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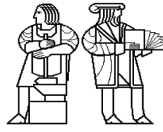
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FINANCIAL DEVELOPMENT,
GENDER AND ENTREPRENEURSHIP

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Abstract:

Female entrepreneurs are much less frequent than male entrepreneurs. In this paper we investigate a possible culprit: access to financial services. We use a dataset with entrepreneurship rates by opportunity and by need from the Global Entrepreneurship Monitor and indicators of financial institutions from Beck, Demirgüç-Kunt and Levine (2000) for 41 developed and developing countries from 2001 to 2004. Our conclusions are that financial development, though generally encouraging entrepreneurial activity, is unlikely, by itself, to contribute to bring male and female entrepreneurship rates closer together. Moreover, our results suggest that it is entrepreneurship by need that is most affected by financial development, suggesting that the possible more complex aspects of evaluating projects associated with market or technological opportunities are not overcome by aggregate financial development and need more specific measures.

Keywords: Entrepreneurship, Financial Institutions

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1. Motivation

Female entrepreneurs are much less frequent than male entrepreneurs. As recently documented in Minniti et al. (2005) and Llussá (2009a), the entrepreneurship rate is lower for females than for males, and significantly so.¹ Understanding why female and male entrepreneurship rates differ so blatantly is a far more complicated matter than documenting it. In this paper we investigate a possible culprit: access to financial services. We investigate the role of country financial development on the rate of entrepreneurship, highlighting how female and male entrepreneurs are differently affected.

Financial development is an important element of the growth process. Wide access to external capital at reasonable interest rates fosters enterprise growth as well as the creation of new business firms.² In the case of nascent entrepreneurs, access to external resources is a key issue, as both the youth and the size of the venture limit the willingness of financial institutions to lend, dependent on little guarantees in terms of collateral. Financing constraints are often the major reason for potential entrepreneurs to postpone creating a new venture³. If men have easier access to financial services, then the lower entrepreneurial activity of females can be partly explained. In this paper we estimate the differential impact of financial development on female and male entrepreneurs. We also test whether financial development affects different entrepreneurs in different ways, depending on age, educational status, work status and personal income. We conduct this exercise for entrepreneurs driven by “need” and by “opportunity”. By examining the role of an array of standard indicators of financial development on different types of entrepreneurs, we provide a detailed picture of the relation between finance, gender and entrepreneurship.

New businesses play an important role in furthering economic growth through competition and innovation. Any discouragement of entrepreneurial activity for discriminatory reasons imposes a cost on the economy. If gender discrimination in finance explains the lower rate of female entrepreneurship, and financial development

¹ The only exception is the creation of new firms in poor countries for reasons of “need”, where the female and male entrepreneurship rates are statistically the same. See Llussá (2009a). Entrepreneurship by need is the situation where individuals are mostly “pushed” into creating new businesses to exit a bad condition, such as unemployment or a need for additional resources. It contrasts with entrepreneurship by “opportunity”, where individuals are mostly “pulled” into creating a new venture because of an attractive opportunity such as the availability of a new technology or idea with market potential.

² Exploiting market opportunities depends on the availability of capital. Evans and Leighton (1989) and Aldrich and Zimmer (1986) argue that access to financial resources enhance the probability of business opportunity exploitation.

³ For an analysis of the performance of private equity partnerships in the US see Kaplan and Schoar (2005).

helps overcome this problem, a new and important rationale for promoting financial development has been found.

2. Entrepreneurship, finance and gender

2.1. Finance

The institutional environment is a key determinant of the number of entrepreneurs. Baumol (1996) goes as far as hypothesizing that the actual share of possible entrepreneurs in any society is fairly constant, and only institutional differences result in different *actual* entrepreneurship rates.

According to Schumpeter (1934), the services provided by financial intermediaries - evaluation of projects, including the potential for expansion, the risk of failure, firm performance - are essential for technological innovation and economic growth. Several authors, among them Audretsch et al. (2009) and Cassar (2004), suggest that financial constraints are important to determine the likelihood of new business starts. Examining a sample of nascent entrepreneurs rather than established incumbent firms becomes particularly illuminating. Hsu (2004) calls attention for the difficulty faced by entrepreneurs without an established reputation in convincing external source providers to provide financial capital.

Almost by definition, an entrepreneur has idiosyncratic beliefs or knowledge on the worth of a specific business opportunity.⁴ If entrepreneurs and financial institutions shared the same knowledge base and beliefs about the market opportunity, access to finance would not likely be a problem. The suppliers of capital would lend when the market interest rate is lower than the new venture's expected rate of return, or undertake the creation of the firm themselves. Finance would not be an issue.⁵ But entrepreneurs

⁴ Even more objective factors such as user needs - Von Hippel (1986) - or production function aspects - Bruder, Preisendorfer and Ziegler (1992) - which help entrepreneurs identify a market opportunity, as suggested by Shane and Venkataraman (2000), consist of information whose interpretation is very personal.

⁵ Shane and Venkataraman (2000) go as far as suggesting that the other sources of finance would price financial resources so that the profits of the entrepreneur would be driven closer to zero and incentives to

beliefs are so personal⁶ it is sometimes hard to believe they will support a viable firm, let alone a profitable one. In addition the risk associated with the creation of new firms is much larger than that associated with ongoing enterprises, making a sound financial evaluation an even more complex affair.

It is likely that in countries with more developed financial systems, be it banks or stock markets, entrepreneurs will have improved access to funding at all stages of business creation.⁷ Countries with larger banking systems and stock markets, measured as a share of GDP, are likely to offer more opportunities for business creation. Also, higher turnover rates and lower net interest margins correlate with more liquid and efficient financial markets. These are precisely the type of indicators we will test for their impact on female and male entrepreneurship rates.

But financial development can be a two-edged sword. Consider first the perspective of the lender on those individuals that, justly or unjustly, are perceived to have lower collateral or lower abilities, such as the poor and the uneducated. On the one hand, as deeper and more efficient financial markets expand lending, they will also lend more to, say, the poor, the less educated. This may be the result of a wider availability of funds and better information systems, for instance. We will call this the *financial expansion effect*. On the other hand, financial development, through a more intensive use of screening devices, may result in a move away from lending to the poor and the uneducated. We call this the *financial substitution effect*. From the perspective of the borrower and possible entrepreneur, lower interest rates and wider availability of credit may further entrepreneurship. However, a wider availability of finance may encourage investment in established rather than new companies and, as it makes it easier to smooth income through difficult periods, lower the supply of entrepreneurs.

create a new venture would disappear. This argument ignores the role of competition between suppliers of finance, as well as the potential undertaking of firm creation by the owners of capital themselves.

⁶ According to Schumpeter (1934) if many potential entrepreneurs share the same perceptions about which opportunities are profitable, competition in the product market would ensue so that the profit rate would decrease to the point where the incentive to pursue firm creation would be eliminated.

⁷ Though the ideal would be to compile indicators on entrepreneurial finance that are consistent across a wide set of countries across time, that has not been so far undertaken. The wide availability of more general indicators on the development of the banking and the stock market systems presents a wealth of information that we explore here.

As mentioned above, entrepreneurs may be motivated by need or by an attractive market opportunity.⁸ Financial institutions may be unable to differentiate between the two types, which may face very different expected return and risk profiles.⁹ As financial markets become more sophisticated and more is discerned about each venture, there may be a *financial expansion* or a *financial substitution effect*.

Several models emphasize that well functioning financial intermediaries and markets ameliorate information and transaction costs and thereby foster efficient resource allocation and faster growth. King and Levine (1993a,b), Levine (1998, 1999), and Levine, Loayza and Beck (2000) show that bank development helps explain economic growth but these papers do not include stock market measures. On the other hand, Beck and Levine (2002), Levine and Zervos (1998) as well as Rosseau and Wachel (2000) found in a panel data of countries that both bank and stock market development have a positive impact on country's growth. In sum, as pointed by Beck and Levine (2002), economic theory suggests "conflicting evidence about whether stock markets and banks are substitutes, complements, or whether one is more conducive to growth than other".¹⁰ In our study we will use both types of indicators.

