Effect of Financial Efficiency on Creation of New Enterprises

Seungwon Lim
University of British Columbia 2329 West Mall Vancouver, BC Canada
Vancouver School of Economics 6000 Iona Dr, Vancouver, BC Canada

Professor Michal Szkup

Abstract:

How do financial systems affect creation of new enterprises? I empirically address this question by addressing two financial efficiency indicators that affect the creation of enterprises along with macroeconomic variables that explain the creation of enterprises. Bigger size of financial systems increases the number of new enterprises established. Similarly, more inaccurate financial system increases the number of new enterprises established in the developing countries. Banks in developing countries react to decrease in evaluation accuracy by increasing loan provision whilst banks in developed countries react by becoming more conservative in loan provision. Such contrasting evidence suggests that financial systems in both developed and developing countries adopt same strategies in regard to size of credit, but adopt different strategies in regard to degradation in the evaluation accuracy.

Key words: Financial Efficiency, Enterprise, Economic Growth

Table of Contents

1. Introduction **2**

2. Literature review **3**

3. Empirical Strategy **6**

4. Data Preview **7**

4.1 Main Variables 7

4.2 Control Variables 8

4.3 Raw Correlation **10**

5. Empirical Result **12**

5.1 Statistical Examination 12

5.2 Baseline Regression Analysis 14

5.3 Alternative Regression Analysis 14

5.4 Instrumental Variable Strategy 16

6. Robustness **17**

6.1 2008 Financial Crisis: 17

6.2 Comparison between Developed and Developing countries 19

7. Conclusion **21**

References **22**

1. Introduction

There are many explanations that highlight the salience of entrepreneurship in promoting economic growth. One most commonly introduced explanation is the effect of entrepreneurship on the economic growth through job creation, which reduces unemployment. Geroski et al. (1993) note that entrepreneurship may increase productivity by increasing competition. Extending from job creation, entrepreneurship can positively contribute to labor allocation efficiency since profit maximizing and progressive enterprises have knowledge in how to best allocate their labors. Another salient benefit of entrepreneurship on economic growth is through a facilitation of innovation. Entrepreneurship may introduce important innovations through engaging in research and development noted by (Acs and Audretsch, 2003). Often, entrepreneurs start the early evolution of industries, which shapes our consumption pattern. Successful entrepreneurs like Thomas Edison, Henry Ford, Bill Gates have contributed in shaping modern consumption basket of goods in developed economies which consequently influenced the consumption basket of goods in developing countries as well (Van Stel et al.,2005). Furthermore, it is needless to say that entrepreneurship contributes positively to international trade by helping to achieve competitive advantage while adding variety in goods and services, which can decrease the volatility of terms of trade. As far as considering technological advancement into a macroeconomic analysis, understanding the nature of an entity who perceives and integrates the ideas and resource to carry out the innovation is a salient factor to consider.

However, note not all the entrepreneurs are given with sufficient endowment to start their enterprises independently. Especially in a developing country, a low GDP per capita suggests that very few prospective entrepreneurs are able to fund their own enterprises. Alternatively, a majority of entrepreneurs use borrowing and investment opportunities in order to start their ventures. Therefore, financial intermediary plays a salient role in facilitating the creation of enterprises. Subsequently, it is then a logical argument that efficiency in the financial sectors will reflect the number, size, and qualities of new enterprises.

Therefore, I ask to what extent and how does efficiency in financial system affects the creation of enterprises in developing countries. I approach this question with an expectation in a correlation between financial efficiency and creation of new enterprises. Furthermore, part of the hypothesis of this paper states that financial efficiency has a positive association with the creation of new enterprises as better access to credit will promote the greater scale of creation.

It may first appear obvious that an increase in the financial efficiency should positively correlate with the creation of enterprises as intermediaries become more accessible to prospective entrepreneurs. However, further reasoning counters this intuition: Financial intermediaries may become better at evaluation and more rigorously assess the loan applications, rejecting more prospective entrepreneurs who seek loans to fund their enterprises. Thus, the hypothesis also states that financial efficiency, in terms of rigorousness, will reduce the number of new enterprises.

2. Literature review

In considering the effect of financial efficiency on the creation of new enterprises, there have been number of relevant studies that must be examined. First, financial efficiency can be defined by many concepts. One prominent way to identify financial efficiency is the size of credit provision. King and Levine (1993) use credit issued to private enterprise as a proxy to measure the effect of development in the financial sector on entrepreneurship. King and Levine (1993) argue that productivity growth through entrepreneurial activity is the result of rational investment decision and thus productivity growth is intertwined with financial intermediation. Despite the fact that King and Levine (1993) point out the influence of financial institutions on evaluating and funding the entrepreneurial activity, their empirical work lacks the variable that directly measures the number of enterprises established. Furthermore, the size of financial intermediaries, along with other several variables that measure the proportion of private credit, is not complete to be defined as financial efficiency in my research. However, the notion of financial intermediaries choosing the most promising projects, suggested by King and Levine (1993), constructs the frame of this research.

Following King and Levine (1993), Peek and Rosengren (1995) explore the importance of the size of the lender on small businesses. Peek and Rosengren (1995) state that small banks are the major credit provider of small business, and that larger and diversified banks tend to focus much less on small business lending. This would be interesting to explore further if the correlation between the size of credit and creation of enterprise is positive as it would confirm the notion that small size of credit in developing countries tend to increase the number of small enterprises. Although this notion has to assume that developing countries tend to have a small size of credit, it would be intuitive since developing countries have low income and thus low saving.

Evidence of a relationship between financial intermediaries and creation of enterprises can be found in deregulation of the banking sector as reported by Black and Strahan (2002). Black and Strahan (2002) found a significant increase in the rate of new incorporations following deregulation. Notably, as banking markets become more open to competition, the rate of new business incorporation increases. Therefore, consolidation and disappearance of small banks create competitive banking sector which then increases the creation of new enterprises.

Research by Bettignies and Brander (2007) examine the choice of an entrepreneur between venture capital finance and bank finance in starting an enterprise. Bettignies and Brander (2007) report that venture capital tends to be preferred to bank finance when venture capitalist productivity is high and entrepreneurial productivity is low. Thus, in the case of developing countries for my research, Foreign Direct Investment should be taken into account since, in expectation, entrepreneurial productivity is relatively low in developing countries compared to foreign venture capitalist productivity from developed countries.

