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Who Runs the World: Women Entrepreneurs and Economic Development

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ABSTRACT

Economic development aims to increase economic wealth and prosperity within a country to improve the overall quality of living for the people and incite positive change within society. Due to its vital role, economic development, or rather the factors of economic development, has been greatly researched and debated by economists. The Human Capital Approach asserts that people can increase productivity and consequently promote development through greater education and skills attainment as well as improved health. Women in particular have been proven to create and utilize economic opportunities differently from men, and there is evidence that women entrepreneurs are driving forces in economic progress. Though there is much research on development across countries, there is a lack of research on the impact that women entrepreneurs make on the economy across the stages of development. This research assesses the relationship between important measurements related to female entrepreneurial activity and economic development according to the two-category development status (i.e., higher vs lower income), income level, and level of female entrepreneurial activity. It utilizes the World Bank Open Data System to access and evaluate measurements related to human capital, entrepreneurship, women, and female entrepreneurial activity. Two-tailed t-tests and a one-factor ANOVA test reveals important associations: an association between higher rates of female entrepreneurial activity and increased economic development. The results also reveal the importance of capital access and institutions related to start-up procedures for registering businesses in spurring both female entrepreneurial activity and development.

Introduction

Much research has been dedicated to the field of international economic development with progress marked by a multitude of theories that have gradually built upon, adapted, and challenged previous formulations to better capture a comprehensive understanding of what leads to development. Though new theories reframe the objective of development from mere economic to human welfare concerns, what these theoretical frameworks have in common is the objective of understanding economic growth since it correlates with better standards of living and important human development indicators. Factors that have received much attention in research include variables associated with human capital – such as educational attainment, health, and savings rates – and entrepreneurial activity. What has received less attention is the role of women entrepreneurs in contributing to world economies. However, to understand their contributions to development, it is critical to understand earlier theories on economic development from which a clearer picture of the role of women entrepreneurs can be carved out.

Literature Review

Theories of Economic Growth and Development

The stages-of-growth model of development was posed by Walt W. Rostow (1990) who argued that the transition from underdeveloped to developed economies occurs through five stages that all countries must follow. These five stages include: traditional society, preconditions for take-off, take-off into self-sustaining growth, drive to maturity, and the age of high mass consumption. According to Rostow's theory, the traditional society is an agriculturally based economy with little trading and with limited to no scientific and technological knowledge. In the preconditions for the take-off stage, a country will begin to develop its manufacturing industry, which will grow to dominate the economy at the national or international level as opposed to a regional one. Take-off is the stage in which short, intensive growth occurs, while industrialization occurs when institutions and labor become concentrated around a new industry. Drive to maturity occurs over a long period of time as technology usage and standard of living increases, and the economy grows nationally. The age of high mass consumption is the stage when a country's economy is flourishing with mass production and consumerism simultaneously occurring. Rostow argued that advanced or developed countries all passed the third stage, take-off into self-sustaining growth, and that underdeveloped countries fell into the first two stages of traditional society and preconditions for take-off. One of the crucial components of any take-off or development, he argued, is the mobilization of domestic and foreign savings to create sufficient investment to accelerate growth. This idea that investment leads to more growth is also modeled by the Harrod-Domar growth model.

According to the Harrod-Domar Growth Model (Harrod 1939; Domar 1946), there is a direct economic relationship between the size of the total capital stock and the total GDP, therefore, in order for an economy to grow, new investments (i.e., net additions to the capital stock) are necessary. More specifically, the rate of growth of GDP is determined by the net national savings and capital-output ratio. For a country to grow, its economy must save and invest a certain proportion of its GDP, and the more they save and invest, the faster it can grow. In addition to investment, two other factors are important for growth: labor force growth and technological progress. For developing countries, labor force growth would not be important since labor is abundant and can be hired in proportion to capital investments. According to the model, technological progress would decrease the required capital-output ratio since technology would facilitate greater production with less capital such as labor, thereby enabling more growth for a given level of investment.

Unfortunately, the mechanisms of development that were embodied in the stages of growth and the Harrod-Damar Model did not always apply to development patterns (Todaro and Smith 2020), necessitating different explanations for the variations exhibited such as the Structural-Change Model and the Free-Market Theory of Economics. The Structural-Change Model studies how underdeveloped economies transform their domestic economic structure from a heavy emphasis on traditional subsistence farming to a more modern and industrial economy. One of the most well-known theoretical models of development that focused on structural transformation, with a previously heavy emphasis on subsistence farming, was formed by W. Arthur Lewis (1954), who founded the Lewis two-sector model. In this model, an underdeveloped economy consists of two sectors: a traditional, overpopulated rural sector with no marginal labor productivity (classified as surplus labor) and a modern, highly productive urban sector where labor from the subsistence sector is gradually transferred. The model focuses on the process of labor transfer as well as the growth of output and employment in the industrial sector. As this continues, and self-sustaining growth is achieved through the structural transformation, labor will continue to shift into the modern sector until wage equilibrates.

The free-market theory of economics is classified under the neoclassical counter-revolution as a response to emerging conservative governments in the 1980s (Todaro and Smith 2020). It argues that underdevelopment results from poor resource allocation or inefficiency which is attributed to too much state intervention. Neoliberals argue that competitive free markets (a laissez-faire economy), the privatization of state-owned enterprises, free trade, and the elimination of price distortions and government regulations are the best ways to stimulate economic growth within a country. The neoclassical revolution can be split into three different components: the free-market approach, the public choice, and the market-friendly approach (Todaro and Smith 2020). The free-market approach argues that the market alone is efficient and that the demand and supply for goods reach an equilibrium where government intervention would distort results. The public-choice theory argues that governments can do virtually nothing right as politicians and states act from self-interested needs. The market-friendly approach is a branch of the neoclassical counterrevolution and

recognizes that there are many imperfections in developing-country product and factor markets and that governments do play a key role in aiding the operation of markets through "market-friendly" interventions including education systems, health care facilities, physical and social infrastructures, etc. The market-friendly approach differs from the free-market approach and public-choice theory by acknowledging that market failures can occur in developing countries. The traditional neoclassical growth theory argues that liberalization of a national market attracts domestic and foreign investment, increasing the rate of capital accumulation.