2.2. Gender

Several authors have found that women are discriminated against in access to financial markets. Alesina et al. (2008), using Bank of Italy data on individual transactions involving about 200 Italian banks, find evidence that women pay higher interest rates than men after controlling for an array of characteristics of self-employed

⁸ In the case of large barriers to entry or radically new technologies, the expected return may be very high. The latter case is discussed in Utterback (1994).

⁹ Some information asymmetries may inhibit the marketing of innovative ideas. This problem affects especially very innovative new ventures in the earliest stage of the startup process but may be mitigated by the issuing of patents and prototypes. Patents are a means to protect property rights and signal the entrepreneur's ability to appropriate the returns to innovation. According to Audretsch et al (2009) prototypes signal the actual feasibility of the proposed project, providing additional value to patents as signals and thus make financing easier.

¹⁰ Generally most new firms have to rely on some form of external finance from banks or other sources. The literature so far has focused on the informational asymmetries and transaction costs associated with the creation of new ventures, which inhibit access to finance in the earlier stages of the firm creation process. "Banks and stock markets may play a role in reducing these asymmetries and lowering transaction costs but we do not have information on how much markets and banks ameliorate information and transaction costs", as pointed in Beck and Levine (2002).

individuals or owners of micro firms, as well as the characteristics of their businesses and their local credit markets.¹¹ Female borrowers pay between around 20 basis points more than men,¹² and this in spite of the fact that female-owned businesses go bankrupt less frequently than businesses owned by males, and have a slightly better credit history.¹³ Female owners pay more for credit independently of the market structure and benefit less from regional social capital. In principle, discrimination could be statistical or taste-based but given that women default less, the latter type is more likely. Taste discrimination implies that lender “holding risk constant, charge more to women because they are biased against them”.¹⁴ Alesina and Giuliano (2007) show that Italy is an extreme case amongst OECD countries in viewing women in a “traditional role”, but this type of gender discrimination in access to finance is likely to exist in other countries.¹⁵

Scherr et al. (1993) use the 41.000 firms from the 1982 Characteristics of Business Owners survey and finds that financing of the small start ups is related to the entrepreneur’s characteristics, as well as industry, profitability and the size of the firm.

There are also reasons to doubt the relevance of the entrepreneur’s gender in access to financial markets. Cassar (2002), which examines four different types of financing: leverage, long-term leverage, outside financing and bank financing, [[[Does he examine just the type or also the amount?]]] suggests that financiers weigh firm

¹¹ The authors also control for risk, expressed in the past credit history of the individual borrower, the sector in which she operates and the type of activity. Results are also robust when controlling for social capital and trust. The period covered ranges from 2004 to 2006 and the total number of observations is 1.2 million.

¹² The figure varies between 16 and 42 basis points, depending on the econometric specification.

¹³ Armendiz and Morduch (2005) survey of microfinance in developing countries also presents evidence of women being significantly more reliable borrowers than men.

¹⁴ Becker (1971) developed the taste-based discrimination model. In the present case, if banks discriminate against women due to a “preference for discrimination“, it means they are willing foregoing expected profits. Other banks may exploit this opportunity and make an extra profit by not discriminating, but this only if they don’t share the taste for discrimination. Alesina et al. (2008) show that banks run by women are less likely to discriminate against women but the presence of women on bank boards is minimal in Italy. We risk admitting this as a general fact.

¹⁵ Several studies unveil evidence of taste discrimination in different settings. Blanchflower et al. (2003) using data from the 1993 and 1998 US National Surveys of Small Business Finance show evidence of racial discrimination in the small-business credit market. Bertrand et al. (2005) conducted an interesting experiment in South Africa: a lender mailed out over 50,000 letters to incumbent clients offering short-term loans at a randomly chosen interest rate and suggesting different psychological characteristics; the authors observe that loan take-up was affected both by the interest rates and the psychological features in the letter. Ravina (2008) using data from Prosper.com, a 150 million dollars online lending market in which borrowers post loan requests that include verifiable financial information, photos, offered interest rate etc., found that personal characteristics like beauty and race affect credit conditions though unrelated with the probability of not paying the loan.

characteristics such as size and non-current assets when deciding whether to lend, while the characteristics of the entrepreneurs – such as education, race and gender - were not found to influence the financing of the start-up.¹⁶

The choice of being an entrepreneur may be relatively exogenous and mostly determined by personal experiences that are extremely difficult to identify.¹⁷ Empirical research has shown that external social influences since early age, including having an entrepreneurial father, mother or uncle increases the likelihood of becoming an entrepreneur.¹⁸ However, if we think that in many countries daughters are less exposed to such experiences or less likely to infer from those experiences relevant guidance for their professional future, the relevance of gender is restored.

2. Data and Specification

2.1. Data and Summary Statistics

Drawing on the literature on financial development and economic growth, we collect indicators related to banks and to stock markets for the years 2001 to 2004 from Beck, Demirgüç-Kunt and Levine, (2000) updates. For bank development we use bank credit to the private sector as a share of GDP as a measure of the extension of banking services in the economy. This same indicator is used by Levine and Zervos (1998) and Beck and Levine (2002).¹⁹ Additionally we use the net interest as a proxy for the efficiency of the banking system.

¹⁶ Cassar (2004) uses a more limited range of owners characteristics than Scherr et al (1993), but did consider several firm-specific variables such as size around start-up, asset structure and legal organization of the firm not included in Scherr et al. (1993). Shane and Venkataraman (2000) criticize empirical research looking separately at entrepreneurs as opposed to other individuals since this may lead to a poor identification of the role of personal attributes as opposed to profitable market opportunities.

¹⁷ As an example, Shane and Venkataraman (2000) argue that optimistic individuals will have higher probability of exploiting business opportunities.

¹⁸ See Djankov (2006a). Shavinina (2007) studied Richard Branson's biography in detail and found that some of micro-social factors like parental trust, an entrepreneurial attitude among family members, open and sincere relationships, treating everybody as equals, high ethical standards and other personality traits were key factors for Richard Branson's entrepreneurial giftedness.

¹⁹ Naturally, the extent to which bank claims by deposit money banks divided by GDP facilitate information and transaction costs is not known with exactitude. Beck and Levine (2002) argue that bank credit improves

To measure stock market development we use two indicators: as a measure of overall size of the stock market we use market capitalization relative to GDP and as a measure of market liquidity, we use the ratio of total value traded in the stock market divided by stock market capitalization.²⁰

Each of these financial variables will be used successively, in a similar specification, and we will learn the general effect of bank and stock market development indices on the entrepreneurship rates of males and females.

As to the data on entrepreneurship, we use the Global Entrepreneurship Monitor.²¹ GEM covers about 400,000 individuals between the dates of 2001 – with 65,681 individuals - to 2004 - with 140,535 individuals - , for 41 developed and developing countries. In this data base entrepreneurs are defined individuals starting a new business who are (i) alone or with others currently trying to start a new business, including any type of self-employment or (ii) alone or with others are trying to start a new business or new venture together with their employer as an effort that is part of their normal work, and who (a) have been active in the past 12 months in trying to start the new business, (b) expect to own part of it, and (c) had not paid salaries and wages to anybody, including the owner/managers, for more than 3 months.

This dataset is particularly adequate to address the issue at hand since, as suggested by Ardagna and Lusardi (2008), GEM data represents the potential rather than the actual supply of entrepreneurs. In addition, the GEM dataset has the advantages of having no survivorship bias,²² no relevant geographic or industry limitations.²³

upon alternative measures, such as the ratio of M3/GDP used by other studies as proxy for financial development. Since the bank credit variable considers bank credit to the private sector, it excludes credits by development banks and loans to the government and public enterprises, which are part of M3.

