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Exploring the Determinants of Financial Development (Using Panel Data on Developed and Developing Countries)

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Abstract This research paper investigates the determinants of financial development. Credit to private sector is used as proxy of financial development in this study. Panel data from 1990 to 2012 on 27 developed and 30 developing countries has been used. The main interest of the research paper is to explore how different variables or indicators affect the credit to private sector as percentage of GDP (CPS) (We use credit to private sector as percent of GDP (CPS) as proxy of financial development.). The Hausman test is used to check weather fixed effect model is more appropriate or random effect model. Hausman test is in favor of Fixed Effect Model. The role of different important variables which effect the financial development have been found by using fixed effect model. It is concluded from empirical results that all exogenous variables except NFDI and RL have significant effect on financial development.

Keywords: *credit to private sector, financial development, panel data analysis, fixed effect model, hausman test*

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1. Introduction

The importance of financial development and economic growth have become more pronounced in recent years; in addition to other vital factors, the long term economic growth and welfare are correlated with the degree of financial development. There are different indicators to measure financial development such as size, depth, access, efficiency and stability of a financial system. The financial systems include markets, intermediaries, range of assets, institutions and regulations. A strong financial system guarantees the high capital accumulation (the rate of investment), trading, hedging, insurance services, diversified saving and portfolio choices etc. which facilitate and encourage the inflow of foreign capital and technological innovation. The greater financial development leads to poverty reduction, income inequality, mobilization of savings, better access of the poor to finance, high return investment, promotion of sound cooperate governance and enhancement of economic growth as well as welfare.

The key importance of financial development and economic growth is generally acknowledged in the literature. However, the area of public sector borrowing from domestic banks and its impact on financial development and credit to private sector is still under-research. The public debt is often seen as a burden for both developing and developed countries. Since the early 1990s, there has been a fiscal improvement in both developing and developed countries due to restricted public debt; however, the fiscal adjustment in developed countries has been more noticeable than developing countries (World Economic Outlook, 2001).

In recent years, the public debt in advanced countries has been falling while the emerging market countries do not follow the same trend. It is because advanced countries preferred to give credit to private sector than the public sector to avoid the crowding out situation. The crowding out situation limited the excess of private sector on credit from domestic banks both in developed and developing countries. The supply and demand of credit to the public and private sectors depends upon the macroeconomic conditions. If the level of public debt is high in the economy and macroeconomic variables indicate that the country's economic situation is vulnerable, domestic banks may be expected to prefer to finance public sector instead of private sector, which is more risky borrower. Thus, the private sector credit by the domestic banks may decline in such economies (IMF, Research Department, 2004),

The credit to private sector is essential for the private investment and development in an economy. The domestic banks play a pivotal role in increasing employment, efficiency, productivity and inducing growth in an economy. However, in large emerging countries than advanced ones, the domestic banks mostly prefer to

finance public sector to private sector. Thus, the private sector faces problems in finding credit for investment in form of crowding out systematically (Caballero and Krishnamurthy, 2004).

The importance of financial sector cannot be denied as efficient financial system is a perquisite condition for rapid economic growth. On one side the well-organized financial sector escalates the inflow of capital, availability of financial services, improve saving and efficient allocation of credit in economy while on the other side the same factors help to improve GDP growth rate. The credit to private sector can be taken as a proxy of development in financial sector.

In this research report, our objective is to explore the antecedents of credit to private sector using panel data on 27 developed and 30 developing countries from the period 1990-2012.

2. Literature Review

Anthony and Frank (2013) studied the commercial bank's credit rationing behavior in Ghana. The log it model was used and odd ratios were calculated. The results suggested that even though interest rates might be liberalized to ensure the proper credit allocation, the commercial banks would still ration out credit due to moral hazards & adverse selection. It was therefore suggested, that government and central bank should play their active role in the financial sector and forced the commercial banks to improve their credit systems to reduce default rate rather than using the traditional methods.

Rubaszek and Serwa (2012) formulated a life cycle model for credit to household sector and linked it with individual income uncertainty. The dynamic life-cycle general equilibrium model is used for 36 countries from period 1990-2005. The results showed that decrease in deposit and savings from individuals and rising spread rate persistently reduced the level of credit to household sector.

Djankov *et. al* (2005) tried to estimate the determinants of private credit by using date set on legal creditor's rights and registration of private and public credit in 129 countries. The study found that both creditors' protection through the legal system and information sharing institutions were associated with higher ratios of private credit to GDP, but that the former was relatively more important in the richer countries. An analysis of legal reforms also showed that credit to private sector arose after improvements in creditor's rights and in information sharing.