Although reaching a singular consensus amongst these economic theories is improbable, we can extract key takeaways from each theory to better understand the main factors of economic development. For example, the linear-stages model reveals the crucial role that *savings and investments* have in enabling sustainable long-run growth. The Lewis two-sector model of *structural change* emphasizes the transfer of *resources* from low to high productivity in economic activities, and the connection between a traditional agricultural industry and an industrialized modern industry. The neoclassical economic theory promotes *efficiency and productivity* through a proper *pricing system* as a crucial part of any successful development process.

These factors can be distilled down to the three crucial components of economic development emphasized by Todaro (2020): capital accumulation, population growth, and technological progress. Capital accumulation includes all new investments in land, physical equipment, and human resources through education, health, and job skills. Capital accumulation occurs when some proportion of present income is saved and invested to stimulate output and income. Population growth and associated increases in the labor force are traditionally believed to be a positive factor in stimulating economic growth as a larger workforce entails more workers and a larger domestic market (though some have questioned whether a rapidly growing labor force exerts a positive or negative pressure on economic progress). Technological progress is arguably the most important source of economic growth and results from new and improved ways of accomplishing traditional tasks such as growing crops and building infrastructures.

Human Development

Though a larger labor force plays an important role in facilitating economic growth, labor productivity also depends upon health and education as explicated by the Human Capital Approach. Human capital is a term used by economists that describes health, education, and other human capacities that generate productivity when increased. The human capital theory posits that people can increase their productivity capacity through greater education and skills training as well as maintaining good health. The former is particularly important in that higher levels of education and training allow developing countries to absorb modern technology, innovate, and improve capacity for further growth. Good health ensures that workers are not sick and able to work, while also enabling greater productivity as healthy workers are more efficient. Not only do education and health impact economic growth, but they also impact each other. A good education will provide necessary knowledge for health such as how to maintain personal hygiene and what healthy practices are; good health will in turn ensure that students are able to attend school. Economic growth, good health, and education follow a cyclical pattern whereby the improvement of one factor will improve another: health and education will lead to economic growth, while a healthy economy that translates to higher income will enable individuals to invest more in their health and education. Health and education are, therefore, principal objectives of development.

However, this paradigm of economic development has undergone extensive criticism for the last several decades as questions of "development for what end" have been raised. Oftentimes, economists discuss development as the end goal, and economic theories focus on development as measured by GDP and human development, emphasized as merely a factor of production. However, Amartya Sen's capability approach argues that development and "the expansion of commodity goods" are valuable for human welfare and freedom, and are the means for well-being, not the end. Sen explains how well-being is not simply the commodities a person consumes, but what use the consumer can make out of the commodities, defined by Sen as capabilities – "the freedom that a person has in terms of the choice of functionings, given his personal features (conversion of characteristics into functionings) and his command

over commodities" (Sen 1999; Todaro 2020). Development and GDP cannot properly assess a person's well-being, and people should not be reduced to mere instruments of development. However, economic development is still needed even in raising well-being, but Sen's message remains important in realizing the values and perspectives that economists should place in furthering development.

Economic development is premised upon the existence of good governance (Sachs 2015). One way in which governments facilitate development is to create stable environments in which markets can function, which requires the maintenance of the rule of law. The rule of law includes enforcing property rights whereby the government protects an individual's property by eliminating destructive competition for control of economic resources (i.e., property). The government must also enforce other laws and impose order to prevent theft and fraud, protect the rights and safety of citizens, and provide the legal and social framework under which the economy operates (Todaro and Smith 2020). Thus, the rule of law is crucial for economic transactions by securing civil and economic rights and promoting trust within the economy.

The government is essential for taking care of domestic savings and foreign finance for public investment projects that contribute toward long-term economic goals. This may include educational institutions, the construction of railways, and other economic infrastructures. Economic policies including setting or applying taxes, tariffs, quotas, minimum wages, and interest rates are also carried out by the government to ensure a smooth relationship between private business operators and the social objectives of the government. Additionally, social services provided by the government play a central role in enabling societies to prosper. Services such as education and health care enhance productivity within the economy and ensure well-being.

Entrepreneurial Activity and Development

Entrepreneurs, people who assume the risks of starting a business, have also been cited as playing critical roles in facilitating economic growth, particularly in this age of globalization. Though they were not expected to thrive – since it was assumed that larger fixed costs would hinder entry and impede entrepreneurial activity, favoring larger firms – new and small entrepreneurial firms did not become obsolete as a result of globalization. In fact, large firms in high-cost domestic countries lost their comparative advantage due to globalization and let go of many of their employees in an attempt to keep up with their foreign competition (Audretsch and Thurik 2001). In fact, evidence has revealed that large firms are no longer the primary providers of new jobs, but that the majority of new jobs created came from small enterprises (Birch 1981). In addition, the shift to a knowledge-based economy resulted in the new importance of small firms. Small entrepreneurial firms utilize knowledge spillover due to their size constraint and lack of sufficient investments to produce new knowledge. As a result, they acquire knowledge essential for innovation by resorting to methods such as networks or linkages (Audretsch, Keilbach, Lehnman 2006). By doing so, entrepreneurial opportunities are created and incite growth by providing a conduit for knowledge spillover and the commercialization of knowledge and new ideas. Small firms, and therefore entrepreneurs who start them, maximize labor through innovation, create jobs and increase employment, and promote consumer spending and economic activity that will eventually contribute to economic growth and overall prosperity of the economy.

Women and Economic Development

The participation of women in the labor force has also been cited as critical in national economic development. Discrimination against women as it relates particularly to education hinders economic development, so closing the educational gender gap by expanding educational opportunities for women is economically desirable; it will increase productivity and earnings and result in greater labor force participation. A greater labor force and earnings will result in an increase in consumer spending and economic activity that will boost economic growth. There is also evidence that education for girls is one of the most cost-effective ways to boost development goals, and is found to have the

highest rates of return of any investment (Todaro and Smith 2020). It is estimated that the cost of not educating girls is $92 billion a year (Plan International 2008).