²⁰ See also Levine and Zervos (1998) and Beck and Levine (2002).

²¹ Henceforth GEM.

²² The bias caused by survivorship of some firms, leading to the fact that the sample of firms at any given time is not representative of the population of the firms at the time of start up. The longer the time period elapsing between the time when respondents are surveyed and the beginning of the start-up, the greater the influence of the survivorship bias. With enough time elapsing only surviving firms would be in the sample.

²³ As an example, Shaffer and Pulver (1985), Carter and Van Auken (1990) and Van Auken and Neeley (1996) are based on a dataset from Midwest US states alone.

Our empirical specification will control for individual characteristics relating to age, education, individual income and work status. We will separately estimate how personal characteristics, country financial development and their interaction affect the likelihood that someone becoming an entrepreneur.

Table 1 presents summary statistics of financial indicators: private credit by deposit money banks divided by GDP has a mean of 96% across the sample, a minimum of 5.3% and a maximum of 105%. Net interest margin - bank's net interest revenue as a share of its interest-bearing (total earning) assets - has a mean of 3.4% and varies from 0.89% to 13.9%. Stock Market Capitalization divided by GDP has a mean of 88% and varies from 0.77% to 408%. Finally, Stock Market Total Value Traded (total shares traded on the stock market exchange) divided by Stock Market Capitalization has a mean of 92.5% and varies from 0.23% to 306%. The higher the value of these indicators the more developed is the financial system with the exception of the net interest margin. In the case of the net interest margin, higher value signals a less efficient financial market. Table 2 shows that these indicators are highly correlated, as one would expect.

Table 3 presents summary statistics as to the type and characteristics of entrepreneurs. About 4% of the individuals in our sample are opportunity driven entrepreneurs and about 1% are driven by need. The sample size consists of 414,569 individuals, 53% of which are women, and the average in the sample is about 43 years old. Also, 56% of individuals work at the time of the interview, 10% is retired, 5% are students and 23% are individuals who do not work at the time of the interview – and, in addition, are neither students nor retired. In terms of income, 26% of individuals report that their income is in the lowest 33rd income percentile of their country's income distribution at the time of the interview, 27% report that their income is in the middle 33rd income percentile and 20% in the upper 33rd income percentile. Individuals with a high school degree, college degree or some graduate experience correspond to 33%, 22% and 8% of our sample, respectively.

2.2. Specification

We now formally analyze the effect of financial indicators on gender entrepreneurship. Our dependent variables will be the entrepreneurship rate by opportunity (TEA OPP) and by need (TEA NEC), and our independent variables will include a host of individual characteristics, taken alone and interacted with the financial indicator. The dependent variable is binary, and we use probit estimation and cluster standard errors at country level. Our sample includes countries whose macroeconomic and institutional characteristics vary widely and may correlate with the entrepreneurship indices. However, we control for country specific characteristics by including country fixed effects in all our specifications.

For an individual i , in country j , at time t , we define the outcome of interest y_{ijt} as TEA OPP or TEA NEC, an indicator which takes the values 1 or 0, with the former indicating entrepreneurial activity. We estimate the equation for y_{ijt} :

$$y_{ijt} = \alpha + \beta_1 \cdot X_{ijt} + \beta_2 \cdot F_{jt} + \beta_3 \cdot X_{ijt} \cdot F_{jt} + \eta_t + \gamma_t + \varepsilon_{ijt} \quad (1)$$

where α is a constant, X_{ijt} is a vector of individual characteristics - including age, employment status, education and income -, F_{jt} is the aggregate financial development indicator, varying across countries and over time. This same vector of individual characteristics is then interacted with each of the financial indicators F_{jt} to produce different estimates. Also, η_t is a vector of country dummies and γ_t a vector of year dummies.

The coefficient on a variable such as “Low Income”, for instance, will give us the change in the probability of becoming an entrepreneur for an individual with the average characteristics in the sample. The variable “ $F_{jt} \cdot \text{Low Income}$ ” will give us the additional – positive or negative – effect on the probability of a low income person becoming an entrepreneur. Positive and significant coefficients on the variables interacted with the financial indicator suggest that an improvement in that financial indicator will result in an increase in entrepreneurship rates for that specific group.

3. Results

In Tables 4 through 7 we present the estimates obtained from the probit models, organized successively by type of entrepreneurial activity – TEAOPP and TEANEC -, by financial indicator – bank and then stock market indicators -, and by gender. The first point to be made, observable throughout, is that individual characteristics are associated with the likelihood of attempts to create new ventures. Entrepreneurial activity decreases weakly with age²⁴ and is positively associated with working status irrespective of gender and type of motivation – opportunity or need. Student status seems to discourage entrepreneurship, more significantly so for females. A high income status encourages individual entrepreneurial activity by opportunity, while low income discourages it. The reverse, though less starkly, seems to occur with entrepreneurship by need.²⁵ Also very consistent is the relation between education and entrepreneurial activity. While any education above basic education encourages entrepreneurship by opportunity, the higher educational levels are negatively associated with entrepreneurship by need. Indicators of financial development are for the most part not significantly related to entrepreneurial activity, lacking either statistical or economic – quantitative – significance.²⁶

As to the interaction between financial indicators and the different population groups, the results are mixed. Financial development seems to weakly facilitate entrepreneurial activity by older people – as testified by the positive coefficients throughout, though statistical significance is present in only one case. Also, financial development facilitates the emergence of low income entrepreneurs by opportunity and not so by need. Only high income males are encouraged to create new ventures when

²⁴ According to Evans and Leighton (1989) the probability of an individual becoming self-employed is independent of age or experience for the first 20 years of employment and this may be explained by liquidity constraints and the need to accumulate assets to start a business or because it takes time to identify a market opportunity – older people may faster identify a business opportunity but may be less prone to exploit it.

²⁵ One should remind oneself we are controlling for country effects, including income per capita, through the introduction of country dummies.

²⁶ This was to a certain extent expected, as these indicators do not vary with each individual within a country. Beck and Levine (2002) found that the results for the relation between financial development and growth were not consistent across econometric methods and specifications and conclude that overall financial development matters for growth but it is difficult to identify the specific components of the financial system most closely associated with economic success. In addition, Cassar (2004) argues that “firms with a relative lack of tangible assets appear to be financed through less formal means, where nonbank financing, such as loans from individuals unrelated to business, plays a more important role in the capital structure for start ups.” This highlights the importance of network resources in these types of ventures and the possible smaller relevance of formal financial intermediaries.

their motivation is need, while entrepreneurship by opportunity is overall unaffected. A curious pattern also emerges as to education. While educated individuals are encouraged by financial development to become entrepreneurs driven by need, the same financial development does not strongly affect their rates of entrepreneurship by opportunity. The pattern for high income and highly educated individuals suggests that their entrepreneurial activity is encouraged by financial development mostly in the case where they are motivated by need. Generally, our results suggest that the opportunity motivation is less sensitive to financial development and constraints than entrepreneurship by need, and this is true even for high income and highly educated individuals.

