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## Effects of SME Access to Capital on Country Economic Performance: Understanding the Differences Between the Developed and the Developing World

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EFFECTS OF SME ACCESS TO CAPITAL ON COUNTRY ECONOMIC PERFORMANCE:  
UNDERSTANDING THE DIFFERENCES BETWEEN THE DEVELOPED AND THE  
DEVELOPING WORLD

by

WILLIAM BENJAMIN REED

A thesis submitted in partial fulfillment of the requirements  
for the degree of Bachelor of Science in Business Administration  
in the Department of Finance  
in the College of Business Administration  
at the University of Central Florida  
Orlando, Florida

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Thesis Chair: Melissa Frye, Ph.D.

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## ABSTRACT

The intent of this thesis is to explore the effects of small-medium enterprises' (SME) access to capital on country economic performance and examine the differences between the developed world and the developing world. Specifically, two main questions are addressed: whether there are significantly higher barriers-to-entry through a lack of access to credit in developing countries as well as whether SMEs access to credit around the world has changed over time.

Using a sample of 46 countries and grouping them two different ways (developed vs developing and free-market vs non-free-market), I find a negative correlation between the SMEs access to capital and country performance for both developed and developing economies. Surprisingly, the free-market and non-free-market economies differ in that free-market economies SME access to funding is positively correlated to GDP per capita and GNI for developed countries, while non-free-market economies SME access to funding are negatively correlated with country growth measurements (real GDP growth and gross fixed capital formation). The data do not, however, confidently support the conclusions that SMEs exert a causal impact on growth. Furthermore, I find that over the last decade, access to finance SME has remained relatively stagnant in developing countries, despite best efforts from the IMF and the World Bank.

## DEDICATION

For my mom and dad, I love you more than anything. Through everything. Thank you.

## ACKNOWLEDGEMENTS

In a world where God is often an afterthought, I'd like to acknowledge Him first. I am thankful for His timing. In everything.

I'd also like to my Thesis Chair, Dr. Melissa Frye, for her patience with my timing. In everything. Thank you for being an educator, cheerleader, and confidant.

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## INTRODUCTION

Without question, small-medium size enterprises (SMEs) are the drivers of both economic growth and job creation around the world. In 2015, enterprises employing fewer than 250 persons represented 99 percent of all enterprises in the EU (Eurostat, 2019). In 2016, US firms with fewer than 500 workers accounted for 99.7 percent of all enterprises while firms with fewer than 100 workers accounting for 98.2 percent of all enterprises. Small businesses accounted for 61.8% of net new jobs from the first quarter of 1993 until the third quarter of 2016 (Small Business & Entrepreneurship Council).

SME job creation is not simply a developed economy occurrence – SMEs impact job growth around the entire world. According to the World Bank, “in emerging markets, most formal jobs are generated by SMEs, which create 7 out of 10 jobs.” However, the paper goes on to explain that, “access to finance is a key constraint to SME growth, it is the second most cited obstacle facing SMEs to grow their businesses in emerging markets and developing countries” (World Bank SME Finance, 2019).

To clarify, many governments, namely middle income and high-income economies, the OECD (used in this study) and the IMF, all define a SME as, “an enterprise employing up to 249 persons.” They further divide the category into micro (1-9 employees), small (10-49 employees) and medium (50-249 employees) enterprises, though for this thesis I will use the large grouping of the above definition.

One might assume that technology and fintech have finally caught up with the lending world and are enabling SMEs to overcome information opaqueness through relationship lending. “Relationship lending” technology was first formally modelled in Petersen and Rajan (1995) and

is primarily based on proprietary soft information about the SME gathered over time “through multiple interactions with the borrower, often through the provision of multiple financial services” (Boot, 2000). Thus, the common assumption is that SME presence and access to finance must be growing.

The importance of SMEs and their well-being has been a topic of conversation amongst many of the top minds at both the International Monetary Fund (IMF) as well as the World Bank. The World Bank provides direct and indirect support to SMEs. Eighty percent of World Bank programs involve direct financial assistance to SMEs, while twenty percent of World Bank programs involve indirect support such as technical assistance for SMEs and for institutions that support SME development (World Bank SME Finance, 2019).

The literature suggests three main stances on SMEs and their benefits:

- (1) SMEs improve competition and entrepreneurship. Thus, SMEs have external benefits on economic efficiency, innovation, and productivity.
- (2) SMEs are often viewed as more productive than large firms for the economy, but financial markets and other institutional failures obstructed SME growth
- (3) SME expansion improves employment more than large firms because SMEs are more labor intensive (World Bank, 1994, 2002, 2004).

This paper makes several contributions to the literature. First, the data compiled and presented greatly improve upon existing data on SMEs, which have been very scarce. By categorizing the time periods into 2009 – 2012 and 2013 – 2017, it is possible to see impact and changes over time in various groupings of countries, most interestingly.

