United States where market size is more important than the price effect.

In addition, we confirm that entrepreneurship has a direct and positive impact on economic performance. Even though the effect of entrepreneurship on regional economic performance varies according to different dependent variables (Van Praag & Versloot, 2007), this study corroborates that entrepreneurs contribute positively and significantly to regional economic performance. This result is consistent with previous literature showing that entrepreneurship plays a pivotal role in promoting regional economic growth (Acs & Armington, 2004; Audretsch & Keilbach, 2004).

We now turn to other exogenous variables. Regional knowledge capital measured by human capital and the number of patents illustrates a significantly positive sign of regional entrepreneurs. This is explained by the fact that knowledge embodied in people and knowledge stock would increase entrepreneurship as well as economic performance. Despite the contradictory empirical results of education, the result illustrates that individuals with high levels of education are more likely to recognize a variety of business opportunities with skills to exploit them. In addition, we also infer that technology helps entrepreneurs start new businesses, which refers to the positive relationship between patent and entrepreneurship.

Meanwhile, the latent variable that reflects regional agglomeration measured by the percentage of urban area households and firm density has a positive effect on entrepreneurship. This result confirms the importance of spatial proximity for knowledge spillovers (i.e., tacit knowledge) through entrepreneurial activities (Acs & Varga, 2005; Polanyi, 1967), and follows previous studies that demonstrate a positive and significant relationship between agglomeration and new firm birthrate (Acs et al., 2009; Audretsch & Fritsch, 1994).

In summary, this study finds that the concentration of income in a small portion of people hampers economic performance as it negatively affects entrepreneurship. To be specific, one can conclude that the market size effect dominates the price effect in the market: Income inequality negatively affects entrepreneurial activities due to insufficient demand arising from the concentration of wealth.

**Conclusion**

This study investigates whether income inequality affects regional economic performance through entrepreneurship. The effect of inequality on entrepreneurship is not straightforward, but it is possible to conjecture the relationship through innovation that is regarded as the main role of entrepreneurs. By assuming hierarchical preferences in consumption, the present study expects income inequality to have a negative influence on regional economic performance because the concentration of income lowers the incentives for entrepreneurs with insufficient demand for innovative products/services.

To test the relationship, we estimate a structural equation model consisting of latent variables including income inequality, regional knowledge capital, agglomeration, entrepreneurship, and economic performance for MSAs in the United States. The results show that income inequality negatively affects both entrepreneurship and economic performance. In addition, we corroborate that entrepreneurship plays an important role in regional economies. This study contributes to the current literature of economic development by suggesting that entrepreneurship mediates between income inequality and economic performance.

We suggest two policy implications based on our empirical results. First, income inequality should be reduced to increase regional economic performance because inequality hampers economic growth. As Guth (2005) suggested, polarized economic and social conditions hamper innovation processes. A society with a homogenous middle class is more likely than an unequal society to increase socioeconomic capital accumulation that boosts regional economies (Easterly, 2001). Therefore, a comprehensive approach to increasing regional competitiveness by expanding the proportion of the middle class is recommended. However, relevant policy tools and programs that do not harm business incentives must be developed (Ostry & Berg, 2011). Second, beyond supply-driven innovation for maximization of profits, building and diffusing the concept of “inclusive innovation,” which emphasizes the role of innovation encompassing low-income individuals, is required (Foster & Heeks, 2013). With respect to the increasing innovation gap, recent regional innovation system research recommends certain institutional environments that help entrepreneurs who strategically serve the consumers at the bottom of the economic pyramid (Guth, 2005). We therefore suggest governmental intervention in the market to promote entrepreneurial innovation that can improve the well-being of less affluent people.

In addition to the policy implications, we argue that more research is needed on the relationship between income distribution and entrepreneurship because incentives and profits of innovation can determine economic growth and induce innovation (Acemoglu & Linn, 2004). Since very few studies have covered entrepreneurial rents and innovation strategies from the perspective of the demand side, additional studies on the relationship between income inequality and entrepreneurship are necessary to determine the effect of income distribution on innovation as well as on economic growth.
This study has the following limitations. First, this research does not construct a dynamic model capturing the price of new products decreasing over time because of data availability constraints. The reliability of the results would be increased if panel data were available and employed herein. Second, this study posits that income inequality and consumption inequality are synonymous. However, this might not be applicable if income and consumption do not covary (Meyer & Sullivan, 2013). Inconsistencies between income and consumption can be problematic during a severe recession like the Great Recession. Despite these limitations, this study is pertinent because it suggests the role of entrepreneurship in the relationship between income inequality and regional economic performance. Future studies can continue in this domain, using better data sets and modeling approaches.

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Notes
1. One can argue this by investigating the effects of entrepreneurial activities on income inequality. However, the causal relationship between the two variables is not clear due to data collection problems and differences in research methods. Some studies have demonstrated that income inequality Granger causes innovation (entrepreneurship) (Gutiérrez-Romero & Mendez-Errico, 2015; Tselios, 2011). As this relationship remains ambiguous, that between inequality and entrepreneurship seems to be context specific.
2. We attempted to employ the Gini index as a measurement of income inequality; however, the index was disregarded as its composite reliability was lower. Therefore, we used poverty and unemployment rates to gauge regional income inequality.
3. Following the BDS data definition, start-ups are regarded as any firm with zero age. Following the U.S. Census Bureau, a firm’s birth year is defined as the year an establishment first reported positive employment in the Longitudinal Business Database (LBD).

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