As to the gender pattern, there are 22 statistically significant coefficients for the interacted variables in the case of males, as opposed to 16 statistically significant coefficients for females. Given that financial development is generally associated with an encouragement of entrepreneurial activity, we find that, surprisingly, males seem to benefit more from financial development than females. This suggests that it is not financial development that explains the lower entrepreneurship rates of females or, alternatively, financial development does not seem able to correct any gender bias in access to capital. In addition, as will become clearer in the Figures presented below, the quantitative effect of financial development on entrepreneurial activity tends to be larger for males than for females. The *financial expansion effect* associated with financial development benefits mostly males. As to the financial substitution effect, it seems non-existent as to entrepreneurship by need – all coefficients are positive -, but present in the case of individuals with higher education or graduate experience motivated by opportunity, which are negatively affected by financial development. Here it is as though financial development, by bringing forth more sophisticated information systems and wider acceptance of other collateral, makes individuals with education less privileged in the access to credit.²⁷

In Figures 1 through 9 we highlight the impact of financial development on the entrepreneurship rate of different population groups. We represent the product of the coefficient taken from Tables 4 and 7 and multiply it by the standard deviation of the

²⁷ Please note that these individuals have nevertheless an entrepreneurial rate larger than the average, as witnessed by the positive coefficients on education as an isolated individual characteristic.

financial indicator (Table 1), thus obtaining an estimate of the quantitative effect of specific improvements in the financial system. We conduct the same exercise for entrepreneurship by need and by opportunity. As an example, the value close to 0.005 for Private Credit Banks/GDP and Low Income males in Figure 2 is the product of the coefficient 0.0127 from Table 4 by the standard deviation of Private Credit by Banks/GDP in our sample. In all the Figures solid grey and black bars - representing women and men, respectively - mean that the coefficient in the probit regressions - Tables 4 to 7 - is significant.

Analyzing entrepreneurship by opportunity - TEA OPP - first, regarding age, there is evidence, in Figure 1 that older males become more entrepreneurial with financial development. In Figure 2 we find that all coefficients for Low Income individuals are positive, indicating that financial development encourages entrepreneurship by this group. Also, it is low income males that seem to benefit most from financial development, with more coefficients that are quantitatively and statistically more significant. The contrast with High Income individuals (Figure 3) is stark, as all except one coefficient in the latter cases is statistically insignificant, and the statistically significant coefficient is negative, suggesting that financial development makes finance relatively less available to High Income females. Finally, we also analyze individuals with graduate experience in Figure 4, which we find to be relatively discouraged when a country becomes more financially developed.

As to entrepreneurship by need, in Figures 5 through 9, we find that Individuals Not Working (Figure 5) benefit from financial development, increasing the rate at which they try new ventures motivated by need in the case of an increase in stock market capitalization but not in the case of an increase in market liquidity (stock value traded/stock market capitalization). As for individual income (Figures 6 and 7), both low income males and females increase their entrepreneurship rate but the coefficients were statistically significant only in the case of the financial indicators net interest margin and market liquidity, and for women entrepreneurs. As for high income individuals, only males respond to financial development by increasing their entrepreneurship rate with significant coefficients, and this increase is captured by all financial indicators. Those with college education (Figure 8) and graduate experience

(Figure 9) do seem to benefit from financial development, whether male or female. The quantitative effect of financial development is higher for the male entrepreneurship rate.

In sum, financial development does affect specific population groups differently, as to their inclination to create new business ventures. It seems that the effect is more significant in the case of entrepreneurship by need and stronger for males than for females.

4. Conclusion

Financial development, though generally encouraging entrepreneurial activity, is unlikely, by itself, to contribute to bring male and female entrepreneurship rates closer together. Moreover, our results suggest that it is entrepreneurship by need that is most affected by financial development, suggesting that the possible more complex aspects of evaluating projects associated with market or technological opportunities are not overcome by aggregate financial development and need more specific measures.

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Appendix – Variables Definition

TEA = 1 if individuals are starting a new business or are owners and managers of a young firm, 0 otherwise. Source: Global Entrepreneurship Monitor (GEM).

TEAOPP = 1 if individuals are starting a new business or are owners and managers of a young firm to take advantage of a business opportunity, 0 otherwise. Entrepreneurship indices - source: Global Entrepreneurship Monitor (GEM).

TEANEC = 1 if individuals are starting a new business or are owners and managers of a young firm because they could find no better economic work, 0 otherwise. Entrepreneurship indices - source: Global Entrepreneurship Monitor (GEM).

AGE.= age of individuals at the time of the interview.

WORKING=individuals who work at the time of the interview.

NOT WORKING=individuals who do not work at the time of the interview (and are not students, not retired, and do not work at home).

RETIRED= individuals who are retired at the time of the interview.

STUDENTS= individuals who are students at the time of the interview.

LOW INCOME=individuals who report that their income is in the lowest 33rd income percentile of their country's income distribution at the time of the interview.

MIDDLE INCOME = individuals who report that their income is in the middle 33rd income percentile of their country's income distribution at the time of the interview.

HIGH INCOME = individuals who report that their income is in the upper 33rd income percentile of their country's income distribution at the time of the interview.

SECONDARY EDUCATION (HIGH SCHOOL) = only individuals with a high school degree.

COLLEGE = only individuals with a college degree.

GRADUATE EXPERIENCE . = only individuals with at least some graduate school education.

PRIVATE CREDIT BY DEPOSIT MONEY BANKS/GDP= Private credit by deposit money banks to GDP, calculated using the following deflation method: $\{(0.5)*[F_t/P_{et} + F_{t-1}/P_{et-1}]\}/[GDP_t/P_{at}]$ where F is credit to the private sector, P_e is end-of period CPI, and P_a is average annual CPI - source: Beck, Demirgüç-Kunt and Levine, (2000) and updates.

NET INTEREST MARGIN= Accounting value of bank's net interest revenue as a share of its interest-bearing (total earning) assets - source: Beck, Demirgüç-Kunt and Levine, (2000) and updates.

STOCK MARKET CAPITALIZATION/GDP= Value of listed shares to GDP, calculated using the following deflation method: $\{(0.5)*[F_t/P_{et} + F_{t-1}/P_{et-1}]\}/[GDP_t/P_{at}]$ where F is stock market capitalization, P_e is end-of period CPI, and P_a is average annual CPI - source: Beck, Demirgüç-Kunt and Levine, (2000) and updates.

STOCK MARKET TOTAL VALUE TRADED/ STOCK MARKET
CAPITALIZATION= Total shares traded on the stock market exchange divided by
stock market capitalization - source: Beck, Demirgüç-Kunt and Levine, (2000) and
updates.

Table 1 : Summary Statistics of Financial Development Indicators

<i>Variables</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Minimum</i>	<i>Maximum</i>
Private Credit by Deposit Money Banks/GDP	0.9604714	0.3834246	0.05319	10.553898
Net Interest Margin	0.034063	0.0211351	0.008943	0.139764
Stock Market Capitalization/GDP	0.882614	0.5653578	0.007727	40.786483
Stock Mkt Total Value Traded/Stock Mkt Capitalization	0.9252373	0.5429359	0.0022796	30.563341

Table 2: Correlation Matrix of Financial Development Indicators

	<i>pcrd</i>	<i>netint</i>	<i>stmk</i>	<i>stval/stmk</i>
Private Credit by Deposit Money Banks/GDP (<i>pcrd</i>)	1.0000			
Net Interest Margin (<i>netint</i>)	-0.6071	1.0000		
Stock Market Capitalization/GDP (<i>stmk</i>)	0.3728	-0.1724	1.0000	
Stock Mkt Total Value Traded/Stck Mkt Capitalization (<i>stval/stmk</i>)	0.3830	-0.3191	0.0839	1.0000

Table 3: Summary Statistics of Individual Characteristics and Entrepreneurship Rates

<i>Variables</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Minimum</i>	<i>Maximum</i>
Entrepreneurship Rate by Opportunity	0.04	0.20	0	1
Entrepreneurship Rate by Necessity	0.01	0.11	0	1
Female	0.53	0.50	0	1
Male	0.47	0.50	0	1
Age	43.32	16.37	14	98
Working	0.56	0.50	0	1
Retired	0.10	0.30	0	1
Not Working	0.23	0.42	0	1
Students	0.05	0.21	0	1
Low Income	0.26	0.44	0	1
Middle Income	0.27	0.44	0	1
High Income	0.20	0.40	0	1
Secondary Education (High School)	0.33	0.47	0	1
College Education	0.22	0.41	0	1
Graduate Experience	0.08	0.27	0	1

Note: Sample size: 414,569 individuals.