Some minor questions are also addressed pertaining to differences between free-market and GDP impacts on SMEs, grouping the countries using two different methods. The first using the World Bank's 2019 listings of developed countries compared to their lesser developed counterparts, and the second is the Organization for Economic Co-operation and Development (OECD) categories of free-market economies compared to non-OECD member countries (non-free-market). This thesis also explores the correlation between changes in funding for SMEs and the country's performance, based on performance measurements such as GDP per capita, gross national income per capita, gross fixed capital formation, and others. Ultimately, this thesis aims to determine the impact of SMEs on country performance in both developing and developed countries

To answer these questions, I use a rich multi-country data set the OECD "Financing SMEs and Entrepreneurs: An OECD Scoreboard" which provides over 30 variables on SME financing and performance across 46 countries. Eleven of the available variables were used for the purposes of this analysis.

My study has a few limitations. First, because of data limitations, my statistical analyses do not establish causality and are limited in scope. I am unable to analyze the results for any single country in depth. Additionally, as is usual with datasets involving both developed and developing economies, there are significantly more observations for the developed world than the developing.

## LITERATURE REVIEW

This section reviews existing evidence, both empirical and theoretical, on whether SMEs boost economic expansion and thereby country performance. The literature covers many aspects from financial constraints of SMEs to SME impact on country performance. Previous research has shown that financial and institutional underdevelopment constrains the growth and operation of small and medium size firms significantly more than that of large firms (Beck et al., 2005b)

As suggested by Cziráky et al (2005) and Cravo et al (2012), previous studies examining developing countries indicate that the relative importance of SMEs is negatively correlated with economic growth. In addition, the literature shows that SMEs human capital may be more important for economic growth than the relative size of the SME sector.

However, the literature has mixed opinions on the importance of SME on economic growth. One study found a strong, positive association between the importance of SMEs and GDP per capita growth (Beck, Demirguc-Kunt, and Levine, 2005a).

Studies have also been conducted on the relationship between SMEs, the informal economy and various verticals of private sector – specifically in manufacturing. Dr. Ayyagari argues that the contribution of the SME sector to total employment in manufacturing and to GDP across a broad spectrum of count is significant (Ayyagari, M., Beck, T., & Demirguc-Kunt, A., 2007).

Further research has been conducted to establish a connection between job growth and SME loans. Ardic, Oya Pinar Mylenko, and Nataliya Saltane, Valentina (2011) were some of the first to analyze a dataset after seeing that there has been an increased interest in the role of small and medium enterprises in job creation and economic growth. “The bulk of the global small and

medium enterprise lending volume, 70 percent, is in high-income countries. On average, small and medium enterprise loans constitute 13 percent of gross domestic product in developed countries and 3 percent in developing countries.”

Based on cross-country regressions, this literature suggests that there is a strong positive association between the extent of a country’s financial development and its growth rate, and that “the direction of causation runs from finance to growth rather than the reverse” (Beck, Levine, and Loayza, 2000; Levine, Loayza, and Beck, 2000).

There is ubiquitous and lengthy literature about the importance of SMEs to an economy, and enough “radio chatter” to assume that things are being done to bolster SMEs around the world, especially when it comes to technological advances in lending (as stated in the introduction). However, there is a gap in the literature regarding movement over time and whether these World Bank and IMF efforts have been moving the needle in developing countries in the last 10 years.

## HYPOTHESIS

GDP per capita, real GDP growth, gross fixed capital formation, and gross national income per capita will be used as country performance measurements to understand both the statistical significance and the corollary relationships with SMEs in developing (World Bank), developed (World Bank), free-market (OECD) and non-free-market (OECD) economies have with those measurements of economic performance.

For the purposes of this thesis, the OECD definition of SME (249 employees or less). Country selection was determined by all available country data in the OECD database section titled “Financing SMEs and Entrepreneurs: An OECD Scoreboard.” Country groupings for free-market vs non-free-market comparisons used the OECD 2019 rankings whether they were a OECD member or not. The OECD defines member countries as a group of 34 member countries that discuss and develop economic and social policy. OECD members are democratic countries that support free-market economies (OECD, 2019). Country groupings for developed and developing will use the United Nations 2019 rankings (UN WESP, 2019).

When approaching this topic, there are two aims: (i) to make a case that robust economies around the world are directly connected to beneficial SME market conditions and (ii) to understand the SME market conditions movement over time in developed, developing, free-market, and non-free-market economies.

The following four hypotheses are considered through the analysis:

1. SMEs in developing countries have significantly higher barriers to entry and access to credit in developing countries

2. SMEs access to credit in developed countries has remained constant over the years, while SMEs access to credit in developing countries is rising (understood through the comparison of 2009-2012 Early vs 2013-2017 Late time periods)

3. Based on the performance measurements listed, there is a statistical correlation between increased access to funding for SMEs and the country's performance

4. SME impact on performance is increasing in both developing and developed countries

## DATA

There are several methods by which countries are routinely grouped together. However, for the purposes of this thesis and to take into consideration far more aspects than simply GDP per capita or GNI per capita, the World Economic Situation and Prospects (WESP) country classifications were used, as published by the United Nations in their 2019 paper (UN WESP). WESP classifies all countries of the world into one of three broad categories: developed economies, economies in transition, and developing economies. The composition of these groupings, specified in Table 1 is intended to reflect basic economic country conditions. For purposes of this analysis, the groupings have been further condensed to into two categories, developed economies and developing economies, with both transition and developing economies merged together. When grouping countries by free-market vs non-free-market, China and Russia were included to give complete perspective, though some may argue to exclude the two based on governmental influence and capital allocation – but this is goal of comparing non-free-market economies to those that are free-market.

