Growth of Small Firms: An Empirical Analysis of Macroeconomic Factors

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ABSTRACT

This research investigates factors that affect firm growth in the United States. The study utilizes the growth in employment due to firm expansion as a proxy for firm growth. Studies on the determinants of firm growth have focused on microeconomic factors as drivers of small business growth. However, this paper deviates from the norm and instead focuses on an empirical analysis of macroeconomic factors that affect firm growth in the United States. This focus is in response to the dynamic macroeconomic environment that impacts businesses, their performance, and growth. The study applies the Dynamic OLS cointegration method on time series data for 1980-2020. Augmented Dickey-Fuller and Phillip Perron unit root tests were conducted to test the stationarity of the time series utilized. Findings from the study show that real GDP growth, real exchange rate, and innovation have a robust and significant effect on the growth of small business firms in the United States. Other macroeconomic factors, including real interest rates, openness, and inflation, significantly impact firm growth depending on the size of the firms. The results also show that export growth significantly affects the growth of firms with 19 or fewer employees. Policy to improve the growth of firms in the United States should focus on improving the macroeconomic environment that allows firms to thrive.

Keywords: Firm growth, macroeconomic variables, Dynamic Least Squares, small business

1. INTRODUCTION

There are extensive studies in the literature on firm growth, which suggest that firms must experience different stages of growth amidst challenges. While the literature on this area has extensively focused on microeconomic factors that affect growth, fewer studies have attempted to investigate the impact of macroeconomic factors on firm growth. Whereas firm growth can be measured in terms of growth in turnover and profitability, the expansion of employees as the firm grows can be a viable measure of firm growth over time. Thus, the company's expansion in terms of employees determines its ability to sustain an additional workforce, which is also a measure of its financial success. As the company grows, it contributes to the nation's economic gain through an expansion of its businesses and assets.

Although there was significant growth in employment due to firm expansion in U.S. companies, the question that remains to be answered is how macroeconomic conditions affect this growth. A clear understanding of these factors can provide policymakers with critical information needed to implement policies that create favorable conditions for firm performance and growth. While studies have identified internal factors of growth, such as technology, skilled personnel, efficient procedures, brand names, trade contracts, and others, the country's macroeconomic environment has been identified as a critical component (Geroski, 2000). Macroeconomic factors are critical to firm growth and, to an extent, show that factors external to the firm can indeed affect the success and performance of the firm.

While previous studies on firm growth have focused on microeconomic factors, the current study examines the impact of selected macroeconomic indicators on the growth of firms in the United States. Thus, the study employs time series data to investigate macroeconomic factors that affect the growth of small firms. The study does not control firm-specific factors that affect growth but focuses only on macroeconomic factors. We tested if firm growth was due to key macroeconomic factors such as inflation, interest rates, openness, and real exchange rates. The paper contributes to the literature by focusing on the macroeconomic determinants of firm growth. The method adopted for the estimation is the Fully Modified Least Squares proposed by Phillips and Hansen (1990). The estimator uses a semi-parametric framework to account for the cointegrating series' potential endogeneity and serial correlation. Thus, the FMOLs provide more reliable and robust estimates than ordinary least squares.

The rest of the paper is organized as follows. We review the theoretical and empirical evidence on the determinants of firm growth in section 2. Section 3 describes the methodology and data used for the study. Section 4 presents the results and discusses the main findings, and section 4 provides the conclusion and policy suggestions.

2. LITERATURE REVIEW

Over the past five decades, researchers in the United States have extensively studied the factors influencing the growth of small and mid-sized businesses and the barriers they face. These studies have focused on either the internal factors within firms (the resource-based view), external factors (the industrial organization view), or a combination of both. Scholars generally agree that a combination of internal and external factors impact and hinder the growth of individual firms.

For instance, Macrae (1992) analyzed 51 factors believed to influence small and mid-sized firms. These factors included managerial expertise, available resources, management moti-

vation, market structure, and opportunities. Breen and Karanasios (2010) discovered that prudent managerial practices, such as securing government contracts, positively impact a firm's growth. Pichot (2016) emphasized the critical role of an entrepreneur's vision in a firm's growth, highlighting the importance of employing skilled employees, seeking growth opportunities, and being innovative within the industry's niche.