Table 4: TEA by Opportunity – Banks

	F_{jt} = Credit Banks/GDP		F_{jt} = Net Interest Margin	
	Female	Male	Female	Male
Age	-0.0005 (0.0001)***	-0.0013 (0.0002)***	-0.0004 (0.0001)***	-0.0009 (0.0001)***
Working	0.0221 (0.0056)***	0.0267 (0.0050)***	0.0182 (0.0034)***	0.0369 (0.0043)***
Students	-0.0064 (0.0048)	-0.0249 (0.0070)***	-0.0090 (0.0036)**	-0.0169 (0.0072)**
Not Working	-0.0013 (0.0068)	-0.0057 (0.0118)	0.0001 (0.0045)	0.0082 (0.0095)
Low Income	-0.0053 (0.0016)***	-0.0183 (0.0033)***	-0.0028 (0.0013)**	-0.0023 (0.0023)
High Income	0.0060 (0.0037)*	0.0098 (0.0074)	0.0066 (0.0018)***	0.0185 (0.0043)***
Secondary Degree	0.0104 (0.0032)***	0.0160 (0.0060)***	0.0020 (0.0014)	0.0078 (0.0036)**
Post Secondary Degree	0.0112 (0.0063)**	0.0293 (0.0097)***	0.0089 (0.0028)***	0.0216 (0.0055)***
Graduate Experience	0.0176 (0.0071)***	0.0451 (0.0121)***	0.0108 (0.0032)***	0.0226 (0.0050)***
F_{jt}	0.0013 (0.0124)	-0.0057 (0.0272)	0.0646 (0.1417)	-0.0118 (0.1587)
F_{jt} *Age	0.0001 (0.0001)	0.0003 (0.0002)*	0.0007 (0.0016)	0.0016 (0.0024)
F_{jt} *Working	-0.0024 (0.0050)	0.0081 (0.0066)	-0.0526 (0.0688)	0.1035 (0.0744)
F_{jt} *Students	-0.0063 (0.0074)	0.0024 (0.0161)	0.0289 (0.0975)	0.2779 (0.1882)
F_{jt} *Not Working	-0.0015 (0.0066)	0.0016 (0.0144)	0.0472 (0.0863)	0.2885 (0.1388)**
F_{jt} *Low Income	0.0016 (0.0018)	0.0127 (0.0034)***	0.0319 (0.0234)	0.1692 (0.0517)***
F_{jt} *High Income	0.0008 (0.0026)	0.0056 (0.0059)	-0.0125 (0.0426)	0.0667 (0.0938)
F_{jt} *Secondary Degree	-0.0051 (0.0027)*	-0.0055 (0.0052)	-0.0657 (0.0292)**	-0.0576 (0.0661)
F_{jt} * Post Sec. Degree	-0.0012 (0.0045)	-0.0063 (0.0069)	-0.0014 (0.0724)	0.0118 (0.1238)
F_{jt} *Grad. Experience	-0.0025 (0.0037)	-0.0097 (0.0064)	-0.0360 (0.0440)	-0.1528 (0.0861)*
Pseudo R ²	0.1103	0.0817	0.1112	0.0820
N. of observations	215292	192161	215114	192223

Note: Significant at 1% (***); 5% (**) and 10% (*). Standard errors in parenthesis adjusted for clustering on country. Net Interest Margin coefficient and interactions multiplied by -1.

Table 5: TEA by Opportunity (Stock Market)

	$F_{jt} = \text{Stock Mkt Cap/GDP}$		$F_{jt} = \text{V.Traded/Stmk}$	
	Female	Male	Female	Male
Age	-0.0004 (0.0001)***	-0.0012 (0.0001)***	-0.0003 (0.0001)***	-0.0010 (0.0001)***
Working	0.0177 (0.0044)***	0.0256 (0.0041)***	0.0222 (0.0037)***	0.0350 (0.0038)***
Students	-0.0119 (0.0031)***	-0.0272 (0.0055)***	0.0015 (0.0056)	-0.0104 (0.0079)
Not Working	-0.0071 (0.0044)	-0.0179 (0.0064)***	-0.0006 (0.0045)	0.0025 (0.0094)
Low Income	-0.0062 (0.0010)***	-0.0101 (0.0031)***	-0.0049 (0.0014)***	-0.0109 (0.0044)**
High Income	0.0097 (0.0028)***	0.0220 (0.0066)***	0.0067 (0.0027)***	0.0124 (0.0052)***
Secondary Degree	0.0047 (0.0022)**	0.0102 (0.0041)***	0.0053 (0.0028)**	0.0094 (0.0042)**
Post Secondary Degree	0.0061 (0.0032)**	0.0167 (0.0054)***	0.0108 (0.0040)***	0.0239 (0.0058)***
Graduate Experience	0.0146 (0.0050)***	0.0268 (0.0070)***	0.0236 (0.0068)***	0.0442 (0.0095)***
F_{jt}	-0.0074 (0.0059)	-0.0248 (0.0097)***	0.0084 (0.0045)*	0.0031 (0.0063)
$F_{jt} * \text{Age}$	0.0000 (0.0001)	0.0002 (0.0001)	0.0000 (0.0001)	0.0000 (0.0001)
$F_{jt} * \text{Working}$	0.0031 (0.0033)	0.0097 (0.0046)**	-0.0025 (0.0035)	-0.0040 (0.0042)
$F_{jt} * \text{Students}$	0.0054 (0.0050)	0.0074 (0.0079)	-0.0216 (0.0070)***	-0.0274 (0.0166)*
$F_{jt} * \text{Not Working}$	0.0068 (0.0043)	0.0183 (0.0078)**	-0.0021 (0.0059)	-0.0090 (0.0080)
$F_{jt} * \text{Low Income}$	0.0029 (0.0013)**	0.0025 (0.0038)	0.0011 (0.0014)	0.0030 (0.0045)
$F_{jt} * \text{High Income}$	-0.0024 (0.0025)	-0.0057 (0.0061)	0.0003 (0.0022)	0.0034 (0.0048)
$F_{jt} * \text{Secondary Degree}$	0.0004 (0.0018)	0.0004 (0.0033)	-0.0005 (0.0022)	0.0009 (0.0042)
$F_{jt} * \text{Post Sec. Degree}$	0.0034 (0.0022)	0.0050 (0.0034)	-0.0011 (0.0029)	-0.0019 (0.0044)
$F_{jt} * \text{Grad. Experience}$	-0.0003 (0.0026)	0.0034 (0.0040)	-0.0066 (0.0030)**	-0.0099 (0.0054)*
Pseudo R ²	0.1105	0.0816	0.1106	0.0816
N. of observations	218175	195175	218175	195175

Note: Significant at 1% (***); 5% (**) and 10% (*). Standard errors in parenthesis adjusted for clustering on country.