SME variables were grouped in two categories, positive and negative. The positive SME variables are expected to have a positive correlation with country performance (i.e., an increased share of new SME lending would be linked to an increase in GDP per capita). Conversely, the negative SME variables are expected to have a negative correlation with country performance (i.e., an increased bankruptcy year-over-year (YOY) growth rate would be linked to a decrease in GDP per capita).

Below, I analyze each SME variable and discuss why they were chosen:



### Positive SME Variables

An INCREASE in this section would mean an INCREASE of SME access to funding. The following variables were expected to have a positive correlation with country performance measurements.

- A. Share of SME outstanding loans (% of total outstanding business loans). This metric was chosen to understand the country's loan landscape and where many loans are awarded (large firms vs SMEs).
- B. Share of new SME lending (% of total new lending). In a similar fashion to the above metric, this metric is a better look at a yearly increase in SME funding and is a better look at immediate growth in access to finance.
- C. Share of short-term SME lending (% of total SME lending). This metric is used to understand how an SME uses its finance, whether they use a term loan A / Revolver to draw from or perhaps longer-term loans to invest in capital expenditures for assumed future growth (Capex).
- D. Percentage of SME loan applications (SME loan applications/ total number of SMEs). This metric will be used to compare against the share of "new SME lending" to understand the approval rate and progress countries have made.
- E. Growth capital and venture capital for SMEs (% , YOY growth rate). It is generally assumed that Private Equity (PE) and Venture Capital (VC) firms re-allocated much of their monies overseas during the 2008 financial crisis. I included this metric to understand

the movement over time between the Early and Late time periods (as defined in the Introduction) and across developing and developed economies.

### Negative SME Variables

An INCREASE in this section would mean a REDUCTION of SME access to funding. The following variables were expected to have a negative correlation with country performance measurement:

- F. Bankruptcies, SMEs (% , YOY growth rate). Instead of using raw numbers, the percentage YOY growth rate for bankruptcies of SMEs in each country allows for an apples-to-apples comparison that can be used across all country groupings.
- G. Non-performing loans, SMEs (% of all SME loans). International guidelines recommend that loans be classified as “nonperforming” when payments of principal and interest are 90 days or more past due or when future payments are not expected to be received in full. This metric is helpful to measure health and efficiency by identifying problems with asset quality and potential future increases/decreases of SME loan approvals. For example, if we see statistically higher non-performing loans for SMEs over time, it can be expected that lenders will decrease allocation to SMEs in their portfolio or increase interest rate in the future.
- H. Interest rate, SMEs. This metric and the two below it (I. & J.) are excellent measures of access to funding. The higher the interest rate, the harder/more expensive it is for SMEs to borrow and thus invest in future growth

- I. Interest rate, large firms. Classically, larger firms are expected to have a lower interest rate than SMEs because the risk for default/bankruptcy is significantly lower. This metric and the previous are included along with the interest rate spread because interest rates are highly critical to the health of an economy.
- J. Interest rate spread (% points). Although this metric may seem repetitive as the previous two variables could be subtracted to get the spread, understanding the spreads' movement over time can help to make assumptions about future access to credit for SMEs
- K. Collateral, SMEs (% of SMEs needing collateral to obtain bank lending). Lenders substitute the lack of information (opacity) on SMEs with higher requirements for collateral.

### Country Performance

The following metrics are generally accepted as the gold standard for measuring a country's economic health. Although there are several resources that maintain historical data on this, the OECD database was used to maintain consistency with the SME variable measurements.

- L. GDP per capita. This is measured in US dollars, current prices and PPPs. GDP gives information about the size of the economy and how an economy is performing
- M. Real GDP growth. Measured as an annual growth in percentage. Often this growth measurement can be considered an indicator of expectations of future growth.
- N. Gross fixed capital formation. Measured as an annual growth in percentage. Similar to Real GDP growth, this also can be considered as a pulse on the market expectations of future growth.

O. Gross national income per capita. Measured in US dollars, current prices and PPPs.

#### Time Periods

To understand movement over time, all t-tests were run for the overall period of 2009 – 2017 (specifically beginning after the 2008 Great Recession to avoid data outliers) and broken into two period of 4 years each. This allowed for a statistically viable number of observations for both country groupings.