Yazici et al. (2016) studied small family-owned hotels and identified 16 growth factors that influence their development and growth. These factors include active risk-taking, education, family history, networking, diverse business interests, familial investment networks, partnerships with key employees, customer concentration, autonomy, innovation, proactiveness, competitive aggressiveness, location, and a strong desire for success.

Gupta (2019) introduced the concept of entrepreneurial orientation (E.O.), which refers to the entrepreneurial behavior exhibited by companies and significantly impacts their success. E.O. comprises three key elements: innovativeness, risk-taking, and proactiveness. Gupta suggested that each element of E.O. independently and distinctly affects the growth of small firms, with varying degrees of strength and direction. Therefore, small firms are advised to allocate their limited resources wisely, focusing on the dimensions of E.O. that contribute to firm growth instead of addressing the entire E.O. construct.

In a study conducted by Gomezel and Aleksic (2020) on small firm growth in different levels of technological turbulence, the researchers explored the relationship between risk-taking, flow experience, innovation, and firm growth. They defined small firm growth in terms of market share and ROI. The findings revealed a significant relationship between flow experience, innovation, and firm growth in high levels of technological turbulence. However, these relationships are not present at low levels of technological turbulence. Tunberg and Anderson (2020) argue that small firm growth is a complex and challenging process that needs to follow a smooth trajectory. They propose that growth is influenced by momentary experiences and reactions rather than a predetermined strategy, leading to a chaotic rather than an ordered growth journey. This perspective emphasizes the difficulties and uncertainties faced by small firms as they strive for growth

Navarro et al. (2012) proposed that business firms employ various strategic initiatives to achieve growth. These include customer acquisition and retention, global expansion, product innovation, hiring visionary executives, and embracing strategic alliances. Rupasingha and Wang (2017) highlighted the significant impact of small business lending on firms' growth. A study conducted in India revealed that firm size and age hindered growth (Coad and Tamvada, 2012). Gheres et al. (2016) noted that micro firms, in particular, face constraints due to their aversion to growth. Dhliwayo (2021) conducted a study examining the correlation between a company's growth and the duration of its existence. The findings indicate that as small businesses operate for longer periods, the likelihood of achieving growth increases.

Ullah and Smith (2015) posited that many owners of small, family-owned businesses adopt a cautious approach to growth. They highlighted that employment regulations discourage the hiring of non-family members due to additional costs associated with insurance, taxes, maternity leave, and other employment benefits. Boardman et al. (1981) argued that as a small firm grows, it tends to increase leverage, decrease liquidity, and make heavy investments, which, if taken to extremes, can lead to failure. Andersson et al. (2004) suggested that small firms benefit from operating in rapidly changing and dynamic environments, allowing them to expand beyond national borders. Kolvereid and Åmo (2019) found that versatile human resources and labor productivity contribute to the growth of small business firms, based on their study of Norwegian

accounting firms. Krasniqi and Mustafa (2016) concluded that a firm's growth aspirations, managerial capacities, and training programs are significant factors associated with growth. Mahmutaj and Krasniqi (2020) emphasized that a firm's innovative marketing activities are associated with its growth.

Phillips (1993) examined job creation in the United States, particularly within the context of its growing economy and numerous small firms. The study revealed that newly established firms were responsible for the most substantial job creation. Chaganti et al. (2014) supported that quality opportunities, a competent managerial team, and effective resource management play vital roles in sustaining a firm's growth. Wijewardena and Cooray (1995) analyzed the determinants of growth in small Japanese manufacturing firms and found that firms with higher labor skills and larger sizes achieved higher growth rates.

Story (2012) conducted a study on small and mid-sized firms and concluded that no significant relationships existed between growth, finance, and innovation. Thieblot (1976) argued that the federal government's support for small business firms falls short of the harm it inflicts on them. Finally, it is important to note that research findings on growth theories and models have yielded divergent views and conclusions, lacking a widely accepted consensus. As Dobbs and Hamilton (2007) highlighted, the absence of a unifying growth theory has resulted in a wide range of growth measures and model specifications in the literature.

Based on research findings, Hossain (2020) concluded that small firms have the potential to make a greater contribution to the economy when they have improved access to financial resources, acquired financial literacy, and received adequate support from other organizations. This contribution can be achieved through both financial and non-financial growth. A study by Thomas and Douglas (2021) found that small companies can withstand external technological shocks and achieve growth by implementing various strategies, such as restructuring their external networks, leveraging intangible assets, and balancing established and new product opportunities.