Berger et al.(2002)'s model suggests that small banking system may possess managerial simplicity, less coordination problem and superior relationship with borrowers, relative to other banking organizational structure. This, in turn, allows the small banks to resolve the contracting problems associated with lending, which implies that small banks tend to be more efficient. Although Berger et al. (2002) support the model with some empirical evidence provided by other studies, such as Haynes et al. (1999), there is no empirical evidence independently provided by Berger et al. (2002). Therefore, I consider this research with much caution. Nevertheless, Berger et al. (2002)'s model introduces the dynamic of default and contract issues between lenders and borrowers.

Up to this point, most of the works of literature focus on the size of credit provision as an indicator of financial efficiency with few attempts at measuring the accuracy of the banking system. Therefore, I attempt to introduce a proxy that measures the accuracy level of loan assessment which may consolidate the definition of financial efficiency further. Additionally, it is important to understand the potential variables that can affect the financial efficiency and enterprises.

Naudé et al.(2008) hypothesized that unemployment rate can be a profound motivation to start an enterprise but found unemployment rate to be insignificant in explaining the number of new enterprises. As an explanation for this finding, Naudé et al.(2008) suggest that insignificance of unemployment rate may imply start-ups in South Africa are mainly opportunity driven as

opposed to necessity driven. I will thus revisit the significance level of unemployment rate in the data analysis part of this research to observe whether the result for rest of developing countries aligns with that of South Africa.

Djankov et al.(2010)'s findings of large negative correlation of taxes and positive correlation of openness to trade on the entrepreneurial activity are well aligned with economic reasoning. Notably, Djankov et al.(2010) found insignificance in institutional variables, such as Law rigidity and procedure to start a business index, in explaining the entrepreneurial activity among the OECD countries. Nevertheless, I intend to include institutional variables in my analysis as they may have a different effect on the creation of enterprises for developing countries.

Thai and Turkina (2013) argue that GDP per capita reflect the demand side of an economy while associating with economic profitability that an enterprise can benefit from. Consequently, GDP per capita can reflect the available resource that a prospective entrepreneur can possess. This then may play a role in capturing the variation from resourceful and wealthy prospective entrepreneurs who do not need access to banking system.

Mohtadi and Agarwal (2001) accentuate the inclusion of stock market capitalization. Indeed, a prospective entrepreneur may not only receive fund from banks but also from private investors, which Bettignies and Brander (2007) also pointed out. However, since my research focuses on developing countries, I expect private investment will most likely to be facilitated through foreign direct investment.

Munnell et al. (1990) found a robust positive relationship between public capital investment and private sector output. Furthermore, the magnitude of the coefficient on public capital implies the same marginal productivity as for private capital. One thing to note from Munnell et al. (1990)'s study is the evidence of substitution between public capital and private capital. It implies that increment in total liquidity and investment fund will leave an ambiguous sign of capital accumulation on economic growth. Substitutability in variables is further cautioned by Beck, Levine, and Loayza (2000). Beck, Levine, and Loayza (2000) note real interest has both negative substitution and positive income effect on consumption, leaving an ambiguous sign in saving.

Finally, Ivashina and Scharfstein (2010) report the substantial decline of new lending across all types of loans during the financial crisis, implying that size of credit at this particular

year of 2008 and after, would be abnormally reduced. Thus 2008 financial crisis should be controlled in my analysis as the number of new enterprises must have been affected.

3. Empirical Strategy

In answering my question, I rely on the Schumpeterian model of financial intermediation introduced by King and Levine (1993). The schumpeterian model assumes some individuals have capability and endowment, initially unknown, to start their enterprises. Thus, there exists fixed cost in evaluating the probability of success in enterprises which incentivizes the specialized organization, a bank, to perform such task. There also exists necessity of pooling the resource from small savers and mobilizing sufficient resources for enterprises as an internal resource of prospective entrepreneur alone is unlikely to be sufficient. Finally, the potential outcome of the enterprise is monopoly profit generated by innovation and motivates the use of risk diversification by intermediaries due to its uncertainty.

In measuring the effect of financial efficiency on the creation of enterprises, my dependent variable is Number of New Business Registered. World bank offers data for Number of New Business Registered, which can directly measure the creation of enterprises and additionally offer data for main explanatory variables, including Domestic Credit Provided to the Private Sector and Non-Performing Loan Ratio, from 2000 to 2017 over 98 developing countries. Non-Performing Loan Ratio is a fraction value of default loans over total value of loans distributed. Thus, following the theoretical basis of the Schumpeterian model, Non-performing loan measures the accuracy of evaluation in prospective entrepreneurs' unknown ability. Therefore, more accurate evaluation in prospective entrepreneurs by the lenders prevent accumulation of non-performing loan. Domestic Credit Provided to Private Sector measures the provision scale of loans to private enterprises.

Combined, I run a linear regression, including several control variables that may have an impact on the entrepreneurial activity, suggested by the previous literature. This will be my baseline model. Consequently, I interpret the correlation sign and examine the significance level of each main explanatory variable. In particular, I observe whether the sign of correlation and the statistical significance of Domestic Credit Provided to the Private Sector align with the finding of King and Levine (1993) and my initial hypothesis.

Furthermore, the ambiguous sign of the correlation between non-performing loan ratio and the creation of enterprise will play a key role in explaining how evaluation accuracy affects the creation of new enterprises.

More advanced quantitative techniques, Instrumental Variable Strategy, will address potential endogeneity issues may arise in my baseline model. In addressing omitted variable bias, I intend to construct an alternative model with additional variables included. As a result, I aim to draw causality between financial efficiency and the creation of enterprises.