Table 6: TEA by Necessity – Banks

	F_{jt} = Credit Banks/GDP		F_{jt} = Net Interest Margin	
	Female	Male	Female	Male
Age	-0.0001 (0.00003)***	-0.0001 (0.00003)***	-0.0001 (0.00002)***	-0.0001 (0.00003)***
Working	0.0055 (0.0014)***	0.0061 (0.0029)**	0.0056 (0.0014)***	0.0117 (0.0019)***
Students	-0.0039 (0.0008)***	-0.0060 (0.0027)	-0.0029 (0.0011)*	0.0041 (0.0070)
Not Working	-0.0007 (0.0023)	0.0088 (0.0088)	0.0024 (0.0020)	0.0134 (0.0073)**
Low Income	-0.0001 (0.0006)	-0.0005 (0.0011)	0.0018 (0.0007)***	0.0026 (0.0015)*
High Income	-0.0026 (0.0003)***	-0.0047 (0.0011)***	-0.0004 (0.0009)	-0.0004 (0.0010)
Secondary Degree	-0.0004 (0.0007)	-0.0020 (0.0012)*	0.0004 (0.0007)	-0.0011 (0.0011)
Post Secondary Degree	-0.0021 (0.0010)*	-0.0042 (0.0016)**	0.0000 (0.0009)	-0.0002 (0.0014)
Graduate Experience	-0.0030 (0.0007)***	-0.0050 (0.0014)***	0.0027 (0.0020)*	0.0011 (0.0024)
F_{jt}	-0.0068 (0.0054)	-0.0156 (0.0068)**	-0.0968 (0.0246)***	-0.1293 (0.0311)***
F_{jt} *Age	0.00001 (0.00003)	0.00002 (0.00003)	0.0001 (0.0003)	0.0001 (0.0005)
F_{jt} *Working	-0.0011 (0.0014)	0.0029 (0.0040)	0.0044 (0.0141)	0.0751 (0.0302)***
F_{jt} *Students	0.0009 (0.0031)	0.0035 (0.0067)	0.0401 (0.0306)	0.2139 (0.0925)**
F_{jt} *Not Working	0.0002 (0.0025)	-0.0032 (0.0065)	0.0445 (0.0208)**	0.0957 (0.0553)*
F_{jt} *Low Income	0.0008 (0.0007)	0.0022 (0.0015)	0.0168 (0.0070)**	0.0170 (0.0159)
F_{jt} * High Income	0.0024 (0.0007)	0.0036 (0.0012)***	0.0176 (0.0127)	0.0407 (0.0203)**
F_{jt} *Secondary Degree	0.0007 (0.0009)***	0.0015 (0.0011)	0.0054 (0.0101)	-0.0075 (0.0197)
F_{jt} * Post Sec. Degree	0.0019 (0.0012)*	0.0034 (0.0019)*	0.0195 (0.0174)	0.0419 (0.0326)
F_{jt} *Grad. Experience	0.0043 (0.0014)***	0.0044 (0.0021)**	0.0726 (0.0216)***	0.0947 (0.0413)**
Pseudo R2	0.1569	0.1011	0.1614	0.1039
N. of observations	215292	192161	215114	192223

Note: Significant at 1% (***); 5% (**) and 10% (*). Standard errors in parenthesis adjusted for clustering on country. Net Interest Margin coefficient and interactions multiplied by -1.

Table 7: TEA by Necessity (Stock Market)

	$F_{jt} = \text{Stock Mkt Cap/GDP}$		$F_{jt} = \text{V.Traded/Stmk}$	
	Female	Male	Female	Male
Age	-0.0001 (0.00002)***	-0.0001 (0.00002)***	-0.0001 (0.00002)***	-0.0001 (0.00003)***
Working	0.0045 (0.0014)***	0.0055 (0.0023)**	0.0063 (0.0013)***	0.0091 (0.0024)***
Students	-0.0035 (0.0008)***	-0.0058 (0.0026)*	-0.0028 (0.0011)*	-0.0034 (0.0030)
Not Working	-0.0023 (0.0016)	0.0003 (0.0040)	0.0009 (0.0020)	0.0101 (0.0062)**
Low Income	0.0011 (0.0007)*	0.0017 (0.0013)	0.0001 (0.0006)	0.0006 (0.0011)
High Income	-0.0017 (0.0006)***	-0.0031 (0.0009)***	-0.0014 (0.0004)***	-0.0040 (0.0008)***
Secondary Degree	-0.0003 (0.0005)	-0.0018 (0.0010)*	-0.0003 (0.0005)	-0.0021 (0.0009)**
Post Secondary Degree	-0.0017 (0.0008)*	-0.0028 (0.0013)**	-0.0018 (0.0007)**	-0.0032 (0.0010)***
Graduate Experience	-0.0008 (0.0014)	-0.0022 (0.0019)	-0.0028 (0.0006)***	-0.0059 (0.0010)***
F_{jt}	0.0014 (0.0026)	-0.0041 (0.0032)	0.0001 (0.0028)	-0.0026 (0.0038)
$F_{jt} * \text{Age}$	0.00001 (0.00002)	0.0000007 (0.00002)	0.000001 (0.00003)	0.00002 (0.00003)
$F_{jt} * \text{Working}$	0.0003 (0.0012)	0.0039 (0.0023)*	-0.0020 (0.0015)	-0.0018 (0.0027)
$F_{jt} * \text{Students}$	-0.0012 (0.0020)	0.0019 (0.0039)	-0.0044 (0.0030)	-0.0038 (0.0045)
$F_{jt} * \text{Not Working}$	0.0027 (0.0013)**	0.0054 (0.0034)*	-0.0021 (0.0024)	-0.0048 (0.0043)
$F_{jt} * \text{Low Income}$	-0.0004 (0.0006)	0.00004 (0.0012)	0.0009 (0.0005)*	0.0011 (0.0011)
$F_{jt} * \text{High Income}$	0.0009 (0.0006)	0.0015 (0.0007)**	0.0004 (0.0007)	0.0025 (0.0008)***
$F_{jt} * \text{Secondary Degree}$	0.0003 (0.0006)	0.0009 (0.0009)	0.0005 (0.0005)	0.0017 (0.0011)
$F_{jt} * \text{Post Sec. Degree}$	0.0011 (0.0009)	0.0012 (0.0013)	0.0015 (0.0009)*	0.0020 (0.0012)*
$F_{jt} * \text{Grad. Experience}$	0.0001 (0.0013)	-0.0002 (0.0015)	0.0038 (0.0012)***	0.0063 (0.0017)***
Pseudo R ²	0.1592	0.1024	0.1588	0.1031
N. of observations	218175	195175	218175	195175

Note: Significant at 1% (***); 5% (**) and 10% (*). Standard errors in parenthesis adjusted for clustering on country.

Figure 1
Financial Development and Entrepr. Rate by Opportunity (TEA OPP)
Age

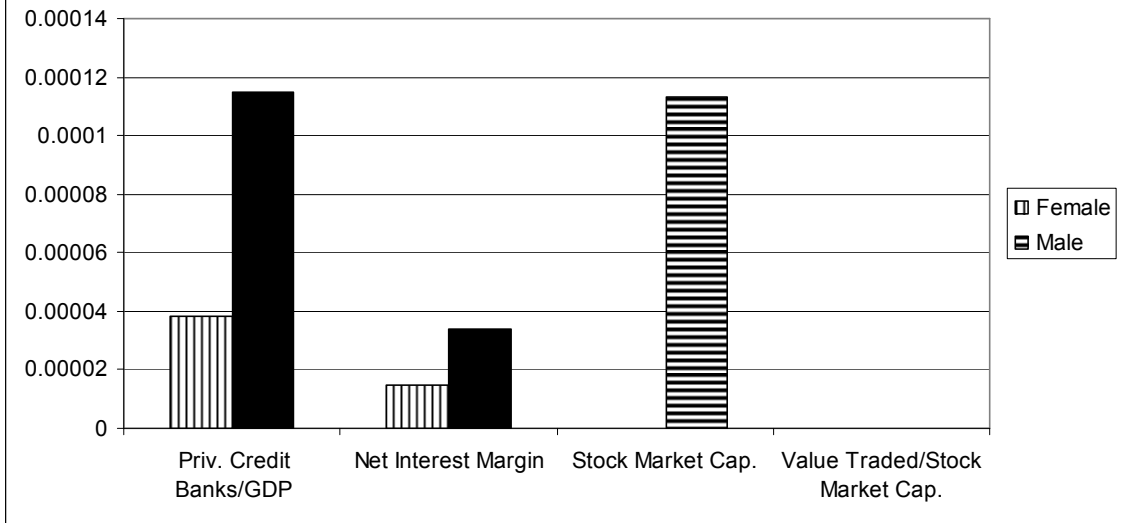
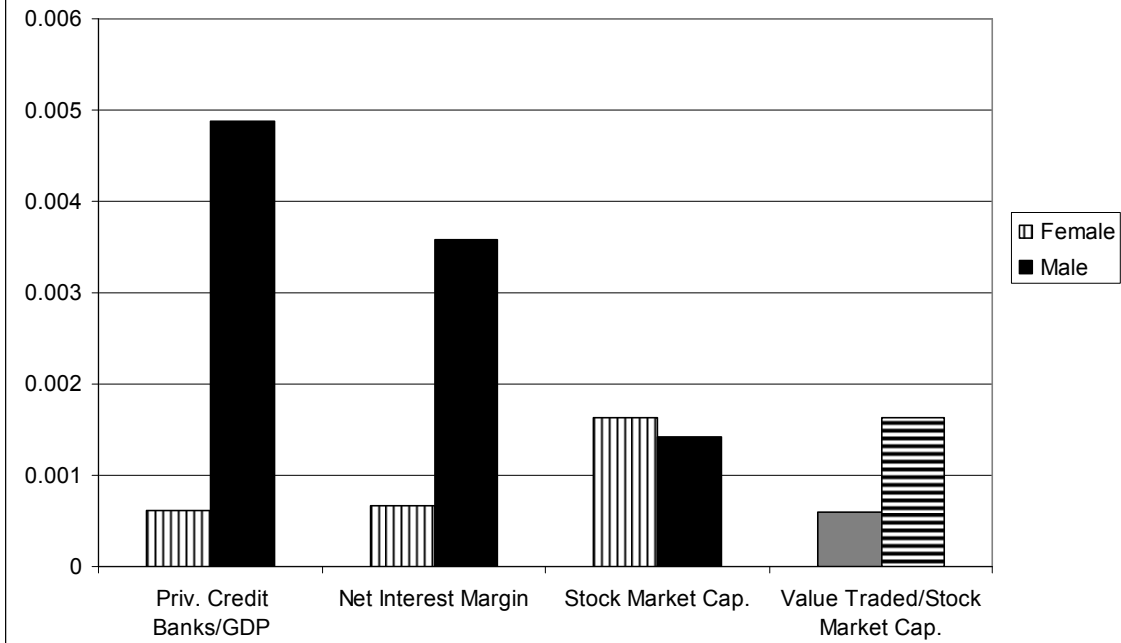