- i. Early (2009 - 2012)
- ii. Late (2013 - 2017)

Table 1:

Country List					
Developed vs Developing (World Bank)			Free-Market vs Non-Free-Market Economies (OECD)		
Developed		Developing	Free-Market		Non-Free-Market
Australia	Lithuania	Chile	Australia	Latvia	Brazil
Austria	Luxembourg	Israel	Austria	Lithuania	China
Belgium	Netherlands	Korea	Belgium	Luxembourg	Colombia
Canada	New Zealand	Mexico	Canada	Mexico	Georgia
Czech Republic	Norway	Turkey	Chile	Netherlands	Indonesia
Denmark	Poland	Brazil	Czech Republic	New Zealand	Kazakhstan
Estonia	Portugal	Colombia	Denmark	Norway	Malaysia
Finland	Slovak Republic	Georgia	Estonia	Poland	Peru
France	Slovenia	Indonesia	Finland	Portugal	Russia
Greece	Spain	Kazakhstan	France	Slovak Republic	Serbia
Hungary	Sweden	Malaysia	Greece	Slovenia	South Africa
Ireland	Switzerland	Peru	Hungary	Spain	Thailand
Italy	United Kingdom	Serbia	Ireland	Sweden	
Japan	United States	South Africa	Israel	Switzerland	
Latvia		Thailand	Italy	Turkey	
			Japan	United Kingdom	
			Korea	United States	

*Broken into two comparison lists. The first analysis was conducted using the World Bank's definition of Developed and Developing. The World Bank also maintains a category "Emerging" that I have included with "Developing." The second analysis was conducted to compare free-market vs non-free-market economies, as defined by the OECD. Russia and China were both included in the OECD analysis but excluded from the World Bank analysis.*

Table 2:

<b>SME Variables</b>	
<b>Positive</b>	Share of SME outstanding loans (% of total outstanding business loans)
	Share of new SME lending (% of total new lending)
	Share of short-term SME lending (% of total SME lending)
	Percentage of SME loan applications (SME loan applications/ total number of SMEs)
	Growth capital and venture capital (% , Year-on-year growth rate)
<b>Negative</b>	Bankruptcies, SMEs (% , Year-on-year growth rate)
	Non-performing loans, SMEs (% of all SME loans)
	Interest rate, SMEs
	Interest rate, large firms
	Interest rate spread (% points)
	Collateral, SMEs (% of SMEs needing collateral to obtain bank lending)

*As explained above, the SME Measurements chosen were to be able to conduct an apples-to-apples cross-country analysis. All measurements are in percentages.*

Table 3:

<b>SME Variables</b>
GDP per capita
Real GDP Growth
Gross Fixed Capital Formation
Gross National Income per capita

*As explained above, the country performance measurements chosen based on prior literature*

## RESULTS

When comparing the differences between the World Bank grouping and the OECD grouping tests, there seems to be very little differences in the t-tests and correlations for the overall period. First, we will discuss the statistically significant items, and then move into potential rationale for the numbers found.

Out of POSITIVE SME variables, Share of SME outstanding loans (% of total outstanding business loans), Share of new SME lending (% of total new lending), Share of short-term SME lending (% of total SME lending), and Percentage of SME loan applications (SME loan applications/ total number of SMEs) are highly correlated with Real GDP Growth in developing countries and GDP Per Capita in developed countries.

Out of NEGATIVE SME Variables, non-performing loans, SMEs (% of all SME loans), Interest rate, SMEs, Interest rate, large firms, Interest rate spread (% points), and Collateral, SMEs (% of SMEs needing collateral to obtain bank lending) are highly correlated with Real GDP Growth in developing countries and GDP Per Capita in developed countries.

### T-tests

T-tests were chosen as the first form of analysis because of their ability to test for difference in means across two different subsamples. The first step to run these tests was the creation of dummy variables in my data set. Each dummy variable will be discussed below its respective table analysis. Rounding to the nearest hundredth for means and the nearest ten-thousandth for the p-value, it is possible to thoroughly start to see statistically significant differences of means between the two tested groups.

A. T-test Overall Period (developed vs. developing)

Table 4:

World Bank T-Test Overall 2009-2017					
	Variables	Developed Overall Mean	Developing Overall Mean	p-value	Observations
Positive	Share of SME outstanding loans (% of total outstanding business loans)	46.80	35.66	<b>9.47E-07</b>	212
	Share of new SME lending (% of total new lending)	25.77	37.95	<b>4.90E-05</b>	123
	Share of short-term SME lending (% of total SME lending)	39.55	33.82	<b>0.0339</b>	167
	Percentage of SME loan applications (SME loan applications/ total number of SMEs)	26.01	40.09	<b>4.60E-06</b>	108
	Growth capital and venture capital (% , Year-on-year growth rate)	21.08	38.36	0.1719	218
Negative	Bankruptcies, SMEs (% , Year-on-year growth rate)	1.11	44.82	<b>0.0125</b>	235
	Non-performing loans, SMEs (% of all SME loans)	41.84	6.09	<b>0.0256</b>	117
	Interest rate, SMEs	4.22	12.13	<b>2.39E-47</b>	233
	Interest rate, large firms	2.93	8.18	<b>3.19E-56</b>	222
	Interest rate spread (% points)	1.28	3.99	<b>4.92E-15</b>	233
	Collateral, SMEs (% of SMEs needing collateral to obtain bank lending)	55.50	62.73	0.1187	107
Country Performance	GDP per capita	40491.56	19465.03	<b>7.13E-31</b>	258
	Real GDP growth	1.21	3.46	<b>1.10E-07</b>	258
	Gross fixed capital formation	0.49	3.11	<b>0.0289</b>	258
	Gross national income per capita	38849.54	20163.68	<b>1.48E-31</b>	257