4. Data Preview

Table 1
Summary Description: All variables

Variable	Description	Source
EN	New businesses registered (number)	World Bank
NPL	Bank nonperforming loans to total gross loans (%)	International Monetary Fund
PRIVATEY	Domestic credit to private sector (% of GDP)	International Monetary Fund
COST	Cost of business start-up procedures (% of GNI per capita)	World Bank
RULE	Rule of Law	The WorldWide Governance Indicators
TRADE	Total Trade over GDP: Export + Import/GDP (%)	World Bank
CAPITAL	Gross capital formation (% of GDP)	World Bank
INF	Inflation, consumer prices (annual %)	International Monetary Fund
INT	Real interest rate (%)	International Monetary Fund
TAX	Total tax rate (% of commercial profits)	World Bank
GDPPC	GDP per capita, PPP (constant 2011 international $)	World Bank
EDUC	Adjusted savings: education expenditure (% of GNI)	World Bank
UNEMPLOY	Unemployment, total (% of total labor force) (national estimate)	World Bank
REGULAT	Regulatory Quality	The WorldWide Governance Indicators
EFFE	Government Effectiveness	The WorldWide Governance Indicators
FDI	Foreign direct investment, net inflows (% of GDP)	International Monetary Fund
TARIFF	Tariff rate, applied, simple mean, all products (%)	World Bank
CELL	Mobile cellular subscriptions	International Telecommunication Union
INTERNET	Individuals using the Internet (% of population)	Netcraft

4.1 Main Variables

EN refers to the dependent variable. Its mean of 31839.7 suggests around 31840 new businesses are registered across the developing countries. Note that EN is right skewed with its mean about three times greater than its median. Thus, there is a possibility of EN containing outlier. Note that log transformation of EN simplifies the interpretation. Instead of the number of enterprises registered, interpretation as a percentage will aid in understanding the scale of impact that financial efficiency indicators have on the creation of enterprises. Main explanatory variables, NPL and PRIVATEY both have similar number of observations. However, lower number of observations in EN variable will reduce down the matching number of observations.

Table 2
Summary Statistic: All variables

Variable	n	Mean	S.D.	Min	0.25	Mdn	0.75	Max
EN	431	31839.7	64901.9	14.0	3021.0	9884.0	38106.0	460000.0
NPL	692	6.3	4.9	0.0	2.7	4.2	9.2	24.6
PRIVATEY	683	41.3	30.7	3.6	19.4	33.8	51.3	156.7
COST	634	35.1	44.7	0.1	7.1	18.8	45.2	317.1
RULE	2131	2.1	0.7	0.0	1.6	2.0	2.5	4.0
TRADE	676	81.1	34.5	21.1	53.2	74.1	105.4	203.9
CAPITAL	2008	24.0	10.6	0.0	18.3	22.7	28.1	147.9
INF	627	5.7	5.1	-8.1	2.9	5.0	7.5	59.2
INT	573	7.2	8.9	-42.3	2.9	6.3	9.9	52.3
TAX	628	47.2	39.3	0.4	30.6	38.2	50.1	285.9
GDPPC	692	9147.6	6556.2	721.2	3829.8	7484.1	13485.0	35632.1
EDUC	2112	4.1	2.7	0.3	2.6	3.6	5.0	23.6
UNEMPLOY	453	8.9	7.6	0.2	4.1	6.8	10.0	36.0
REGULAT	2121	2.1	0.7	0.0	1.7	2.2	2.6	3.9
EFFE	2121	1.9	0.6	0.0	1.5	1.9	2.3	3.7
FDI	2233	4.7	8.5	-56.5	1.3	3.1	5.8	217.9
TARIFF	1603	10.4	5.4	0.0	6.3	10.6	13.2	37.5
CELL	2291	22000000.0	93000000.0	0.0	260000.0	2300000.0	10000000.0	1400000000.0
INTERNET	2251	15.7	17.7	0.0	2.1	8.0	24.4	78.8

NPL and PRIVATEY are right skewed as well but not as much as EN. Mean of NPL suggests that about 6.3% of total value of loans in developing countries are overdue or defaulted, which reflects the inaccuracy of banking system. Interesting note about NPL is its minimum and maximum value. The percentage of non-performing loan can be as low as zero, implying that there are no defaulted or overdue loans in the economy, which is skeptical since it is difficult to expect a perfect accuracy in any banking system. This is could be due to an inaccurate collection of data. For maximum value of NPL, developing country can be as high as 24.6%, suggesting that worst financial sector can expect 75.4% chance of getting their debt paid back. PRIVATEY's average suggests that little less than half of all credit is provided to private sector in the developing countries. Note that institutional variables, RULE, REGULAT are indexed and range from -2.5 for the worst and 2.5 for the best performance. However, for the purpose of interpretation in the regression, the negative value of rating can be misguiding. Thus, I reparametrize each institutional variable by adding the value of its minimum to neutralize the negative values. Consequently, maximum value and average are scaled up by its minimum value. Reparameterizing by adding a constant value will not have any impact on the coefficients of regressors, while only scaling up the intercept.

4.2 Control Variables

Cost of registering Business, such as time opportunity cost is a specific barrier to the creation of enterprises apart from other economic factors. Therefore, the purpose of this variable is to capture hidden cost that entrepreneurs respond in the direct stage of entry, that cannot otherwise be captured by included control variables in the regression.

Rule of Law is an index variable that controls for institutional factor which can help creation of new enterprises. Rule of Law specifically captures the effect of property right and contract enforcement on the creation of enterprises. With property right enforced, enterprises can save substantial cost from assurance in ownership of company's assets, resolving disputes and contractual friction, which are indicators of low cost business operation and ease in the establishment of new enterprises.

Trade Volume is a measurement of extent of country's exporting and importing value over its GDP. The openness to trade can hinder the creation of new enterprise due to competition with foreign goods. Also trade can potentially contribute positively by providing export opportunity.

Capital Formation is a fraction of GDP devoted to additional fixed assets that have a direct relationship with the construction of infrastructure. Infrastructure investment is an indicator of mobility of final goods, labor, and raw materials. Such factor then influences the profitability of firms in an economy, which motivates entry of new enterprises.

Inflation, to some extent, reflects overall excess demand in goods and services. Thus, demand-pull inflation, in turn, should reflect profit opportunity for enterprises, which can result in an increase in the number of new business.

Interest Rate can affect the creation of new enterprise as it influences the decision to save or borrow and subsequently influence prospective entrepreneurs' decision to borrow in order to fund their enterprises. Note that a rise in interest rate may increase the credit availability from a rise in saving.

TAX is a tax on commercial profit. Thus, *TAX* can discourage the creation of new enterprises.