Esaku (2022) researched small businesses' impact on employment in Africa and discovered that young companies with fewer than six employees play a significant role in creating additional job opportunities and promoting employment growth in Sub-Saharan Africa. Chambers et al. (2022) conducted a research project examining the impact of regulations on business firms. The findings revealed that a 10 percent increase in industry-specific regulatory restrictions resulted in a 0.5 percent reduction in firms across all sizes. However, small firms experienced a larger reduction of 0.6 percent in employment. This indicates that regulatory restrictions have a more pronounced effect on small firms' employment reduction.

Lastly, Sharma and Rai (2023) highlighted that, external shocks, particularly the COVID-19 pandemic, pose a significant survival challenge for most small enterprises. Small businesses are vulnerable due to their limited size, financial resources, and ability to handle unexpected circumstances. The authors also noted that small firms are more susceptible to external shocks' impact on employment and investment. They further suggested that firm agility tends to improve with the age and size of the business.

3. METHODOLOGY

The statistical analysis in this paper focuses on firms with 1 to 19 employees, 20 to 99 employees, firms with over 100 employees, and all categories of firms regardless of their sizes. Key findings should provide insights into the effects of macroeconomic changes on firms of various sizes. The U.S. Census Bureau classifies business firms in terms of employment size as fol-

lows: Firms with 1 to 4 employees, (2) Firms with 5 to 9 employees, (3) Firms with 10 to 19 employees, (4) Firms with less than 20 employees, (5) Firms with 20 to 99 employees, (6) Firms with 100 to 499 employees, (7) Firms with less than 500 employees, and (8) Firms with more than 500 employees.

Unlike previous studies on firm growth that focus on firm-specific factors that affect the growth of firms, the current study investigates the relationship between firm growth and macroeconomic variables in the United States from 1980 to 2020. The growth of firms is measured as the growth in employment resulting from business growth. Defining firm growth as such, the relationship between firm growth and macroeconomic indicators in the United States for the period ranging from 1980 to 2020 is as follows:

$$Firmg = f(INFL, RINT, REER, RGDPg\ OPEN, INNOV)$$

where: INFL is the consumer price index as a measure of inflation, RINT is the real interest rate, REER is the real exchange rate, RGDPg is real GDP growth, OPEN is a measure of openness calculated as the sum of import and exports divided by real GDP, INNOV is measured as the logarithm of the number of patents issued over time. CPI (Consumer Price Index) is a measure of inflation. The equation linking firm growth in each category to the selected macroeconomic variables can be written as follows:

$$FIRMg_{it} = \alpha_0 + \alpha_1 INFL_t + \alpha_2 \mathrm{RINT}_t + \alpha_3 \mathrm{REER}_t + \alpha_4 \mathrm{RGDPg}_t + \alpha_5 \mathrm{OPEN}_t + \alpha_6 \mathrm{INNOV}_t + \varepsilon_t$$

where: α_s represents the coefficients of the independent variables and ε_t the error term at time t. FIRM_g is a proxy firm growth calculated as the expansion in employment across firms and over time due to firm growth.

Description of Macroeconomic Variables

Variable	Description
Inflation (*INFL*)	Evidence shows a strong correlation between inflation and firm size (Wu & Zhang, 2001). Inflation affects firm growth by increasing production costs, such as raw materials and labor, which can compress profit margins unless businesses raise prices. Increased costs can reduce consumer purchasing power over time, decreasing demand for products and services. Additionally, inflation introduces economic uncertainty, influencing firms to make cautious investment decisions and potentially delaying long-term expansions.
Real Interest Rate (*RINT*)	The real interest rate adjusts the nominal interest rate for inflation. It affects firm growth through its influence on borrowing costs. Lower interest rates reduce the cost of borrowing and encourage investments in new projects, expansion, and innovation. High-interest real interest rates constrain growth by increasing the cost of borrowing and reducing consumer spending.
Real Effective Exchange Rate (*REER*)	The real effective exchange rate affects the firm's international competitiveness. A real exchange rate depreciation makes a country's exports cheaper and imports more expensive, boosting exports and stimulating