\***BOLD** indicates statistically significant (p-value below 0.1)



The above table is the t-test run comparing countries organized by the World Bank's definition of "developing" and "developed." As previously stated, the World Bank also includes a third grouping called "emerging" but for the purposes of this analysis the Emerging category has been combined with the developing category.

In this test, we see a statistically significant contrast between the developed and the developing economies, apart from collateral required by SMEs and PE/VC YOY growth rate. For PE/VE growth, the two means pass the eyeball test but there may not be enough observations in the developing data specifically regarding "growth capital and venture capital" to definitively observe a statistical significance. These findings were to be expected, as we know from literature that the environment for SMEs in developed economies is much richer than in developing economies.

Dummy variables created for this table were, 0 for developed and 1 for developing. This t-test covers then entire period (2009-2017) thus I am testing for differences by developed versus developing economies. Collateral remaining consistent across the board is intriguing, however many theories could explain this. For instance, did the Great Recession trigger higher collateral requirements in developed economies in 2009 and 2010 that may have offset the averages in later years? Growth capital could be explained the same way – much money was allocated overseas by PE/VC firms in 2008 and 2009 to retrieve better returns.

B. T-test Early vs. Late Period (developed & developing)

Table 5:

World Bank T-Test Period Early vs Late Period Comparison									
	Variables	Developed Early Period Mean	Developed Late Period Mean	p-value	Observations	Developing Early Period Mean	Developing Late Period Mean	p-value	Observations
Positive	Share of SME outstanding loans (% of total outstanding business loans)	44.94	48.16	0.3268	90	37.33	34.34	0.2705	66
	Share of new SME lending (% of total new lending)	24.95	26.32	0.6595	49	42.97	34.91	0.1684	29
	Share of short-term SME lending (% of total SME lending)	43.80	36.55	<b>0.0357</b>	69	39.73	28.82	<b>0.0012</b>	39
	Percentage of SME loan applications (SME loan applications/ total number of SMEs)	25.84	26.12	0.9045	40	46.23	35.48	0.1120	9
	Growth capital and venture capital (% Year-on-year growth rate)	19.35	22.35	0.7974	92	64.25	19.72	0.1122	36
Negative	Bankruptcies, SMEs (% Year-on-year growth rate)	8.51	-4.76	<b>0.0000</b>	104	26.50	58.21	0.5782	38
	Non-performing loans, SMEs (% of all SME loans)	10.60	59.34	0.1791	42	5.72	6.36	0.5055	59
	Interest rate, SMEs	4.79	3.77	<b>0.0000</b>	104	11.64	12.46	0.5198	44
	Interest rate, large firms	3.42	2.56	<b>0.0000</b>	97	8.28	8.11	0.8051	43
	Interest rate spread (% points)	1.40	1.19	<b>0.0879</b>	103	3.46	4.35	0.3596	43
	Collateral, SMEs (% of SMEs needing collateral to obtain bank lending)	59.70	52.99	0.1805	40	59.62	65.67	0.3479	17
Country Performance	GDP per capita	37399.79	43017.22	<b>0.0036</b>	116	16694.30	21817.54	<b>0.0017</b>	45
	Real GDP growth	-0.15	2.32	<b>0.0000</b>	116	4.46	2.62	<b>0.0055</b>	44
	Gross fixed capital formation	-2.68	3.09	<b>0.0000</b>	116	4.73	1.98	<b>0.0940</b>	36
	Gross national income per capita	36089.62	41120.11	<b>0.0010</b>	116	17197.73	22734.17	<b>0.0015</b>	39

\***BOLD** indicates statistically significant (p-value below 0.1)

Table 5 t-test results explain the change in mean over time in both developed and developing economies and tests whether they are statistically significant. I find this table incredibly surprising because developing countries have had stagnant SME growth. In country performance measures, their GDP and GNI per capita are increasing, but real GDP growth and gross fixed capital formation are decreasing from a mean of 4.73% to 2.62% and from 4.74% to 2.63%.

In the developing world, bankruptcies have sharply increased in the developing world whereas the opposite is true for the developed world. In fact, in the developed world the Early Period's mean was a growth rate of 8.51% whereas the Late Period it's -4.76%.

In the developed world interest rates have fallen dramatically which can be explained through economic recovery, however the spread between SMEs and Large firms has also statistically decreased. This is a very good thing as larger firms tend to lever their economies of scale and beat out SMEs in the market.