Rotherford (2000) quantified the socioeconomic characteristics of financial sector in 38 Sub Saharan African countries. The study found that the range of financial products was limited and became a big hurdler in banking sector growth. The study calculated different money multiplier and then linked them with banking sector growth.

Kosmidou *et al* (2002) studied the interrelationship between bank performance, financial structure and macroeconomic indicators. The study used unbalanced panel data on 32 commercial banks and stock market during the period 1995-2002 in U.K. The study found that the banks had to compete with NFBIs and stock market in rapidly challenging environment. The proxies of bank performance as Return of Average Asset, Return of Equity and Net Interest Margin, Capital, Cost to income ratio suggested that only cost efficient and well equipped banks could grow faster. Further, the rising GDP growth rate and low inflation positive affected the bank performance.

Yassin (2012) analyzed financial health of 25 insurance companies in Jordan from 2002 -2007. The study used leverage, liquidity, age, size and management competitive index to measure their performance. The time series analysis depicted that managerial skills, investment opportunities and normal profits made them competitive markets. Moreover, the presence of insurance companies not only improved the role of financial sector but also enhance economic growth and well being through proper allocation of financial resources.

Maleya (2013) studied the financial health of listed companies during the 2006-2012 in Kenya. Most of the firms took financial facility from banks in short run to fulfill their current and operational expenses. The study found that the size, age, return on assets, liquidity had positive effect on firm's performance. However, the increasing leverage, debt and operating cost level led to firm towards bankruptcy and diseconomies of scales. In this situation, the firms focused on stock market for financial assistance that would be made them cost effective, competitive and stable in long run.

3. Data and Methodology

The research paper used the balanced panel data on the sample consisting of 27 developed and 30 developing countries from the period 1990-2012. The following model is formulated to determine the impact of different variables on Credit to Private Sector as percentage of GDP:

$$CPS_{it} = f(POPG_{it}, AGRI_{it}, GDPG_{it}, TOPENNESS_{it}, NFDI_{it}, GSC_{it}, DEM_{it}, RL_{it})$$

Where

CPS =credit to private sector as percent of GDP

POPG = population growth

AGRI = share of agriculture sector in GDP

GDPG= real GDP growth

TOPENNESS = trade openness which is the sum of exports and imports as percent of GDP

NFDI = net foreign direct investment as percent of GDP

GSC = government current spending as percent of GDP

DEM= index of democracy

RL = index of rule of law

The model of this study is:

$$CPS_{it} = \alpha_{1i} + \alpha_2 POPG_{it} + \alpha_3 AGRI_{it} + \alpha_4 GDPG_{it} + \alpha_5 TOPENNESS_{it} + \alpha_6 NFDI_{it} + \alpha_7 GFC_{it} + \alpha_8 DEM_{it} + \alpha_9 RL_{it} + \varepsilon_{it}$$

i stands for the i^{th} cross-sectional individual (i.e. country) and t for the t^{th} time period.

It is often of interest to examine the relationship between the variables by using cross-sectional and time-series data together by longitudinal or panel data sets. The main advantage of panel data is that one can increase the

number of degrees of freedom and power of the test by employing more information on the behavior of a large number of entities at the same time. The additional advantages of panel data are to mitigate problems of multicollinearity that may arise if time-series are modeled individually and presence of heteroscedastcity in cross sectional data. The panel data set addressed these problems efficiently. However, the Heterogeneity across entities/units is central issue when we analyzed the panel data. The report uses the two most prominent estimation techniques (Fixed Effect Model and Random Effect Model) to resolve the heterogeneity. The panel Fixed Effect Model is:

$$y_{it} = \alpha_i + \beta x_{it} + e_{it}$$

i = 1, 2, 3……57 t= 23

α_i = Intercept for each entity

β=slope of panel regression line and same for all entities

x_{it} = independent variables

e_{it}= error term

If individual country effect α_i (cross-sectional or time specific effect) does not exist, the Ordinary Least Squares (OLS) produces efficient and consistent parameters/estimates. As there is the problem of heterogeneity in the panel data, the OLS estimators is no longer BLUE. Then the most appropriate method is Pooled Ordinary Least Square to produce efficient and consistent parameters/estimates.