	firm growth. In contrast, appreciating the real exchange rate can make exports more expensive and reduce a firm's competitiveness abroad.
RGDP Growth (R*GDPG*)	Real Gross domestic product (GDP) growth reflects the country's overall economic health and market potential. Higher GDP growth typically signals increasing demand for goods and services, creating opportunities for firms to expand their operations and increase sales. High growth rates indicate a favorable economic environment for investment and business activities.
Openness (*OPEN*)	Openness refers to the extent of a country's integration with the global economy through trade and investment. Greater Openness often increases market opportunities, access to foreign markets, and exposure to international competition. Increased market opportunities can drive firms to innovate and improve efficiency, thus fostering growth. However, it also exposes firms to global economic fluctuations and competition. Openness was constructed as total trade expressed as a percentage of real gross domestic product.
Innovation (*INNOV*)	Innovation is a critical driver of firm growth. Firms investing in research and development (R&D) and bringing new products, services, or processes to market can gain a competitive edge, attract customers, and increase market share. Innovation can lead to improved productivity, cost reductions, and the creation of new revenue streams, all of which contribute to firm growth. Innovation is measured in terms of U.S. patent issues over time. Research has shown that studies consider patents as a proxy for Innovation (Burhan et al., 2017; Alsaaty et al., 2021).

Data

The data source of the macroeconomic variables for the study is derived from the Federal Reserve Economic, https://fred.stlouisfed.org, the World Bank Development Indicators, and the U.S. Census Bureau 2022 Business Dynamics Statistical Data Tables. Data on patents was also obtained from the U.S. Census Bureau.

EMPIRICAL RESULTS

Equation (2) is estimated using the Dynamic Least Squares (DOLS) developed by Phillips and Hansen (1990). The methodology uses a semi-parametric correction to solve potential endogeneity and serial correlation resulting from unit roots in the cointegrating series. The DOLS modifies the least squares and accounts for the effects of serial correlation and the endogeneity in the regressors arising from a cointegrating relationship (Phillips & Hansen, 1990; Hansen, 1995). The DOLs approach provides more reliable standard errors compared to those from the ordinary least squares method. The estimation approach requires all the regressors to be integrated into order one. The estimated results provide evidence of the long-run relationship between firm growth and macroeconomic variables.

The results of the DOLS for cointegrating relations shown in Tables 3-6 show strong results from the estimated models. The DOLS estimates are unbiased and clear of serial correlation and endogeneity issues. Thus, it would be needless to explore problems of serial correlation and endogeneity. The selected kernel is Newey and West automatic bandwidth estimator, which is superior to the one developed by Andrews (1991) since it produces estimates close to the finite-sample optimal bandwidth parameter. However, the choice of kernel has only minor effects on the performance of the DOLS. Also, the Quadratic Spectral (Q.S.) performs marginally better than the Barlett or the Parzen kernels. Thus, these two kernels have been used in the estimations of the DOLS models.

Testing for stationarity

The section presents the econometric results of the effect of changes in macroeconomic variables and firm growth in the United States. The procedure begins with evidence that the model estimates are statistically flawless. Stationarity tests are conducted to test the order of integration of each variable included in the study. The study applies the Augmented Dickey-Fuller (ADF) test and the Phillip and Perron (P.P.) test with the trend and intercepts to analyze the existence of unit roots in the data. The results shown in Table 1(Appendix) indicate that all variables are stationary at the first difference in both the ADF and P.P. tests.

DOLS Regression Estimates

Tables 2-5 (Appendix) present the dynamic ordinary least squares (DOLS) results on the relationship between firm growth and the macroeconomic environment. Table 2 shows the DOLS regression results for firms with 1-19 employees. Real interest rates show a positive but not significant relationship with firm growth in firms with 1-19 employees, and inflation does not benefit smaller firms and is not significant. The coefficient of Real interest rate is positive but does not significantly impact firm growth, indicating that exchange rates appreciate. Growth in GDP has a positive and significant impact on growth in forms of this size. Openness to trade negatively impacts growth, possibly because they face high competition from international markets. Innovation is positively and significantly related to firm growth in this category. This suggests that firms that invest in R&D and innovative products are better positioned for growth.

Table 3 (Appendix) presents the results of Firms with 20 to 99 employees. In this case, in contrast to the smaller firms with a maximum of 19 employees, inflation has a significant and positive relationship to growth. Similarly, the Rate of interest has a significant and positive impact on growth in firms. The real exchange rate has a significant and negative influence on firm growth. This significant effect suggests that an increase in the real exchange rate leads to a rise in export prices and a fall in the demand for exports, thus affecting these firms negatively. The estimates show that real GDP growth is a strong and positive factor influencing firm growth. Further Innovation has a positive and significant impact on Firm growth indicating that firms that promote a culture of innovation tend to grow larger.