According to Mohindra and Nikiema (2010), women in developing countries are more susceptible to health issues in both reproductive and non-reproductive health than women in developed countries. Investing in women would improve child development and protect future generations of productive workers. Women are the primary care-takers of the family and are in charge of taking care of their family's domestic needs, and by securing their health, it would ultimately improve their children's well-being, protecting human capital and eventually increasing economic efficiency. However, an important caveat – as underscored by Amartya Sen's human development approach – is that women are not simply instruments for development, and that society should also genuinely care for the well-being of women beyond what she can do for the economy (Mohindra and Nikiema 2010).

Women Entrepreneurs and Economic Development

The lack of women entrepreneurs is an economic issue and not a gender issue as the prosperity of any new firm is beneficial to the economy as a whole (Mitchell 2011). Though women entrepreneurs are a minority, they manage to create jobs in a different way than men do and provide new solutions in management. They have a different level of involvement and exploit economic opportunities differently than men (Abiodun and Duro Amos 2018). According to Mitchell, there is evidence that reveals startups to be a crucial factor in job creation and leadership in new industries. Nearly half of the workforce is women, and their lag in building high-growth firms contributes to a major economic deficit. Mitchell argues that "the nation has fewer jobs—and less strength in emerging industries—than it could if women's entrepreneurship were on par with men's. Women capable of starting growth companies may well be our greatest under-utilized economic resource" (2011, p.2)

Although there has been much research conducted on economic development across countries, there has been little research on patterns of entrepreneurial activity with regards to financial and legal institutions as they either create or limit barriers to starting and operating businesses. Moreover, the role of women entrepreneurs in economic development, though of growing importance, has been understudied (Brush & Cooper 2012). Therefore this research sought to assess what relationships exist between 1) rates of female entrepreneurial activity and its related measurements and 2) the commonly cited factors of economic development. What differences exist by 1) lower vs higher economic status 2) development status (i.e., low, lower-middle, upper-middle, and high) and 3) lower vs. higher female entrepreneurial activity?

Data

The data used for this research paper was acquired from the World Bank Open Data system. Measurements from the World Development Indicators included Gross National Income (GNI) per capita in constant 2015 US$ and Life Expectancy at birth. The GNI per capita (constant 2015 US$) is the dollar value of a country's final income in a given year divided by its population. For analysis, the WESP (World Economic Situation and Prospects) has classified countries into four different categories by their level of development using their GNI per capita: low income, lower middle income, upper middle income, and high income. The range of GNI per capita for each category was established by the World Bank. Countries with a GNI per capita less than $1,035 fall into the low income category, those between $1,036 and $4,085 as lower middle income, those between $4086 and $12,615 as upper middle income, and those above $12,615 as high income countries.

Additional measurements were obtained by Gender Statistics. For example, these measurements included Saved to start, operate, or expand a farm or business, female (% age 15+); Share of female business owners (% of total business owners); and Firms with female participation in ownership (% of firms). Table 1 lists additional measurements evaluated. Two measurements used under Gender Statistics were indexes: Women Business and the Law Index

Score (scale 1-100) and Women, Business and the Law: Entrepreneurship Indicator Score (score 1-100). The first index measures how various laws and regulations may affect a woman's economic opportunity while the second index measures the constraints women face when it comes to starting and running a business. Both track the progress toward legal equality between men and women in 190 economies. The indicator-level scores were found by evaluating responses to questions related to a certain indicator (sent to various experts in fields working on gender issues) which were then scaled to 100; the overall scores were calculated by the World Bank by taking the average of each indicator (100 representing the highest possible score).

Values were gathered for each of the measurements (not including categorical) for all countries in the world for the span of ten years (2013-2022). The mean was then calculated for each measurement. This technique was used to ensure the most accurate reflection of values and to account for spotty data for certain countries/years. For the categorical measurements, the values were not averaged. Instead, the set of values for each measurement from the year 2021 was used; this year was chosen because 2021 provided the most recent, complete, available data.

The measurements were chosen because of their relevance to economic development as mentioned by the aforementioned theories: education, health, capital investment by entrepreneurs, entrepreneurial activity, and government institutions. To explore education, one of two factors of Amartya Sen's capability approach, four measurements were chosen: Educational attainment, at least Bachelor's or equivalent, population 25+, female (%) (cumulative); Educational attainment, at least Bachelor's or equivalent, population 25+, male (%) (cumulative); Educational attainment, at least completed upper secondary, population 25+, female (%) (cumulative); and Educational attainment, at least completed upper secondary, population 25+, male (%) (cumulative). Not only is it important to analyze a student's upper secondary completion, but it is also important to see what they do after, and if they pursue a higher education, and its corresponding effects on development. Measurements for both genders were collected in order to find and compare the differences in values.

The measurements for health assessed in this research were life expectancy for females, males, and the total population. Measurements for savings included the percentages of women and men over the age of 15 who had savings accounts. For entrepreneurial activity, this research assessed the percentages of women and men over the age of 15 who had saved to start, operate, or expand a farm or business. Other measurements related to entrepreneurial activity that were evaluated included access to finance: percentages of women and men who owned credit cards and who borrowed from a formal financial institution. The main variables that were assessed to uncover the role of female entrepreneurs in economic development included 1) the percentage of women business owners, 2) the percentage of firms with female participation in ownership, 3) the start-up procedures to register a business for females in terms of males, 4) Women, Business, and the Law Index Score, and 5) Women, Business, and the Law: Entrepreneurship Indicator Score.

. We expect that higher education, health, capital investment, and female entrepreneurial activity will lead to higher economic development. To test this inference, the null (Ho) and alternative hypotheses (Ha) were created. The null hypothesis states that there is no difference or association between the factors listed above and higher economic development, while the alternative hypothesis states that the factors are related to higher economic development.