GDP Per Capita is an endowment measure for each individual of a country. As higher GDP Per Capita or richer an individual in an economy is, it is more likely to demand greater quantity and variety of goods, which motivates more creation of the enterprise.

Education delivers management skill, idea and necessary knowledge to start a venture. The variable of education expenditure not only captures provision of knowledge spillover but also the quality of knowledge transferred to individuals.

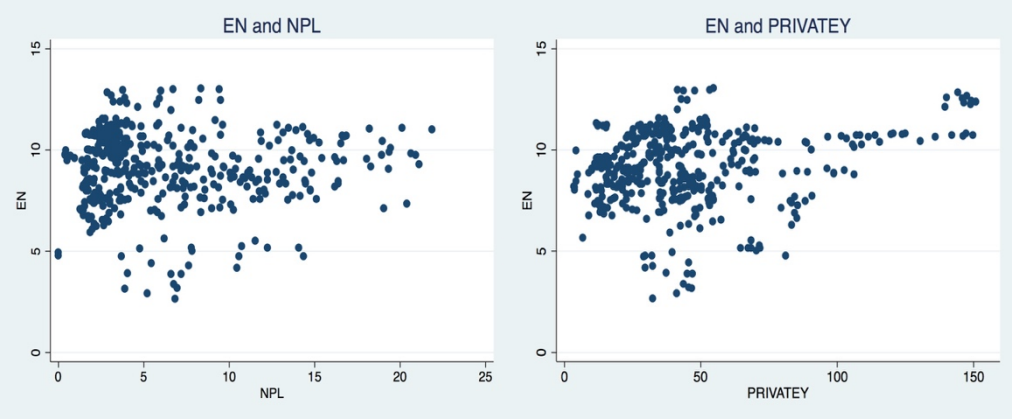
Unemployment is a factor that can indicate the availability of labor that an enterprise requires to produce goods and services. At the same time, it can indicate motivation to be self-employed which may affect the number of new enterprises.

In the next section, I examine the raw correlation of all variables discussed above.

4.3 Raw Correlation

Referring to Table 3, I study the rough relationship between dependent and independent variables. Reminding that initial hypothesis was a negative correlation between EN and NPL, this raw correlation result supports the initial hypothesis. However, the magnitude of correlation suggests almost no correlation between EN and NPL exist. PRIVATEY, the size of credit shows positive and moderate correlation with EN. Visualization of the correlation between EN and NPL also shows weak and ambiguous correlation while visualization of the correlation between EN and PRIVATEY shows moderate and positive correlation.

Graph 1
Plot of dependent variable against main explanatory variables



Note: This visual presentation is produced after elimination of outliers Figure with outliers will be introduced in the following section

Table 3

Correlation between baseline variables

	EN	NPL	PRIVATEY	COST	RULE	TRADE	CAPITAL	INF	INT	TAX	GDPPC	EDUC	UNEMPLOY	REGULAT	EFFE	FDI	TARIFF	CELL	INTERNET
EN	1																		
NPL	-0.0031	1																	
PRIVATEY	0.3947	-0.0367	1																
COST	-0.1911	-0.32	-0.2793	1															
RULE	0.0344	-0.0893	0.5794	-0.3458	1														
TRADE	-0.2197	0.1815	0.4154	-0.1969	0.2682	1													
CAPITAL	-0.1464	-0.0274	-0.0347	-0.3285	0.0571	0.3156	1												
INF	0.0408	-0.0508	-0.1879	0.0027	-0.3115	0.0415	0.1402	1											
INT	-0.0721	0.0819	-0.1294	0.0872	-0.0351	-0.2277	-0.167	-0.5393	1										
TAX	-0.0166	-0.2617	-0.2383	0.2453	-0.3065	-0.4219	-0.1125	0.2425	-0.2023	1									
GDPPC	0.2839	-0.1028	0.4431	-0.3384	0.4602	0.1862	0.0867	0.0108	-0.3318	0.1374	1								
EDUC	0.0543	0.0704	0.2152	-0.0691	0.1091	0.2428	-0.0992	0.0984	-0.1148	0.1217	0.0108	1							
UNEMPLOY	0.1394	0.1668	0.0451	-0.3255	0.1803	-0.1026	0.033	-0.1614	0.068	-0.363	-0.1009	0.0594	1						
REGULAT	0.057	-0.083	0.4864	-0.382	0.7771	0.2442	0.0516	-0.4529	0.1194	-0.471	0.3223	-0.111	0.2747	1					
EFFE	0.1315	-0.1404	0.6117	-0.3365	0.8722	0.2824	0.0495	-0.3646	-0.1469	-0.2128	0.5997	0.0074	0.1265	0.7756	1				
FDI	-0.2299	-0.0688	-0.0584	-0.187	0.0915	0.2962	0.4576	0.0575	0.0107	-0.1507	-0.0387	0.0168	0.082	0.2761	0.058	1			
TARIFF	0.0139	-0.1764	-0.1369	0.4211	-0.3519	-0.3402	-0.0572	0.1589	-0.0178	0.4886	-0.1351	-0.0689	-0.2636	-0.5885	-0.3821	-0.2559	1		
CELL	0.4844	-0.0762	0.1018	-0.0354	-0.1631	-0.4058	-0.2409	0.0418	0.0396	0.2189	0.1518	-0.0717	-0.2231	-0.218	-0.0658	-0.3363	0.3601	1	
INTERNET	0.211	0.1215	0.2357	-0.3466	0.277	0.1503	-0.0626	-0.1033	-0.1081	-0.0263	0.6174	0.0563	0.0471	0.2701	0.3651	-0.1241	-0.2944	0.1105	1

5. Empirical Result

The first step in the empirical analysis is the estimation of regression equation. Here, I define the baseline regression as following, where *i* denotes country and *t* denotes year:

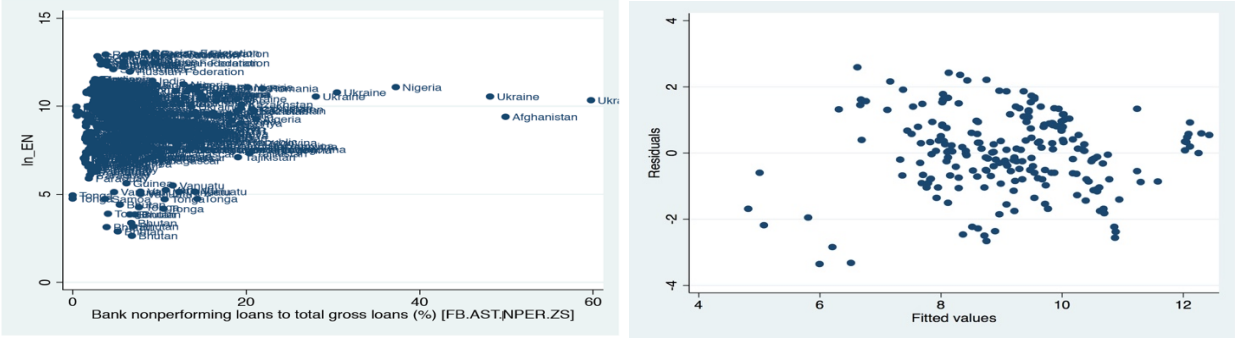
$$Log(EN)_{i,t}=\alpha_{i,t}+\beta_1 NPL_{i,t}+\beta_2 PRIVATEY_{i,t}+\beta_3 COST_{i,t}+\beta_4 RULE_{i,t}+\beta_5 CAPITAL_{i,t}+\beta_6 TRADE_{i,t}+\beta_7 INF_{i,t} +\beta_8 INT_{i,t}+\beta_9 TAX_{i,t}+\beta_{10} GDPPC_{i,t}+\beta_{11} EDUC_{i,t}+\beta_{12} UNEMPLOY_{i,t}+\varepsilon_{i,t}$$

According to the hypothesis, the expected sign of β_1 is negative. This is due to the reasoning that an increase in accuracy of financial sector implies an improvement in efficiency which results in more loan provision. Thus the less non-performing loan circulate in an economy, the more enterprises will be created. On the other hand, the expected sign of β_2 is positive since the greater credit availability will facilitate greater flow of loan provided to the entrepreneurs.

5.1 Statistical Examination

I provide statistical checks on my data while addressing aforementioned outlier issue and heteroscedasticity.

Graph 2
Outliers and Residual vs Fitted plot



Five obvious outliers, Nigeria, Ukraine, Afghanistan and across time, are dropped. In addition, I used robust standard error due to the strong evidence for heteroscedasticity in my baseline model.

Table 3
Creation of Enterprises and Financial Efficiency

	(1)	(2)	(3)	(4)	(5)	(6)
	Baseline Model	Alternative Model	IV: Lag t=1	IV: Lag t=2	IV: Lag t=3	A. Model IV: Lag t=1
Dependent Variable:	log(EN)	log(EN)	log(EN)	log(EN)	log(EN)	log(EN)
NPL	0.0374	0.0932***	0.0454	0.0695*	0.108*	0.111***
(Non Perofrming Loan Ratio)	(1.63)	(4.70)	(1.77)	(2.13)	(2.49)	(4.23)
PRIVATEY	0.0243***	0.0192***	0.0228***	0.0238***	0.0269***	0.0174***
(Size of Private Credit)	(11.81)	(7.39)	(11.72)	(10.67)	(9.50)	(6.49)
COST	-0.0266**	-0.00394	-0.0261**	-0.0233*	-0.0138	-0.00200
(Cost of Startup)	(-3.04)	(-0.54)	(-2.98)	(-2.30)	(-1.29)	(-0.26)
RULE	-1.250***	-1.794***	-1.217***	-1.245***	-1.291***	-2.042***
(Rule of Law)	(-4.96)	(-5.24)	(-4.52)	(-4.28)	(-3.79)	(-5.48)
TRADE	-0.0206***	-0.0157***	-0.0212***	-0.0221***	-0.0269***	-0.0150***
(Total Trade flow)	(-5.12)	(-3.95)	(-5.19)	(-5.13)	(-5.74)	(-3.80)
CAPTIAL	-0.0718***	-0.0103	-0.0719***	-0.0633***	-0.0458**	-0.0108
(Captial Formation)	(-5.42)	(-0.61)	(-5.47)	(-4.33)	(-2.78)	(-0.56)
INF	-0.0215*	0.0235	-0.0305**	-0.0290*	-0.0421	0.0277*
(Inflation)	(-2.00)	(1.68)	(-2.75)	(-2.11)	(-1.39)	(1.99)
INT	-0.0486***	-0.0334*	-0.0552***	-0.0515***	-0.0552***	-0.0298*
(Real Interest Rate)	(-3.73)	(-2.38)	(-4.36)	(-4.05)	(-3.87)	(-1.99)
TAX	-0.00878	0.00627	-0.0115	-0.00969	-0.0105	0.00632
(Total Tax Rate)	(-1.47)	(1.20)	(-1.88)	(-1.48)	(-1.41)	(1.06)
GDPPC	0.0000827***	0.00000724	0.0000831***	0.0000810***	0.0000890***	0.00000182
(GDP per capita)	(4.16)	(0.34)	(4.13)	(3.61)	(3.39)	(0.09)
EDUC	-0.0734	-0.0213	-0.0502	-0.0424	0.000373	0.00612
(Education Expenditure)	(-1.46)	(-0.44)	(-0.92)	(-0.71)	(0.01)	(0.12)
UNEMPLOY	-0.0142	-0.00706	-0.0188	-0.0182	-0.0232	-0.00590
(Unemployment)	(-1.22)	(-0.64)	(-1.55)	(-1.30)	(-1.45)	(-0.52)
REGULAT		1.057*				1.168**
(Regulation Quality)		(2.49)				(2.78)
EFFE		1.006*				1.312**
(Government Effectiveness)		(2.52)				(3.09)
FDI		-0.0231				-0.0463
(Foreign Direct Investment Inflow)		(-0.56)				(-1.05)
TARIFF		-0.0513				-0.0457
(Tariff Rate)		(-1.75)				(-1.43)
CELL		9.39e-09***				9.68e-09***
(Mobile Subscription)		(4.65)				(4.89)
INTERNT		0.00129				0.00155
(Indiv. Internet Usage)		(0.25)				(0.30)
No. Observations	220	198	200	173	146	179
R2	0.581	0.661	0.582	0.563	0.534	0.666
F	-	-	900	230	51	1549

t statistics in parentheses
="* p<0.05 ** p<0.01 *** p<0.001"