Table 4 (Appendix) provides the DOLS regression results for firms with 100+ employees. For firms of this size, inflation has a positive and significant effect on firm growth, suggesting that larger firms have more pricing power and can adjust to inflation by raising prices. Real GDP growth and innovation have a robust and positive impact on the growth of firms that have more than 100 employees. Innovation has a robust and positive relationship to growth in this category

of firms. Therefore, firms that continuously innovate their products and services and have a strategy focused on innovation will tend to grow. The exchange rate has a significant and negative impact on firm growth in this category, implying that increasing export prices do not favor growth in this size of firm. On the other hand, openness to international trade has a positive and significant impact on the growth of these firms. It could imply that while rising export prices may not be favorable, the ease of importing may allow such firms to grow due to imports of goods and services, e.g., due to cost arbitrage and other international supplier advantages.

Table 5 (Appendix) results show a significant impact of macroeconomic factors on the growth of small business firms of all sizes. There is a positive and significant relationship between the growth of small firms and real GDP growth in all the categories or models. As the real GDP increases, firm growth increases. Similarly, innovation positively and significantly impacts small firms. Results indicate that openness, the total international trade divided by GDP, has a robust and positive impact on the growth of small business firms. Here, the negative and significant relationship between the exchange rate and growth indicates that an increase in export prices does not favor growth. However, robust international trade (import and export) positively impacts growth in firms. Inflation impacts growth positively and significantly, while interest rates have a negative and significant impact.

DISCUSSION AND POLICY SUGGESTIONS

The research provides critical insights into the effects of macroeconomic factors on firm growth in the United States and deviates from the traditional focus on microeconomic factors. The relationship between the macroeconomic variable and the growth in small business firms was tested using the Dynamic Least Squares (DOLS) developed by Phillips and Hansen (1990). The DOLS regression estimates offer important insights into the relationship between firm growth and macroeconomic factors (across different firm sizes, 1-19 employees, 20-99 employees, and more than 100 employees. The Augmented Dickey-Fuller (ADF) and the Phillip and Perron (P.P.) tests were used to study the stationarity of the time series data employed.

The research found that inflation positively and significantly affects firm growth. Specifically, this relationship is significant in larger firms (100 plus employees) and firms having 20 to 99 employees but shows a negative and non-significant effect in firm sizes with less than 20 employees. These findings suggest that larger firms are more flexible in making price adjustments than smaller firms, which are adversely affected by inflation. These findings imply that government policy should keep inflation at controlled levels, as this benefits small firms' growth. As inflation disproportionately affects firms depending on firm size, a monetary policy that maintains stability and low inflation may protect smaller firms.

Real interest rates were found to positively affect the growth of firms with over 20 employees. The implication is that the cheaper the cost of borrowing, the larger the opportunity for growth of business firms. Interestingly, no such relationship is seen in firms with less than 20 employees, indicating that fiscal policy should focus on controlling interest rates to promote borrowing and investments for firm growth. Here, policies that support small businesses in inflationary trends, such as subsidized loans or tax breaks or exemptions, may support the growth of these firms.

The real effective exchange rate has a negative and significant relationship with the growth of firms of all sizes, especially in firms in the categories with less than 100 employees. This finding might imply that exports become more expensive as the exchange rate appreciates,

significantly impacting smaller firms. Larger firms, on the other hand, may have a resource advantage to hedge against exchange rate fluctuations. Regarding openness, smaller firms with less than 20 employees do not benefit from openness to international trade, suggesting that export promotion for small business firms may be required along with import substitution. International trade agreements, institutions, and platforms also require processes sensitive to the firm size. Trade policies must protect smaller firms from the adverse effects of international competition. This could include export incentives for firms with less than 20 employees and creating linkages and channels for them to access global markets.

The economy's growth, measured by GDP growth, was positively and significantly related to firm growth across all categories of firms. By implication, economic expansion drives firm growth irrespective of size. Targeting government policies such as investment in infrastructure, technology, and workforce development to support economic growth is critical for firms' growth.