C. T-test Overall Period (free-market vs. non-free-market)

Table 6:

OECD T-Test Overall 2009-2017					
	Variables	Free-Market Overall Mean	Non-Free-Market Overall Mean	p-value	Observations
Positive	Share of SME outstanding loans (% of total outstanding business loans)	45.83	33.25	<b>3.24E-07</b>	257
	Share of new SME lending (% of total new lending)	25.97	40.68	<b>2.98E-06</b>	139
	Share of short-term SME lending (% of total SME lending)	40.46	28.31	<b>4.49E-05</b>	193
	Percentage of SME loan applications (SME loan applications/ total number of SMEs)	26.06	42.14	<b>7.63E-07</b>	111
	Growth capital and venture capital (% , Year-on-year growth rate)	35.38	22.56	0.3323	112
Negative	Bankruptcies, SMEs (% , Year-on-year growth rate)	11.01	23.80	0.5395	269
	Non-performing loans, SMEs (% of all SME loans)	32.63	7.02	0.1170	154
	Interest rate, SMEs	4.61	13.43	<b>1.76E-50</b>	259
	Interest rate, large firms	3.19	9.08	<b>1.45E-61</b>	248
	Interest rate spread (% points)	1.42	4.42	<b>1.654E-15</b>	259
	Collateral, SMEs (% of SMEs needing collateral to obtain bank lending)	55.72	62.65	0.1472	110
Country Performance	GDP per capita	38256.09	14392.45	<b>1.13E-24</b>	303
	Real GDP growth	1.55	3.44	<b>0.0004</b>	303
	Gross fixed capital formation	1.00	2.29	0.4151	303
	Gross national income per capita	36823.49	14855.27	<b>1.46E-23</b>	301

\***BOLD** indicates statistically significant (p-value below 0.1)

Table 6 is the same analysis as the first t-table, however I know compare free market economies to non-free-market economies. Free market economies, not surprising, have more loans in general. However, the new SME loans and applications are higher in non-free-market economies. This supports the notion that SME lending growth is higher in non-free-market economies. For the negative variables, similar to Table 4, non-free-market economies have significantly higher interest rates and interest rate spreads. However, unlike with developing economies, I find no significant difference in bankruptcies and non-performing loans. While the power of the test may be limited, the mean for non-performing loans is quite a bit lower in non-free-market economies. Examining country performance, I continue to find that the larger countries have significantly higher per capita performance, but real GDP growth is higher for non-free-market economies.

D. T-test Early vs. Late Period (free-market & non-free-market)

Table 7:

OECD T-Test Period Early vs Late Period Comparison									
	Variables	Free-Market Early Period Mean	Free-Market Late Period Mean	p-value	Observations	Non-Free-Market Early Period Mean	Non-Free-Market Late Period Mean	p-value	Observations
Positive	Share of SME outstanding loans (% of total outstanding business loans)	43.81	47.34	0.2294	110	33.07	33.38	0.9051	46
	Share of new SME lending (% of total new lending)	24.65	26.84	0.4891	55	41.50	40.11	0.8217	25
	Share of short-term SME lending (% of total SME lending)	45.62	36.81	<b>0.0047</b>	80	29.27	27.70	0.6189	23
	Percentage of SME loan applications (SME loan applications/ total number of SMEs)	26.00	26.10	0.9638	41	39.54	43.14	0.6727	5
	Growth capital and venture capital (% Year-on-year growth rate)	35.38	22.56	0.3323	112	10.63	14.29	0.7251	16
Negative	Bankruptcies, SMEs (% Year-on-year growth rate)	9.03	12.58	0.8501	119	200.52	13.55	0.1838	24
	Non-performing loans, SMEs (% of all SME loans)	8.68	47.10	0.1603	58	7.05	7.00	0.9712	43
	Interest rate, SMEs	5.08	4.24	<b>0.0067</b>	112	13.20	13.58	0.8054	31
	Interest rate, large firms	3.67	2.84	<b>0.0001</b>	105	9.04	9.11	0.9282	30
	Interest rate spread (% points)	1.45	1.39	0.6941	111	4.36	4.46	0.9341	30
	Collateral, SMEs (% of SMEs needing collateral to obtain bank lending)	59.46	53.50	0.2233	41	137.65	88.68	0.2952	16
Country	GDP per capita	35228.70	40721.51	<b>0.0021</b>	136	13298.39	15297.88	0.1254	24
	Real GDP growth	0.38	2.50	<b>0.0000</b>	136	4.26	2.71	0.1248	24
	Gross fixed capital formation	-1.61	3.13	<b>0.0000</b>	136	4.27	0.56	0.1349	20
	Gross national income per capita	34050.46	39109.13	<b>0.0005</b>	136	13823.97	15886.57	0.1709	20

\***BOLD** indicates statistically significant (p-value below 0.1)

From Table 7, perhaps the most interesting result is that free-market economies see significant improvement in all country performance measures. In contrast, the non-free-market countries have remained stagnant. This differs when divide the sample by developed versus developing countries. The developing countries showed a decrease in growth performance and an increase in per capita performance (Table 5). This may simply highlight the importance of how country categorization is defined.