Figure 2
Financial Development and Entrepr. Rate by Opportunity (TEA OPP)
Low Income Individuals



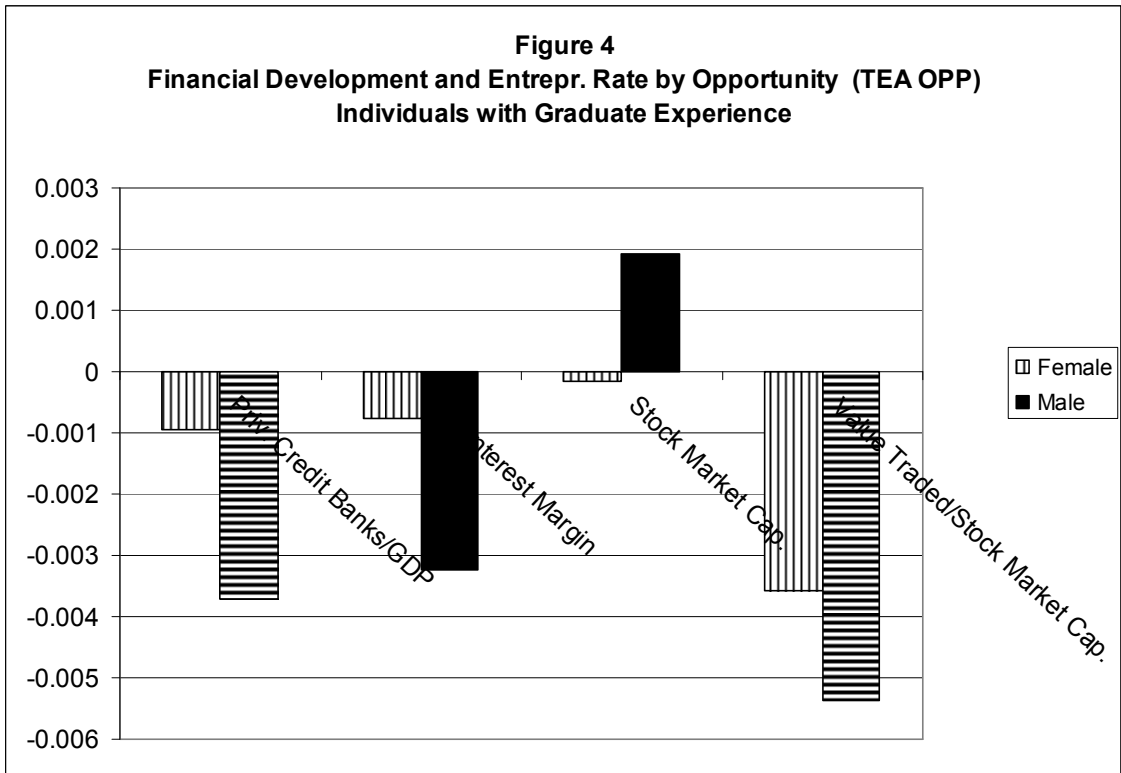
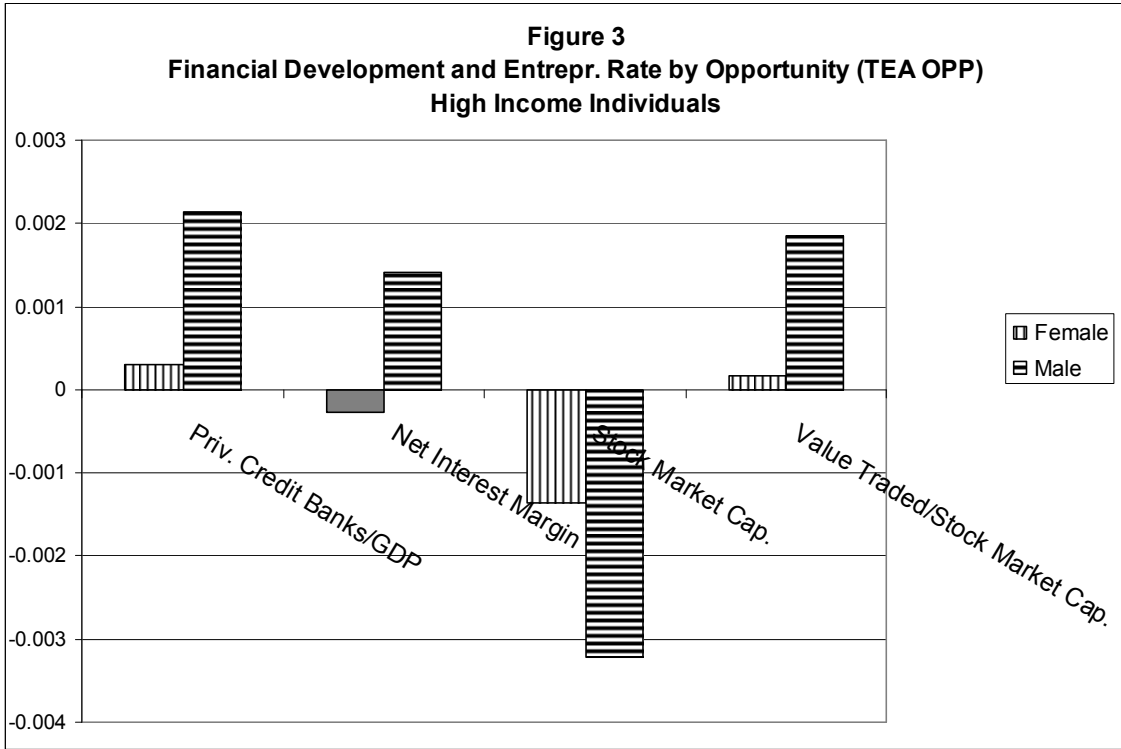


Figure 5
Financial Development and Entrepreneurship Rate by Need (TEA NEC)
Individuals Not Working