Methods

Inferential Statistics is a way to utilize statistics obtained from observations from sample populations to conclude whether or not different populations truly differ. In this paper, statistically significant differences between means of chosen variable measurements were split into populations according to three classifications: (1) low income, lower-middle income, upper-middle income, and high income; (2) lower economic status vs. higher economic status; and (3) lower vs. higher female entrepreneurial activity. According to the World Bank, countries were categorized into different income groups according to their GNI per capita: low income for values less than $1,045, lower-middle income for values between $1,046 to $4,095, upper-middle income for values between $4,096 and 12,695, and high income for values greater than $12,695 in 2021. For the first two-tailed sample t-test, low income and lower-middle

income countries were reclassified as lower income status, while upper-middle and high income countries were re-classified as higher income status.

The hypothesis testing used to compare measurements according to the first classification was the One-Factor ANOVA test, while the testing used to compare measurements for the other two classifications was two-tailed two-sample t-tests. For the third test, countries were categorized according to whether they exhibited lower and higher female entrepreneurial activity. Countries with less than 30% of women participating in ownership were classified as having lower female entrepreneurial activity while those with greater than 30% were classified as having higher female entrepreneurial activity. This number was an arbitrarily decided upon value as it fairly split the population into two.

The two-tailed two-sample t-test is a method in statistics to test whether the unknown population means of two groups are equal. The equality of variance must first be checked by using Levene's test to determine whether to use the t-test for equal or unequal variance. If the p-value for the Levene's test is greater than 0.05, then the t-test for equal variance must be used. On the other hand, if the p-value is less than 0.05, then the t-test for unequal variance must be used. If the p-value is less than 0.05 for the t-test, then the null hypothesis that the means were equal could be rejected with at least 95% certainty, implying that the populations exhibited statistically significant differences in the means. If the p-value is greater than 0.05 for the t-test, then the null hypothesis could not be rejected, and the populations exhibited similar means.

The One Factor ANOVA test is similar to the t-test and serves as an extension, comparing the means of two or more independent groups as opposed to just two populations in the t-test. However, the ANOVA test does not show which mean is statistically significant (if the null hypothesis that the means are equal is rejected and there are at least three groups), but that at least one of the means is different. The null hypothesis (Ho) for this test states that the means of all groups are the same, while the alternative hypothesis (Ha) states that at least one of the means differs from the others. To perform the ANOVA test, the assumption of normality must be met. After it is met and the test is run, we are able to find the p-values associated with each measurement; the statistically significant measurements and their p-values are marked with asterisks next to its name (See Table 2). To identify which particular means differ from the others, the Tukey Honestly Significant Difference (HSD) test was performed. This test reveals which pairs of populations (low, lower-middle, upper-middle, and high income) exhibit statistically significant differences in their means; the level of statistical significance for significant p-values for a certain income level is signaled by the asterisks next to it.

Results

Table 1: Two-Tailed Two-Sample T-tests between Countries with Lower Income and Higher Income.

	Lower Income (Standard Error)	Higher Income (Standard Error)
Economic Development: GNI per capita***	1875.338 (128.5143)	23883.06 (2177.056)
Human Capital Approach		
Education Attainment:		
Educational attainment, at least Bachelor's or equivalent, population 25+ female (% of population)***	9.73123 (1.56315)	23.39249 (1.135796)
Educational attainment, at least Bachelor's or equivalent, population 25+ male (% of population)***	10.54711 (1.238112)	20.80025 (1.042823)
Educational attainment, at least completed upper secondary, population 25+ female (% of population)**	30.31707 (4.05072)	64.33293 (2.049734)
Educational attainment, at least completed upper secondary, population 25+ male (% of population)***	34.04148 (3.741509)	66.23563 (2.233096)

Health:		
Female Life Expectancy (years)***	69.49213 (0.7861512)	79.75818 (0.4538035)
Male Life Expectancy (years)***	64.63137 (0.6906045)	74.15345 (0.5074911)
Total Life Expectancy (years)***	67.02116 (0.7308782)	76.8873 (0.4739006)
Savings:		
Account, female (% age 15+)***	31.69097 (2.048341)	75.91087 (2.315958)
Account, male (% age 15+)***	40.85408 (2.041423)	79.92647 (2.068372)
Entrepreneurial Activity		
Saved to start, operate, or expand a farm or business, female (% age 15+)***	13.22152 (0.9308711)	8.604588 (0.5441477)
Saved to start, operate, or expand a farm or business, male (% age 15+) ***	17.88435 (0.9870151)	13.91312 (0.6725902)
Owns a credit card, female (% age 15+)***	4.374589 (0.6669325)	31.86167 (2.229943)
Owns a credit card, male (% age 15+)***	2.874976 (0.5020161)	27.50023 (2.333829)
Borrowed from a formal financial institution, female (% age 15+)***	8.701812 (0.8179994)	30.50543 (2.032555)
Borrowed from a formal financial institution, male (% age 15+)***	10.82432 (0.8516238)	35.5518 (1.945092)
Female Entrepreneurial Activity		
% Share of female business owners (% of total business owners)*	19.38002 (1.919851)	23.89876 (1.355609)
% Firms with female participation in ownership (% of firms) ***	29.9452 (1.838664)	38.72404 (1.892636)
Start-up procedures to register a business (female in terms of male, %)	101.9893 (0.5639711)	101.4989 (0.4476283)
Women, Business, and the Law Index Score (1-100)***	67.60882 (1.649299)	79.60457 (1.722011)
Women, Business, and the Law: Entrepreneurship Indicator Score (1-100)***	78.85294 (1.807214)	86.37019 (1.50494)

Note: * = p < 0.10; ** = p < 0.05; *** = p < 0.01

Table 2: One-Factor ANOVA and Tukey HSD between Countries classified by Income Level

	Low Income (St Dev)	Lower Middle St Dev	Upper Middle St Dev	High Income St Dev
Human Capital Approach				
Education Attainment:				