## Pearson's Correlation Tests

### E. Correlation Test World Bank developed countries

Table 8:

World Bank Developed Countries' Pearson Correlation					
Country Performance		GDP per capita	Real GDP growth	Gross fixed capital formation	Gross national income per capita
	GDP per capita	1.00	0.22**	0.21**	0.93**
	Real GDP growth	0.22**	1.00	0.76**	0.20**
	Gross fixed capital formation	0.21**	0.76**	1.00	0.21**
	Gross national income per capita	0.93**	0.20**	0.21**	1.00
Positive	Share of SME outstanding loans (% of total outstanding business loans)	-0.12	0.10	0.07	-0.160*
	Share of new SME lending (% of total new lending)	-0.46**	0.15	0.10	-0.56**
	Share of short-term SME lending (% of total SME lending)	-0.02	-0.02	0.00	-0.09
	Percentage of SME loan applications (SME loan applications/ total number of SMEs)	-0.11	0.01	-0.10	-0.12
	Growth capital and venture capital (% Year-on-year growth rate)	-0.05	0.11	0.06	-0.11
Negative	Bankruptcies, SMEs (% Year-on-year growth rate)	-0.08	-0.55**	-0.50**	-0.12
	Non-performing loans, SMEs (% of all SME loans)	0.12	0.00	0.04	0.15
	Interest rate, SMEs	-0.38**	-0.16*	-0.14*	-0.43**
	Interest rate, large firms	-0.42**	-0.23**	-0.19**	-0.49**
	Interest rate spread (% points)	-0.16*	-0.01	-0.02	-0.15*
	Collateral, SMEs (% of SMEs needing collateral to obtain bank lending)	-0.11	-0.01	-0.05	-0.13
**. Correlation is significant at the 0.01 level (2-tailed).					
*. Correlation is significant at the 0.05 level (2-tailed).					

Table 8 shows that for developed countries, the negative SME variables are generally negatively correlated with performance as expected. The most surprising outcome of this study is that positive SME variables are consistent with Cravo et al studies to have a negative correlation with country performance.



F. Correlation Test World Bank developing countries

Table 9:

World Bank Developing Countries' Pearson Correlation					
		GDP per capita	Real GDP growth	Gross fixed capital formation	Gross national income per capita
Country Performance	GDP per capita	1.00	0.06	0.08	0.99**
	Real GDP growth	0.06	1.00	0.89**	0.17
	Gross fixed capital formation	0.08	0.89**	1.00	0.14
	Gross national income per capita	0.99**	0.17	0.14	1.00
Positive	Share of SME outstanding loans (% of total outstanding business loans)	0.71**	-0.02	0.04	0.70**
	Share of new SME lending (% of total new lending)	-0.24	-0.35	-0.34	-0.21
	Share of short-term SME lending (% of total SME lending)	0.74**	0.03	0.11	0.71**
	Percentage of SME loan applications (SME loan applications/ total number of SMEs)	-0.94**	0.41	0.56	-0.93**
	Growth capital and venture capital (% , Year-on-year growth rate)	-0.13	0.20	0.22	-0.17
Negative	Bankruptcies, SMEs (% , Year-on-year growth rate)	0.00	-0.06	-0.07	0.00
	Non-performing loans, SMEs (% of all SME loans)	-0.31**	-0.22	-0.31**	-0.35**
	Interest rate, SMEs	-0.66**	-0.35*	-0.40**	-0.71**
	Interest rate, large firms	-0.76**	-0.08	-0.20	-0.67**
	Interest rate spread (% points)	-0.41**	-0.50**	-0.48**	-0.68**
	Collateral, SMEs (% of SMEs needing collateral to obtain bank lending)	-0.59*	0.58	0.69*	-0.57
** . Correlation is significant at the 0.01 level (2-tailed).					
* . Correlation is significant at the 0.05 level (2-tailed).					

In Table 9, developing countries the per capita measures of performance are significantly positively correlated with the share of SME outstanding loans and short-term SME lending. However, it is negatively correlation with SME loan applications and most negative SME

variables. For the growth measures of performance, it is surprising that none of the positive SME variables are significantly correlated. For the negative SME variables, some are negatively correlated. Overall, my negative variables are consistent with my hypothesis. My positive variables have mixed results, but certainly not strongly supporting my hypotheses.