As measured in the current study, innovation with patent issues is a key factor that drives growth. This variable was significant across all categories of firms, significantly larger firms with 20 or more employees. Therefore, firms that invest in R&D and innovation are in a better position for growth, regardless of size. However, larger firms tend to benefit more than smaller firms. Ideally, government policies to boost research, development, and innovation are essential for firm growth. Hence, funding research and supporting innovation through efficient processes may be helpful strategies for enhancing firm growth in small businesses. Proactive policy development and deployment are required in emerging technologies like Artificial intelligence that impact innovation.

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APPENDIX

Table 1 Unit Root Tests for stationarity (1980-2020)

	Augmented Dickey-Fuller		Phillip Perron	
Variable	level	First difference	level	First difference
FIRMg1-19	-0.4616	-6.0866**	-0.5050	-6.0856**
FIRMg20-99	-3.2254	-7.3210**	-3.2794	-9.8691**
FIRMg100+	-1.6892	-6.0996**	-1.3611	-8.5071**
FIRMgAll	-2.4861	-4.7716*	-2.2579	-8.6988**
INFL	-3.2364	-5.2781*	-3.9742	-6.3279**
RINT	-1.9310	-5.1771*	-1.5232	-5.0994**
REER	-2.1506	-10.3685**	-5.5506	-10.2652**
RGDPg	-4.0550	-8.2818**	-4.0997	-11.2437**
OPEN	-1.4435	-6.2276**	-1.3972	-6.2171**
INNOV	-0.1137	-6.0291**	-0.7252	-9.1995**

Note: (i) ADF test of the variables shows stationarity at first difference at 5% level; *and ** indicate that the estimated root is significant at 1% and 5%, respectively.

Table 2. DOLS Regression for Firms 1-19

Variables	Coefficient	S.E.	t-Stat.	Prob.
INFL	-0.0268	0.0182	-1.4681	0.1642
RINT	0.0223	0.0219	1.0151	0.3273
REER	-0.0089	0.0021	-4.1537	0.0010***
RGDPg	0.0721	0.0165	4.3588	0.0007***
OPEN	-0.0425	0.0099	-4.2941	0.0007***
INNOV	0.1915	0.0742	2.5801	0.0218**
Constant	10.9360	0.8029	13.6210	0.0000***
R-squared	0.9687			
Adjusted R-squared	0.9150			

Note. ***, **, * indicate the estimated coefficient is significant at 1%, 5% and 10% respectively

Table 3. DOLS Regression for Firms 20-99

Variables	Coeff.	S.E.	t-Stat.	Prob.
INFL	0.0667	0.0288	2.3163	0.0362**
RINT	0.0864	0.0346	2.4939	0.0258**
REER	-0.0126	0.0034	-3.7222	0.0023***
RGDPg	0.1535	0.0261	5.8774	0.0000***
OPEN	0.0170	0.0156	1.0861	0.2958
INNOV	0.3731	0.1172	3.1843	0.0066***
Constant	10.3157	1.2673	8.1401	0.0000
R-squared	08178			
Adjusted R-squared	0.5059			

Note. ***, **, * indicate the estimated coefficient is significant at 1%, 5% and 10% respectively

Table 4. DOLS Regression for Firms 100+

Variables	Coeff.	S.E.	t-Stat.	Prob.
INFL	0.0560	0.0272	2.0571	0.0588*
RINT	0.0681	0.0328	2.0787	0.0565*
REER	-0.0080	0.0032	-2.5015	0.0254**
RGDPg	0.0969	0.0250	3.9254	0.0015***
OPEN	0.0316	0.0148	2.1364	0.0508*
INNOV	0.4144	0.1108	3.7408	0.0022***
Constant	10.3245	1.1982	8.6170	0.0000
R-squared	0.9406			
Adjusted R-squared	0.8387			

Note. ***, **,* indicate the estimated coefficient is significant at 1%, 5% and 10% respectively

Table 5. DOLS Regression for Firms All

Variables	Coeff.	S.E.	t-Stat.	Prob.
INFL	0.0544	0.0225	2.2009	0.0464**
RINT	.0770	0.0308	2.5044	0.0264**
REER	-0.0086	0.0028	-3.0665	0.0090*
RGDPg	0.1029	0.0216	4.7982	0.0003*
OPEN	0.0245	0.0132	1.8642	0.0850***
INNOV	0.3562	0.1033	3.4492	0.0043*
Constant	11.7940	1.1730	10.0543	0.0000
R-squared	0.8976			
Adjusted R-squared	0.70859			

Note. ***, **, * indicate the estimated coefficient is significant at 1%, 5% and 10% respectively