5.2 Baseline Regression Analysis

In examining the Baseline Model (1), notice the positive coefficient of PRIVATEY approves the hypothesis of this study and the finding by King and Levine (1993). The coefficient of PRIVATEY implies that every 1% (GDP) increase of credit provided to private enterprises associates with 2.43% increase in the creation of new enterprises. Moreover, PRIVATEY is statistically significant. On the other hand, the positive coefficient of NPL disapproves the hypothesis of this study. Although its magnitude is similar to that of PRIVATEY, it is not statistically significant. In comparison, the coefficient magnitudes of main explanatory variables are moderate relative to standard explanatory variables. Finding of statistically insignificance of UNEMPLOY variable aligns with the finding by Naudé et al.(2008), suggesting that creation of enterprise is likely to be opportunity driven, not necessity driven in the developing countries. Statistically significant and negative coefficient of INT suggests that saving motive overpowers the rise in credit availability effect on the creation of new enterprises. Furthermore, statistically significant and negative coefficient of TRADE suggests that openness to trade discourages the creation of enterprises through increasing competition with imported goods and services, rather than encouraging through promoting domestic export.

Until this point, there seems to be no evidence of financial accuracy having an impact on the creation of new enterprises. Moreover. among the statistically significant variables, negative coefficients of CAPITAL, infrastructure variable, and RULE, institutional variable, are puzzling since more expenditure on infrastructure and legal security should prosper the enterprises, motivating the creation of enterprises. The possible correlation between these variables and the error term raises a potential issue of a bias in the Baseline Model (1). Indeed, there is a reasonable possibility of other relevant variables omitted from the baseline model (1). These variables are correlated with the creation of enterprise, causing bias as a result. Therefore, I propose an alternative model which includes these variables, FDI inflow, Tariff, Institutional variables that capture trust on government policy and digital infrastructure.

5.3 Alternative Regression Analysis

In the Alternative Model (2), the coefficient of NPL becomes statistically significant and increases by almost three times in magnitude. However, its sign stays positive, disapproving the hypothesis

again. There is no substantial change in the coefficient of PRIVATEY as its sign and statistical significance level lead to the identical conclusion in the Baseline Model (1).

The interpretations of aforementioned control variables are identical, while CAPTIAL and RULE variables are still puzzling.

Additional intuitional variables, such as EFFE and REUGLAT, are statistically significant. Also, their positive association with the creation of enterprise yield intuitive interpretation in the Alternative Model (2). Property right variable, RULE, can correlate with creditability and commitment of enforcer, EFFE and REGULAT, while correlating with creation of enterprises. Thus, such inclusion can result in more suppression of omitted variable bias in the Baseline Model (1) by controlling wider spectrum of institutional variation.

Additional digital infrastructure variables of telecommunication, CELL, and internet access, INTERNET, are intended to capture the variation beyond physical infrastructure. According to Jensen (2007), digital infrastructure has played an important mode of business transaction by reducing price volatility in India. The coefficients of digital infrastructure variables are expectedly positive, but only CELL is statistically significant.

Furthermore, control of FDI can capture the effect on the creation of enterprise through the establishment of subsidiaries and affiliates in developing countries. Furthermore, FDI can mediate the inflow of capital to a host country, correlating with CAPTIAL variable. TARIFF variable can correlate with TRADE variable while affecting the creation of enterprise by creating trade barrier, making exports costly.

Any variables on the right hand side of the Alternative Model (2) could be reasoned to have a correlation with the creation of enterprises while satisfying their data availability. With this note, the limitation of controlling omitted variable due to a lack of data still persist in the Alternative Model (2). One crucial omitted variable of concern is the Depth of Credit Information and Disclosure. Depth of Credit Information and Disclosure can negatively affect NPL while affecting the creation of enterprises ambiguously in sign, causing bias. This is because of a notion that Depth of Credit Information and Disclosure has direct relationship with the abilities of lenders to accurately assess prospective entrepreneurs and with business registration process at the same time. Also, observing the coefficient of Depth of Credit Information and Disclosure can assess the sign of NPL coefficient found in both Baseline Model (1) and Alternative Model (2). Despite the data

offered for the variable by World Bank, there is insufficient number of observations matched in my regression analysis for developing countries. Another limitation is in the intertemporal relationship between EN, dependent variable and NPL, main explanatory variable. Reverse causality between the number of business registered and non-performing loan can exist through lagged feedback from enterprise creation to the non-performing loan. Suppose for time period t=0, NPL rises as banks become more inaccurate and excessively lend to unpromising applicants as suggested by the positive coefficient of NPL found in both models (1) and (2). Furthermore, assume that the bank lends to 10 entrepreneurs. Among the 10 entrepreneurs, who registered and started their ventures, 8 entrepreneurs fail while only 2 successfully sustain their enterprises. While 2 of the successful entrepreneurs do not affect non-performing loan as they are capable of paying their debts, 8 of failed entrepreneurs will positively affect NPL at t=1 for not meeting the debt schedule. In this way, current period of dependent variable EN_t can reversely affect future independent variable NPL_{t+1}.

5.4 Instrumental Variable Strategy

A potential remedy to these issues can be instrumental variable strategy, by using lagged NPL variable as an instrument. This strategy controls for endogeneity arising from the reverse causality since it is impossible for a current level of enterprises created to affect past non-performing loan. Moreover, further lagged NPL variables, NPL_{t-2} and $NPL_{t-3,}$ are more likely to satisfy the exclusion restriction necessary to be valid instrument. However, lagging NPL for three years may not be sufficient to satisfy exclusion restriction since loan schedule varies by an individual and some loans may carry over three years. Under this circumstance, IV strategy in this study may lose validity as lagged NPLs affect the creation of enterprise at current period.

The IV Model (3) lags NPL as an instrument by one year and IV Model (4) lags NPL consecutively by two years. Additionally, IV Alternative Model (6) incorporates additional variables in the alternative model, lagging NPL by one year.