## G. Correlation Test free-market countries

Table 10:

Free-Market Pearson Correlation					
		GDP per capita	Real GDP growth	Gross fixed capital formation	Gross national income per capita
Country Performance	GDP per capita	1.00	-0.46**	-0.29	1.00**
	Real GDP growth	-0.46**	1.00	0.91**	-0.41**
	Gross fixed capital formation	-0.29	0.91**	1.00	-0.19
	Gross national income per capita	1.00**	-0.41**	-0.19	1.00
Positive	Share of SME outstanding loans (% of total outstanding business loans)	-0.19	0.41**	0.01	-0.47**
	Share of new SME lending (% of total new lending)	-0.47*	0.46*	-0.18	-0.46*
	Share of short-term SME lending (% of total SME lending)	0.16	0.42*	0.14	-0.06
	Percentage of SME loan applications (SME loan applications/ total number of SMEs)	0.27	0.69*	0.61	0.10
	Growth capital and venture capital (% Year-on-year growth rate)	-0.13	0.08	0.05	-0.14
	Non-performing loans, SMEs (% of all SME loans)	0.75**	-0.52**	-0.39**	0.79**
	Interest rate, SMEs	0.12	-0.77**	-0.69**	0.06
Negative	Interest rate, large firms	0.10	-0.62**	-0.65**	0.47*
	Interest rate spread (% points)	0.11	-0.67**	-0.50**	-0.19
	Collateral, SMEs (% of SMEs needing collateral to obtain bank lending)	0.26	-0.83**	-0.36	0.29
	Bankruptcies, SMEs (% Year-on-year growth rate)	-0.12	-0.23	-0.09	-0.12
*. Correlation is significant at the 0.05 level (2-tailed).					
**. Correlation is significant at the 0.01 level (2-tailed).					

This table shows a fairly stark contrast between Table 8, since the Free-Market country list is much more highly correlated with the growth performance metrics rather than per capita

performance. Additionally, the positive SME variables have a positive correlation with the growth performance and the negative SME variables have a negative correlation with the growth performance, which as was originally hypothesized.

## H. Correlation Test non-free-market countries

Table 11:

<b>Non-Free-Market Countries Pearson Correlation</b>					
		GDP per capita	Real GDP growth	Gross fixed capital formation	Gross national income per capita
<b>Country Performance</b>	GDP per capita	1.00	0.12*	0.15**	0.94**
	Real GDP growth	0.12*	1.00	0.78**	0.09
	Gross fixed capital formation	0.15**	0.78**	1.00	0.14*
	Gross national income per capita	0.94**	0.09	0.14*	1.00
<b>Positive</b>	Share of SME outstanding loans (% of total outstanding business loans)	0.01	0.07	0.06	-0.02
	Share of new SME lending (% of total new lending)	-0.40**	0.11	0.05	-0.45**
	Share of short-term SME lending (% of total SME lending)	-0.02	0.01	0.02	-0.08
	Percentage of SME loan applications (SME loan applications/ total number of SMEs)	-0.11	0.00	-0.10	-0.12
	Growth capital and venture capital (% , Year-on-year growth rate)	-0.12*	0.15**	0.11	-0.17**
<b>Negative</b>	Bankruptcies, SMEs (% , Year-on-year growth rate)	-0.08	-0.05	-0.07	-0.10
	Non-performing loans, SMEs (% of all SME loans)	0.14	-0.02	0.02	0.16*
	Interest rate, SMEs	-0.47**	-0.08	-0.12	-0.54**
	Interest rate, large firms	-0.50**	-0.14*	-0.15*	-0.57**
	Interest rate spread (% points)	-0.27**	0.01	-0.04	-0.30**
	Collateral, SMEs (% of SMEs needing collateral to obtain bank lending)	-0.11	-0.01	-0.04	-0.14
*. Correlation is significant at the 0.05 level (2-tailed).					
**. Correlation is significant at the 0.01 level (2-tailed).					

Table 11 is extremely similar to its counterpart in the developing world (Table 9). This is surprising because there are markedly different relationships between the Free-Market and the Developed World.

## CONCLUSION

In conclusion, SMEs operating in developing countries are more likely to be credit-constrained and pay significantly higher interest rates than their counterparts in high-income countries. In my period analysis over time, in developed countries there is a statistically significant difference between the early and late periods of SME activity, while in developing countries, activity has remained stagnant over the last 10 years.

Unlike my original hypothesis surmised, SMEs access to credit in developed countries has increased between the early and late periods, while SMEs access to credit in developing countries is remained virtually unchanged (understood through the comparison of 2009-2012 Early vs 2013-2017 Late time periods).

The difference in interest rate spreads between SMEs and Large Firms is clearly statistically significant between developing and developed countries. SMEs in both developing countries and non-free-market countries have significantly limited access to credit compared to their counterparts.

Free-market economies are highly correlated with the growth performance metrics in contrast with developed countries which are highly correlated with per capita country performance. Additionally, in a Free-Market, the positive SME variables have a positive correlation with the growth performance and the negative SME variables have a negative correlation with the growth performance, which as was originally hypothesized. for developed countries, the negative SME variable are generally negatively correlated with performance as expected. The most surprising outcome of this study is that positive SME variables have a negative correlation with country performance. Although there is not enough evidence to support

causation, further research should be done to better understand what the differences are between developed countries and free-market economies and why the results could be so drastically diverse.

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