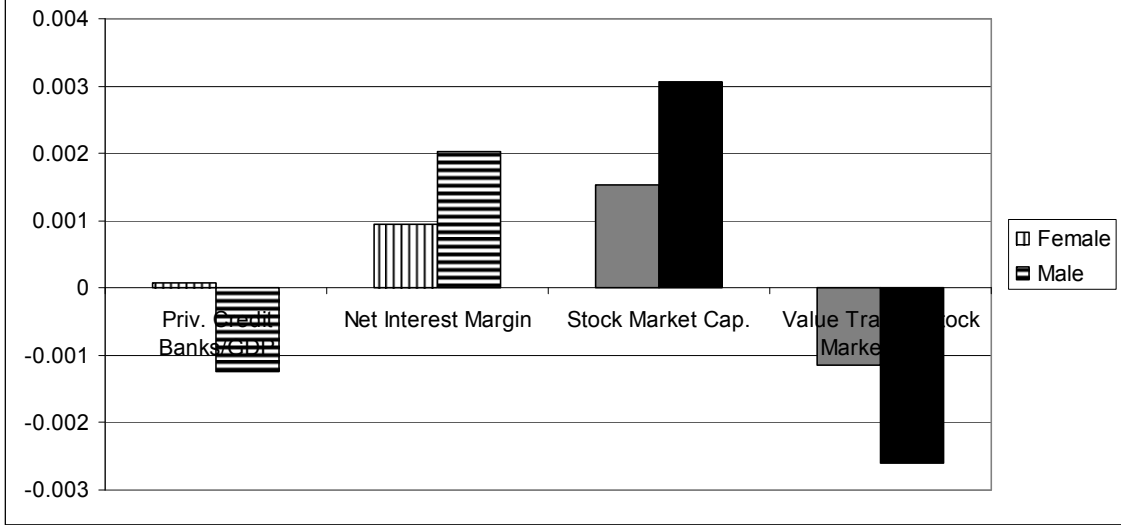


Figure 6
Financial Development and Entrepreneurship Rate by Need (TEA NEC)
Low Income Individuals

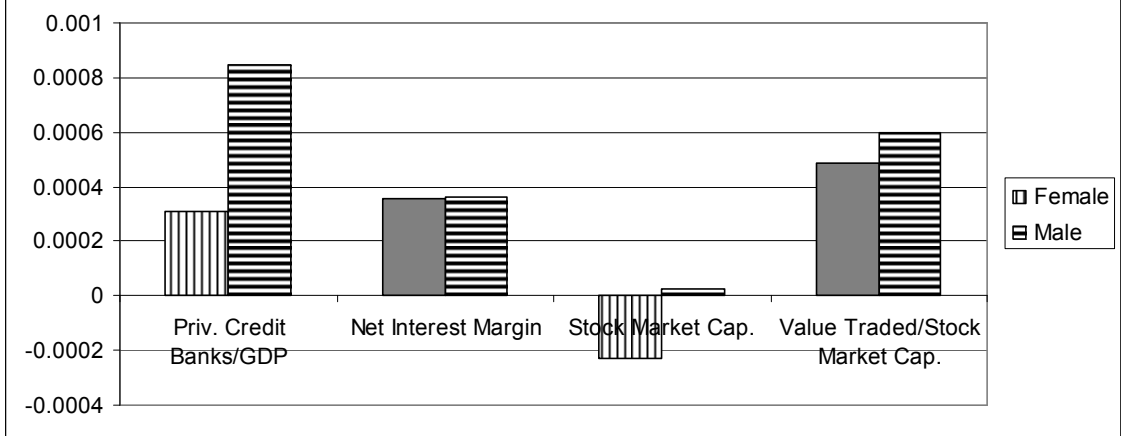


Figure 7
Financial Development and Entrepreneurship Rate by Need (TEA NEC)
High Income Individuals

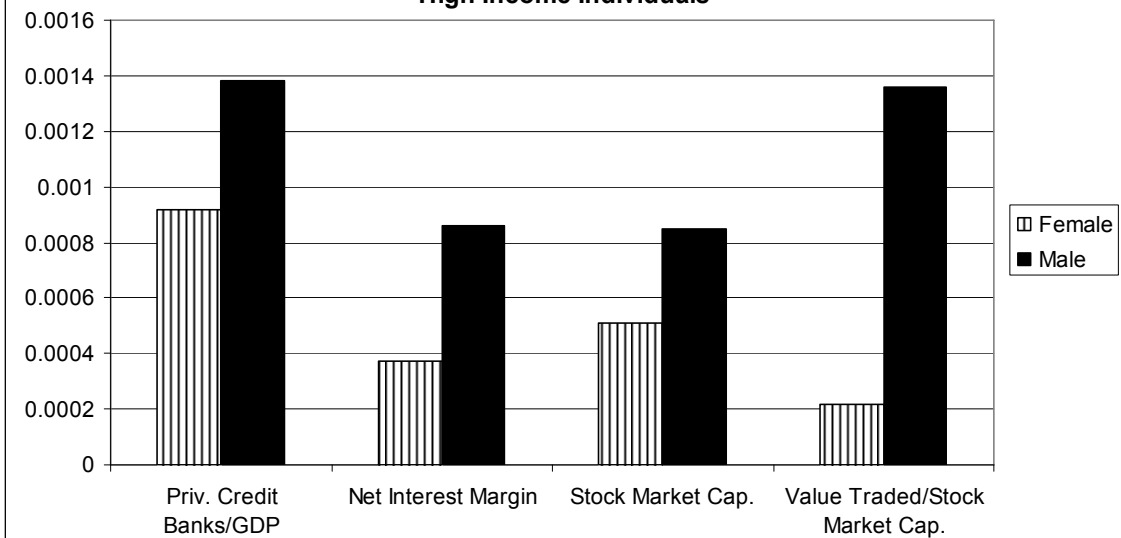


Figure 8
Financial Development and Entrepreneurship Rate by Need (TEA NEC)
Individuals with College Education

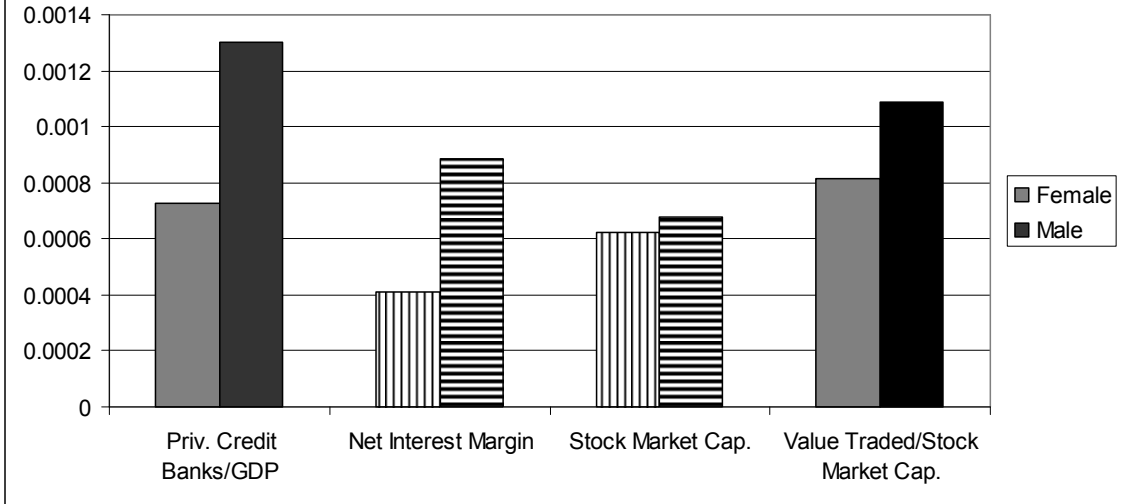


Figure 9
Financial Development and Entrepreneurship Rate by Need (TEA NEC)
Individuals with Graduate Experience