In the IV Alternative Model (6), NPL is statistically significant as in Alternative Model (2). The coefficient magnitudes of NPL are doubled in the Alternative models (2) and (6) compared to rest of the models, suggesting evidence for bias related to NPL in the Baseline model (1). Importantly, notice the consistently positive signs of NPL throughout the alternations of empirical strategies. This consistency consolidates the interpretation of credit provision increases as the banks become

more inaccurate in the developing countries. The significance level and interpretation of PRIVATREY are also consistent with previous regression models discussed. Moreover, the magnitude of PRIVATEY changes little from Baseline Model (1) to Alternative (2) and IV Alternative Model (6). This suggests there is little bias related to PRIVATEY in the baseline model.

One may interpret the coefficient of NPL as increase in non-performing loan ratio associates with increase in the number of enterprises created. However, it is crucial to realize that this is exclusively true when non-performing loan ratio rises strictly as a result of a rise in the non-performing loan. This is because of the fact that non-performing loan ratio is:

$$\frac{\text{Non performing loans}}{\text{Total loans}}$$

If rise in NPL is due to a decrease in total loans, the interpretation is not applicable as change in NPL is not due to rise in inaccuracy of banking sector. Furthermore, notice that the results are true for developing countries, not for developed countries.

6. Robustness

6.1 2008 Financial Crisis:

The crash of financial market and banking system in 2008 Financial Crisis had a substantial impact on the credit provision. Therefore, non-performing loan and the creation of enterprise would have been greatly affected. By adding a binary variable for financial crisis and adding an interaction term, I replicated the Baseline Model (1) and Alternative Model (2) in Table3. The coefficient of financial crisis variable, FCRISIS, indicates the creation of enterprises is 5.62 percent higher during the 2008 Financial Crisis, compared to other years. Notably, the interaction term, INTERAC, indicates that NPL had about 10 percent higher incremental effect on the creation of enterprises during the Financial Crisis in the developing countries.

In comparing models (1) and (2) in Table 4 to Table 3, one can see the changes in coefficients are small and the analysis results are insensitive to incorporating Financial Crisis. In fact, their signs, magnitudes and significance level are almost identical.

Table 4
2008 Financial Crisis

	(1)	(2)
	Baseline Model	Alternative Model
Dependent Variable	log(EN)	log(EN)
NPL	0.0390	0.0931***
	(1.70)	(4.61)
PRIVATEY	0.0240***	0.0191***
	(11.96)	(7.39)
COST	-0.0270**	-0.00417
	(-3.04)	(-0.56)
RULE	-1.249***	-1.769***
	(-4.93)	(-5.15)
TRADE	-0.0210***	-0.0159***
	(-5.12)	(-3.93)
CAPITAL	-0.0723***	-0.0104
	(-5.46)	(-0.61)
INF	-0.0255*	0.0208
	(-2.32)	(1.53)
INT	-0.0494***	-0.0340*
	(-3.73)	(-2.38)
TAX	-0.00928	0.00601
	(-1.52)	(1.13)
GDPPC	0.0000817***	0.00000500
	(4.05)	(0.23)
EDUC	-0.0646	-0.0187
	(-1.25)	(-0.39)
UNEMPLOY	-0.0173	-0.00849
	(-1.46)	(-0.75)
FCRISIS	0.0562	0.115
	(0.07)	(0.17)
INTERAC	0.101	0.0376
	(0.60)	(0.28)
REGULAT		1.032*
		(2.40)
EFFE		0.991*
		(2.47)
FDI		-0.0253
		(-0.63)
TARIFF		-0.0526
		(-1.78)
CELL		9.38e-09***
		(4.63)
INTERNET		0.00225
		(0.42)
FCRISIS	0.0562	0.115
	(0.07)	(0.17)
INTERAC	0.101	0.0376
	(0.60)	(0.28)
No.Observations	220	198
R2	0.585	0.663

t statistics in parentheses
="* p<0.05 ** p<0.01 *** p<0.001"

6.2 Comparison between Developed and Developing countries

Revisiting the interpretation of positive sign of NPL, earlier it was noted that banks lend more to prospective entrepreneurs as non-performing loans increase in the developing countries. One possible argument for the positive sign of NPL is risk diversification strategy the banks perform. Due to an expectation of default, it is possible that banks in the developing countries choose to diversify the risk by increasing the number of loans and preferably lending to different types of entrepreneurs. Due to this behavior, it is possible that NPL has positive association with creation of enterprises in the developing countries. Following this argument, it is uncertain how banks in the developed countries react to an increase in non-performing loan. This motivates the comparison between developing and developed countries in the signs of NPL.

Table 5 shows all of the regression models replicated from Table 3 for developing and developed countries, with one modification that excludes INT variable due to its insufficient number of matching observations. It is evident that NPL has negative association with creation of new enterprises in the developed countries given that the coefficients of NPL are consistently negative. This contrasting result implies that banks in the developed countries tend to become more conservative in lending as non-performing loan increases. Therefore, earlier argument, risk diversification, may not apply to the banks in the developed countries.