Educational attainment, at least Bachelor's or equivalent, population 25+ female (% of population)***	7.1168039 (9.5210787) vs. UM*** vs. High***	11.208949 (9.1746665) vs. High***	17.128971 (8.5345696) vs. Low*** vs. High***	26.388087 (8.2622202) vs. Low*** vs. LM*** vs. UM***
Educational attainment, at least Bachelor's or equivalent, population 25+ male (% of population)***	7.2422836 (6.5869853) vs. UM** vs. High***	12.41506 (7.3502776) vs. High***	15.753278 (7.4101545) vs. LM** vs. High***	23.214018 (8.1282052) vs. Low *** vs. LM*** vs. UM***
Educational attainment, at least completed upper secondary, population 25+ female (% of population)**	20.342056 (22.824724) vs. UM*** vs. High***	35.119854 (25.891093) vs. UM *** vs. High***	54.762944 (19.719415) vs. Low*** vs. LM*** vs. High**	69.399394 (15.060886) vs. Low*** vs. LM*** vs. UM**
Educational attainment, at least completed upper secondary, population 25+ male (% of population)***	23.536233 (18.860487) vs. UM*** vs. High***	39.099568 (24.37227) vs. UM*** vs. High***	57.924096 (21.385749) vs. Low*** vs. LM*** vs. High**	70.635859 (17.439296) vs. Low*** vs. LM*** vs. UM**
Health:				
Female Life Expectancy (years)***	68.128581 (9.2833803) vs. UM*** vs. High***	70.377248 (6.2491146) vs. UM*** vs. High***	76.042172 (4.5743634) vs. Low*** vs. LM*** vs. High***	82.545184 (2.5721943) vs. Low*** vs. LM*** vs. UM***
Male Life Expectancy (years)***	63.649118 (8.2081492) vs. UM*** vs. High***	65.268976 (5.4854301) vs. UM*** vs. High***	70.067396 (4.7620118) vs. Low*** vs. LM*** vs. High***	77.217993 (3.412322) vs. Low*** vs. LM*** vs. UM***
Total Life Expectancy (years)***	65.85803 (8.6766132) vs. UM*** vs. High***	67.776181 (5.7895654) vs. UM*** vs. High***	72.987926 (4.5831038) vs. Low*** vs. LM*** vs. High***	79.811835 (2.8937306) vs. Low*** vs. LM*** vs. UM***
Savings:				
Account, female (% age 15+)***	25.808472 (15.907066) vs. UM*** vs. High***	34.828296 (16.917588) vs. UM*** vs. High***	60.108114 (18.763412) vs. Low*** vs. LM*** vs. High***	88.421389 (13.975426) vs. Low*** vs. LM*** vs. UM***
Account, male (% age 15+)***	35.028958 (17.839012) vs. UM*** vs. High***	43.960815 (15.800952) vs. UM*** vs. High***	65.863947 (17.694411) vs. Low*** vs. LM*** vs. High***	91.059306 (11.508714) vs. Low*** vs. LM*** vs. UM***

Entrepreneurial Activity				
Saved to start, operate, or expand a farm or business, female (% age 15+)***	15.681667 (7.069494) vs. UM*** vs. High***	11.909444 (7.8240644) vs. High***	9.5131579 (5.2165556) vs. Low***	7.87 (4.7788915) vs. Low*** vs. LM***
Saved to start, operate, or expand a farm or business, male (% age 15+) ***	20.486875 (7.0646016) vs. UM*** vs. High***	16.496333 (8.4930337)	14.542763 (7.0403097) vs. Low***	13.404043 (5.4549338) vs. Low***
Owns a credit card, female (% age 15+)***	3.3938194 (5.7291155) vs. UM*** vs. High***	3.3938194 (5.4286169) vs. UM*** vs. High***	15.908114 (8.6582748) vs. Low*** vs. LM*** vs. High***	44.491562 (18.593075) vs. Low*** vs. LM*** vs. UM***
Owns a credit card, male (% age 15+)***	2.2714583 (3.8242105) vs. UM** vs. High***	3.1968519 (4.350312) vs. UM** vs. High***	11.229605 (6.2197605) vs. Low** vs. LM*** vs. High***	40.381146 (20.813514) vs. Low*** vs. LM*** vs. UM***
Borrowed from a formal financial institution, female (% age 15+)***	5.9007639 (4.0166608) vs. UM*** vs. High***	10.195704 (7.5071556) vs. UM** vs. High***	17.311228 (6.6640561) vs. Low*** vs. LM*** vs. High***	40.950833 (18.852213) vs. Low*** vs. LM*** vs. UM***
Borrowed from a formal financial institution, male (% age 15+)***	7.8776389 (5.271726) vs. UM*** vs. High***	12.395889 (7.4531969) vs. UM*** vs. High***	22.127368 (8.1185506) vs. Low*** vs. LM*** vs. High***	46.179479 (16.597967) vs. Low*** vs. LM*** vs. UM***
Female Entrepreneurial Activity				
% Share of female business owners (% of total business owners)***	10.870612 (6.2565116) vs. LM** vs. UM*** vs. High***	21.507367 (9.1833927) vs. Low**	26.862005 (7.0966172) vs. Low***	21.458442 (7.2031437) vs. Low***
% Firms with female participation in ownership (% of firms) ***	23.36 (10.840441) Vs. LM* vs. UM** vs. High***	32.808333 (15.653158) vs. Low* vs. High***	36.458333 (17.467676) vs. Low**	40.666071 (9.1349761) vs. Low*** vs. LM*
Start-up procedures to register a business (female in terms of male, %)	102.18963 (5.9060222)	101.89086 (4.8688282)	101.05637 (3.547905)	101.85757 (5.2854588)
Women, Business, and the Law Index Score (1-100)***	67.024554 (13.810026) vs. High***	67.895833 (15.956708) vs. High***	74.816489 (14.750877) vs. High**	83.552632 (18.798493) vs. Low***

				vs. LM*** vs. UM**
Women, Business, and the Law: Entrepreneurship Indicator Score (1-100)***	72.589286 (12.628637) vs. LM** vs. UM* vs. High***	81.929825 (17.614533) vs. Low** vs. High**	81.117021 (17.529544) vs. Low* vs. High**	90.701754 (11.771204) vs. Low*** vs. LM** vs. UM**