Table 5
Comparison between Developing and Developed Countries

	Developed Countries						Developing Countries					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
	Baseline Model	Alternative Model	IV: Lag t=1	IV: Lag t=2	IV: Lag t=3	A. Model IV: Lag t=1	Baseline Model	Alternative Model	IV: Lag t=1	IV: Lag t=2	IV: Lag t=3	A. Model IV: Lag t=1
Dependent Variable:	log(EN)	log(EN)	log(EN)	log(EN)	log(EN)	log(EN)	log(EN)	log(EN)	log(EN)	log(EN)	log(EN)	log(EN)
NPL	**-0.0416*** **	**-0.0152**	**-0.0209**	**-0.00789**	**-0.0255**	**-0.00678**	**0.0250**	**0.0849*** **	**0.0383**	**0.0529**	**0.0846***	**0.108*** **
(Non Perofrming Loan Ratio)	(-3.55)	(-1.95)	(-1.51)	(-0.39)	(0.93)	(-0.68)	(1.28)	(5.56)	(1.67)	(1.79)	(1.98)	(5.99)
PRIVATEY	0.0134***	0.00933***	0.0130***	0.0127***	0.0111***	0.00940***	0.0241***	0.0187***	0.0234***	0.0248***	0.0287***	0.0171***
(Size of Private Credit)	(8.26)	(9.22)	(7.57)	(6.41)	(4.68)	(8.69)	(11.57)	(7.06)	(10.90)	(10.14)	(8.84)	(6.27)
COST	-0.0514***	-0.0528***	-0.0549***	-0.0584***	-0.0687***	-0.0611***	-0.0266***	-0.00862	-0.0248**	-0.0242*	-0.0171	-0.00531
(Cost of Startup)	(-4.95)	(-4.94)	(-4.74)	(-4.28)	(-3.91)	(-5.30)	(-3.45)	(-1.25)	(-3.18)	(-2.46)	(-1.39)	(-0.77)
RULE	-0.278	-0.878**	-0.210	-0.153	-0.0963	-1.003**	-0.854***	-1.283***	-0.780**	-0.814**	-0.862*	-1.353***
(Rule of Law)	(-1.41)	(-2.82)	(-1.04)	(-0.71)	(-0.41)	(-3.13)	(-3.38)	(-3.58)	(-2.76)	(-2.66)	(-2.36)	(-3.40)
TRADE	-0.000991	0.000127	-0.00145	-0.00191*	-0.00318**	-0.000212	-0.0179***	-0.0132***	-0.0182***	-0.0190***	-0.0221***	-0.0122***
(Total Trade flow)	(-1.18)	(0.15)	(-1.63)	(-1.99)	(-3.10)	(-0.26)	(-5.10)	(-3.62)	(-5.16)	(-5.09)	(-5.41)	(-3.50)
CAPTIAL	-0.0260	0.00973	-0.0112	-0.00205	0.00511	0.0141	-0.0636***	0.000415	-0.0617***	-0.0547***	-0.0394*	0.00638
(Captial Formation)	(-1.39)	(0.73)	(-0.56)	(-0.09)	(0.19)	(0.90)	(-4.56)	(0.02)	(-4.24)	(-3.34)	(-2.16)	(0.31)
INF	0.0327	0.0343	0.0553	0.0637	0.103**	0.0513*	0.0197	0.0463***	0.0183	0.0192	0.0193	0.0458***
(Inflation)	(1.01)	(1.28)	(1.75)	(1.89)	(2.66)	(2.05)	(1.85)	(4.02)	(1.70)	(1.45)	(0.61)	(4.20)
TAX	0.0290***	0.0153***	0.0293***	0.0280***	0.0250***	0.0151***	0.000523	0.0111*	0.0000202	0.00167	0.00300	0.0135**
(Total Tax Rate)	(6.33)	(4.06)	(6.26)	(5.57)	(4.37)	(3.96)	(0.11)	(2.49)	(0.00)	(0.29)	(0.44)	(2.89)
GDPPC	-0.0000161**	-0.0000200**	-0.0000158*	-0.0000165*	-0.00000908	-0.0000203**	0.0000832***	0.00000802	0.0000828***	0.0000760***	0.0000816***	0.00000402
(GDP per capita)	(-2.66)	(-2.91)	(-2.51)	(-2.43)	(-1.25)	(-2.79)	(4.83)	(0.39)	(4.53)	(3.78)	(3.43)	(0.19)
EDUC	-0.122***	-0.0707***	-0.126***	-0.129***	-0.162***	-0.0708***	-0.0918	-0.0515	-0.0821	-0.0784	-0.0607	-0.0318
(Education Expenditure)	(-4.53)	(-4.50)	(-4.96)	(-4.88)	(-5.04)	(-4.68)	(-1.76)	(-1.08)	(-1.43)	(-1.22)	(-0.76)	(-0.62)
UNEMPLOY	-0.0149	0.0180	-0.0258	-0.0342	-0.0475	0.0106	0.000819	0.00307	-0.000884	-0.000866	-0.00154	0.00589
(Unemployment)	(-0.92)	(1.49)	(-1.47)	(-1.69)	(-1.87)	(0.83)	(0.08)	(0.28)	(-0.08)	(-0.07)	(-0.10)	(0.51)
REGULAT		1.658***				1.755***		0.650				0.752
(Regulation Quality)		(4.81)				(4.92)		(1.48)				(1.70)
EFFE		0.0101				0.0614		0.988**				1.122**
(Government Effectiveness)		(0.03)				(0.17)		(2.66)				(3.03)
FDI		0.0000829				-0.0000674		-0.0192				-0.0492
(Foreign Direct Investment Ir		(0.05)				(-0.04)		(-0.56)				(-1.26)
TARIFF		0.122***				0.124***		-0.0606*				-0.0607*
(Tariff Rate)		(3.74)				(3.87)		(-2.18)				(-2.10)
CELL		2.17e-08***				2.17e-08***		1.08e-08***				1.13e-08***
(Mobile Subscription)		(5.62)				(5.37)		(4.33)				(4.65)
INTERNT		0.000233				-0.000862		0.00318				0.00308
(Indiv. Internet Usage)		(0.05)				(-0.17)		(0.61)				(0.57)
No. Observations	273	272	249	220	187	248	251	225	229	199	168	205
R2	0.422	0.688	0.417	0.409	0.344	0.690	0.525	0.623	0.517	0.503	0.478	0.623
F	-	-	900	230	51	1549	-	-	836	188	60	510

t statistics in parentheses
="* p<0.05 ** p<0.01 *** p<0.001"
Note: Variable INT is omitted

7. Conclusion

By defining financial efficiency as size of credit provision and credit assessment accuracy, this paper studied the effect of financial efficiency on the creation of enterprises. As recent studies have suggested, I find the size of credit provided to private sector significantly predicts the creation of enterprises. In addition, I find a positive and robust correlation between non-performing loan ratio and the creation of enterprises in developing countries but a negative correlation in the developed countries. Therefore, banks in the developing countries tend to increase the credit provision while banks in the developed countries become more conservative in response to a rise in non-performing loans. It is possible that strategy of risk diversification adopted by banks in developing countries exclusively maximizes the return, while such strategy is inapplicable to the banks in developed countries. However, there is no empirical evidence in this paper that supports this explanation and requires future study to explore this area. Furthermore, limited interpretation of non-performing ratio motivates future study to incorporate more proxy that assess the financial accuracy, such as information on credit rating.

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