Note: * = p < 0.10; ** = p < 0.05; *** = p < 0.01

Table 3: Two-Tailed Two-Sample T-Tests between Countries by Female Entrepreneurial Activity

	Low (Standard Error)	High (Standard Error)
Economic Development: GNI per capita***	4219.599 (1037.631)	18128.48 (1851.155)
Human Capital Approach		
Education Attainment:		
Educational attainment, at least Bachelor's or equivalent, population 25+ female (% of population)***	10.81631 (2.105149)	21.01778 (1.192112)
Educational attainment, at least Bachelor's or equivalent, population 25+ male (% of population)**	12.94789 (1.788012)	18.54204 (1.053782)
Educational attainment, at least completed upper secondary, population 25+ female (% of population)**	41.76271 (6.050733)	56.23662 (2.480195)
Educational attainment, at least completed upper secondary, population 25+ male (% of population)	48.77295 (5.85856)	57.35996 (2.539835)
Health:		
Female Life Expectancy (years)***	70.01274 (1.22203)	76.56967 (0.583761)
Male Life Expectancy (years)***	65.63332 (1.096971)	71.04258 (0.5762444)
Total Life Expectancy (years)***	67.80817 (1.151844)	73.73826 (0.5745329)
Savings:		
Account, female (% age 15+)***	36.24783 (3.356907)	64.65699 (2.676344)
Account, male (% age 15+)***	46.48812 (3.17412)	69.30417 (2.465838)
Entrepreneurial Activity		
Saved to start, operate, or expand a farm or business, female (% age 15+)	10.115 (1.103995)	10.91097 (0.6204301)
Saved to start, operate, or expand a farm or business, male (% age 15+)	15.10663 (1.165943)	15.94194 (0.6939523)
Owns a credit card, female (% age 15+)***	9.189239 (2.196609)	24.02977 (2.066052)
Owns a credit card, male (% age 15+)***	6.698043 (1.936592)	20.69067 (2.06332)

Borrowed from a formal financial institution, female (% age 15+)***	11.74297 (1.975315)	24.62124 (1.798964)
Borrowed from a formal financial institution, male (% age 15+)***	15.06076 (2.192748)	28.54622 (1.811552)
Female Entrepreneurial Activity		
% Share of female business owners (% of total business owners)***	16.39477 (1.859607)	24.69895 (1.271881)
% Firms with female participation in ownership (% of firms) ***	19.26348 (1.069841)	43.44577 (1.20631)
Start-up procedures to register a business (female in terms of male, %)	102.0909 (0.7914646)	101.5959 (0.391185)
Women, Business, and the Law Index Score (1-100)***	67.77261 (2.587313)	76.34023 (1.428414)
Women, Business, and the Law: Entrepreneurship Indicator Score (1-100)	81.54255 (1.990892)	83.46831 (1.440095)

Note: * = p < 0.10; ** = p < 0.05; *** = p < 0.01

Discussion

Statistically significant differences between the means of countries classified as being lower income and the means of countries classified as being higher income were found for all of the following measurements at the 95% level (see Table 1): GNI per capita, education attainment measures, health measures, savings measures, and entrepreneurial activity measures. Although statistically significant differences at the 95% level existed for several of the female entrepreneurial activity measures, two did not: the Percentage Share of Female Businesses Owners and the Start-up Procedures to Register a Business (females in terms of males as a percentage).

As expected, the mean GNI per capita for higher-income countries was higher than the mean for lower-income countries. It was also found that the mean educational attainment measurements, health measurements, and savings measurements of higher-income countries were higher than those of lower-income countries in line with the Human Capital Approach. When it comes to measurements related to entrepreneurial activity, the mean percentage of women and men who have accessed credit (owning a credit card or borrowing from a financial institution) was also found to be higher in high-income countries than in lower-income countries. However, the opposite was true for the mean percentage of women and men who have saved to start, operate, or expand a farm or business. This makes sense. More developed countries typically have institutions that provide greater stability to finance operations. Lower-income countries typically have weaker governments with less stable financial institutions and therefore access to credit. Hence, it is unsurprising that the mean percentage of women and men who have saved for business is higher in lower-income countries.

Development Status by Income

Similar to what was found for the means of countries classified as lower versus higher income countries, statistically significant differences between the means of countries classified as being low, lower-middle, upper-middle, and high income were found for almost all of the measurements at the 95% level (see Table 2): GNI per capita, education attainment measures, health measures, savings measures, and entrepreneurial activity measures. This was also true for female entrepreneurial measurements with the exception of Start-up Procedures to Register a Business.

Although the one-factor ANOVA tests revealed statistically significant differences between the means for countries according to the four levels of economic development, the tests can only reveal that at least one of the means

is different and not which particular groups exhibited statistically significant differences. In order to determine which groups' means showed significant differences, the HSD Tukey test was performed and the results were noted by asterisks for each group's measurement means. For the educational attainment measures, higher-income countries exhibited higher mean education attainment. Although statistically significant differences in the means for the educational attainment measures between the four groups were found to exist based upon the ANOVA test results, significant differences were found only between 1) low-income and 2) upper-middle or high-income countries at the 95% certainty level. Low-income countries did show lower mean educational attainment than lower-middle-income countries, but no statistically significant differences at high enough certainty. Statistically significant differences in the mean educational attainment measures were also found between 1) high-income countries and 2) lower-middle or upper-middle countries. Similar patterns were found for health measurements with statistically significant differences between 1) low-income and 2) upper-middle or high-income countries at the 95% certainty level but not significantly different between low-income and lower-middle-income countries.

The same pattern of statistically significant differences between the low, lower-middle, upper-middle, and high income countries at the 95% level applies to the savings measurements. However, there is a stark contrast between the percentage of the population that saves for each subpopulation of countries by progressively higher income levels: from 25.8% to 34.8% to 60.1% to 88.4% for females and from 35.0% to 44.0% to 65.9% to 91.1% for males. These progressively larger jumps may perhaps be evidence to support Rostow's five stages of growth theory, revealing the existence of take-off to self-sustaining growth.

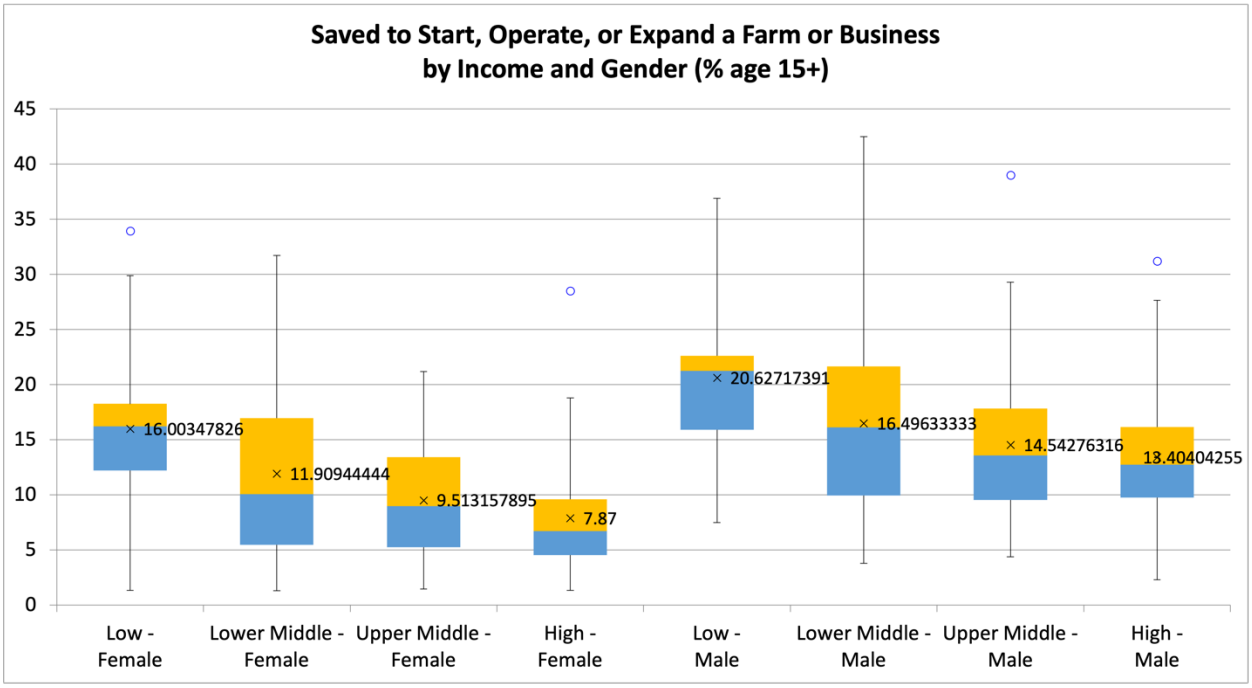

Figure 1. The Rates of Savings to Start, Operate, or Expand a Farm or Business by Income and Gender

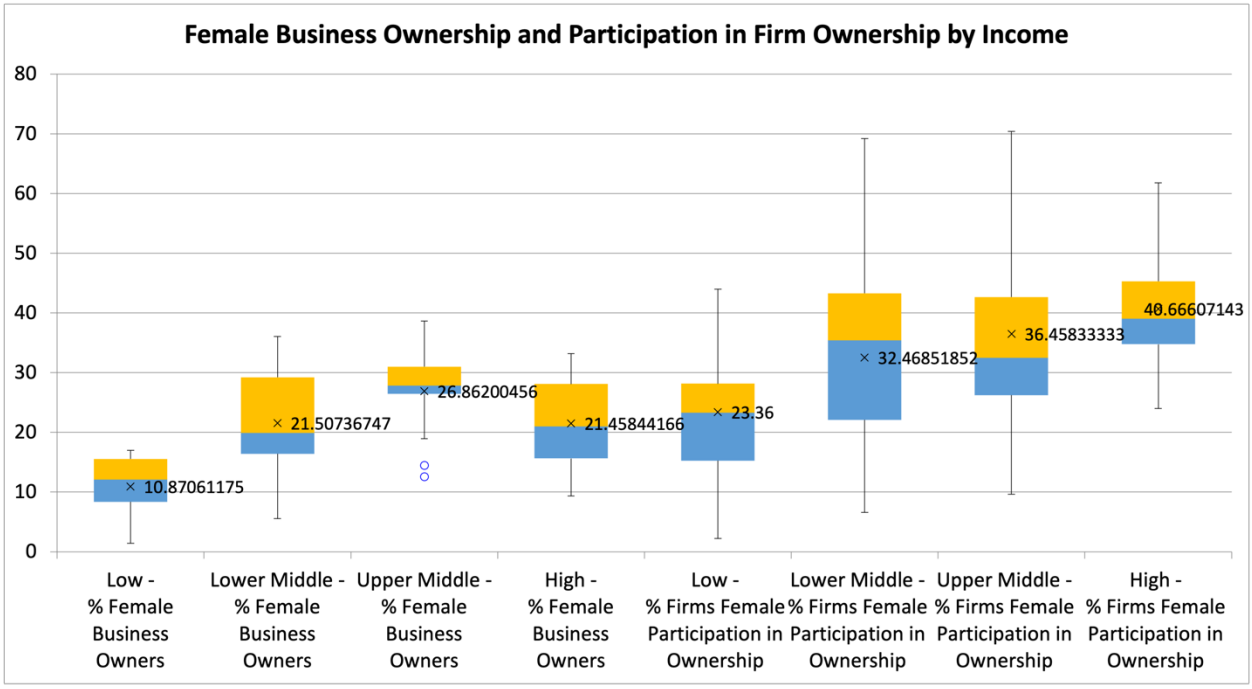

Figure 2. Rates of Female Business Ownership and Participation in Firm Ownership by Income

All the entrepreneurial activity measurements have statistically significant differences between the low and lower-middle income countries and the upper-middle and high income countries. However, there are especially interesting patterns, and the data reveals there to be an inverse relationship between savings rate and borrowing rate from financial institutions. Larger percentages of both females and males in low and lower-middle income countries saved to start, operate, or expand their businesses compared to those in upper-middle and high income countries (See Figure 1). On the contrary, upper-middle and high income countries had a greater mean percentage of females and males owning credit cards compared to low and lower-middle income countries, indicating that low and lower-middle income countries have higher percentages of the population saving for businesses likely due to the lack of access to credit and reliable financial institutions. Additionally, there is a difference between low and lower-middle income countries and upper-middle and high income countries when it comes to borrowing from a formal institution. For both males and females, there is an approximate 35-40% mean difference between the lower income countries and the higher income countries, signaling this to be a great factor in developed countries. Since progressively lower income countries lack financial institutions and government stability, it may be that the people are required to save for themselves, and vice versa for higher income countries.

For the female entrepreneurial activity measurements, all but one was statistically significant at the 95% certainty level; the start-up procedures of women in terms of men had no statistically significant differences across all four income levels and appears to maintain a similar mean value. However, there is an interesting anomaly in the pattern of equality of start-up procedures for women in terms of men: though percentages generally drop across higher income levels, the upper-middle income countries exhibit greater equality at 101.05637, higher than the measurement exhibited for high income countries (see Table 2 and Figure 2). This same pattern also exists for percentage share of business owners who are female (see Table 2). Upper-middle income countries have the highest rates of female business ownership among the four income categories. It could be that these two patterns and anomalies are related, but further study is needed to examine the relationship between procedure steps and the number of female entrepreneurs.

Development Status by Female Entrepreneurial Activity

Statistically significant differences between the means of countries classified with low entrepreneurial activity and high entrepreneurial activity were found for the majority of measurements at the 95% certainty level (see Table 3): GNI per capita, 3 out of 4 educational attainment measures, all health measures, all savings measures, 4 out of 6 entrepreneurial activity measures, and 3 out of 5 female entrepreneurial activity measures.

As expected, statistically significant differences in the mean educational attainment measures were found for low entrepreneurial activity and high entrepreneurial activity at the 95% confidence level as female entrepreneurial activity is associated with income, which is also correlated to education. Similarly, statistically significant differences between the means were found for the low entrepreneurial activity and high entrepreneurial activity at the 95% confidence level for the health measurements, supporting the Human Capital theory of the relation between health and education on labor productivity and therefore economic development. Notably, the mean percentages of both males and females who own a credit card between low and high entrepreneurial activity have statistically significant differences at the 95% certainty level and a difference of three times, highlighting the vital role access to credit has on entrepreneurial activity. Similarly, for the mean percentage of borrowing from a formal financial institution for both males and females, statistically significant differences were found between low and high entrepreneurial activity, a jump of about two times, indicating access to and borrowing from financial institutions play a key role in entrepreneurial activity. Additionally, the start-up procedures to register a business by females in terms of males reveal that countries with lower entrepreneurial activity have higher relative steps to registering for females than countries with higher entrepreneurial activity, further supporting the implication drawn regarding the impact that restrictive institutions have on female entrepreneurial activity.

Conclusion

The data reveals expected associations; higher income countries are associated with higher rates of educational attainment, health, and savings, according to the Human Capital Approach, whether assessed by lower vs. higher income (Table 1), income classifications (Table 2), and female entrepreneurial activity (Table 3). The data also reveals the association between entrepreneurial activity and female participation with higher rates of economic development.

However, the data reveals there to be important differences related to entrepreneurial activity. In particular, lower access to credit – owning a credit card or borrowing from financial institutions – most likely leads to women in lower-income countries being inclined to save, shown in Tables 1 and 2, with Table 2 revealing the existence of great hurdles, signaled by the exponential increase from upper-middle to high-income countries. As countries progress from lower middle income to upper middle income, there are progressively larger differences in the rates of borrowing using credit cards or formal financial institutions. This may indicate that undeveloped countries do not have stable financial institutions and that the "big push" for take-off into self-sustaining growth may be external sources of funding needed to enable entrepreneurial activity, specifically female entrepreneurial activity, and thus development. Since there appear to be barriers in lower-income countries – especially for women entrepreneurs – when it comes to access to credit and loans, international organizations such as the UN and World Bank can potentially make funding more available to lower-income countries to enable entrepreneurship and facilitate economic development. Further, Table 3 reveals that when organizing the data by lower and higher rates of female entrepreneurial activity, the savings rates of females and males are not comparably different: 10.1% & 10.9% vs. 15.1% & 15.9%. However, statistically significant and substantial differences exist for the measurements related to access to credit, further substantiating the importance of access to credit and its potential classification as the "big push."

Another policy implication is to reduce the number of set-up procedures so that procedures for men and women reach equality. As mentioned previously, Table 2 exhibits higher rates of female business ownership and relatively lower start-up procedures for women in upper-middle-income countries out of all four income levels. The

upper-middle-income countries are the closest to equality of start-up procedures for men and women, and the share of female business owners is the highest, perhaps signaling that reducing start-up procedure steps may be related to greater ownership of businesses by female entrepreneurs. A potential reason why upper-middle-income countries have higher rates than even high-income countries may be the past aid given to low and lower-middle-income countries by various international organizations. Since the data collected has been an average of ten years, it may be that the low and lower middle-income countries have shifted to the upper middle-income country status as a result of the aid they were given.

Limitations

This paper has potential limitations. The data collected for each measurement was for a span of ten years, and the average was taken due to missing data, a potential source of error. It is important to also note that since averages were used, the data does not relate any progress made by countries as they developed and transitioned from low to lower-middle, upper-middle, and high income.

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