The Fixed Effect Model (FEM) also referred as the "Least-Squares Dummy Variable (LSDV) model" estimates the intercepts (as coefficient of dummy variables)for n-1 units. This model allows intercepts to vary for each cross-section and thus accounts for the individual effect. The FE estimation controls the unit-specific heterogeneity by eliminating (demeaned values) all time-constant information for each individual i^{th} from the data. Moreover, the addition of dummies for all entities expect for one increase the degree of freedom with the alphas pool across entities/units, so in essence, we have n parallel regression lines.

In Fixed Effect Model (FEM), the null hypothesis is that all of the units/entities share the same intercept. The alternative is that they have different intercepts across units. This is tested and compared by a joint F-test statistics. However, sometimes the different unit's intercepts may pick up a random error and thus be inconsistent.

The Random Effect Model (REM) estimates when unobserved heterogeneity is uncorrelated with any one of the explanatory variable in the model. In other words, $\boldsymbol{a_i}$ is a sort of random disturbance at the individual level. The Random Effect model is:

$$y_{it} = \alpha_o + \beta_j x_{it} + a_i + e_{it}$$

α_o= Intercept same for all entities

β_j =different slope for each entity

$\mathbf{X}_{it}$= independent variables

a_i =unobserved variable

e_{it}= error term

In Random Effect Model, if a_i is uncorrelated with any of the explanatory variables then β_j can be consistently estimated for a single cross-section and there is no need to use for panel data. However, this model may loss much useful information about the entities in the other time periods.

The appropriate model estimation strategy is based on the a_i as parameters to be estimated infixed effect method or a_i as random variable uncorrelated with the explanatory variables in random effect model. The FE and RE estimators can be compared through a test whether there is correlation/uncorrelation existed between *ai* and $\mathbf{X}_{it}$ across all time periods or not. The Hausman (1978) can tell us about the appropriate model.

The Hausman test is used to test either RE estimators or FE estimators are consistent. If a_i is uncorrelated with the explanatory variables, in this case, RE estimators are more efficient than FE estimators. If a_i unobserved heterogeneity is correlated with the independent variables in the case, RE estimators are biased, while FE estimators are consistent. The hypothesis is formulated the following way under Hausman test as:

H_0: Corr (a_i, x_j) = 0 RE estimators are more efficient than FE estimators.

H_1: Corr (a_i, x_j) ≠ 0 FE estimators are more efficient than RE estimators.

4. Results and Discussions

This section consists of empirical analysis. The results/estimations are presented with tables and explanations below:

First we explored the descriptive statistics of our panel data in Table 1 and Table 2:

The Table 1 shows the mean value of all the variables used in the analysis during the period 1990 to 2012 for each country. During 1990-2012, Thailand's mean credit to private sector as percentage of GDP is 117.90, mean population growth rate is 0.8, mean share of ARGI in GDP is 10.6, mean GDPG 4.7, mean TOPENESS as percentage of GDP is 107.6, mean NFDI as percentage of GDP is 3.0, mean GSC as percentage of GDP is 0.1, mean DEM index is 6.4 and mean RL index is 0.2. China's average credit to private sector as percentage of GDP is 107.88, mean population growth rate is 0.8. mean share of ARGI in GDP is 15.7, mean GDPG 10.0, mean TOPENESS as percentage of GDP is 51.4, mean NFDI as percentage of GDP is 3.8, mean GSC as percentage of GDP is 0.1, mean DEM index is -0.7 and mean RL index is -0.4 Pakistan's average credit to private sector as percentage of GDP is 24.30, mean population growth rate was 2.2 mean share of ARGI in GDP is 23.80, mean GDPG 4.2, mean TOPENESS as percentage of GDP is 32.7, mean NFDI as percentage of GDP is 1.3, mean GSC as percentage of GDP is 0.1, mean DEM index is 2.5 and mean RL index is -0.7.

The Table 2 shows the total number of observations is 1311 as there are 57 countries and 23 time periods. The overall statistics shows in all panels mean of credit to private sector as a percentage to GDP (CPS) is 172.1862, standard deviation 960.9384 units, minimum value 1.166 and maximum value is 15788.26. The between statistics shows the value between the panels i.e. countries, for example, 751.5921 units is the standard deviation of CPS, the minimum value is 6.546282 and the maximum value is 5736.89 during the period 1990-2012. Similarly, the

within statistics shows the standard deviation of CPS, the minimum value and the maximum value for any specific country during the period 1990-2012.

Table 1. Descriptive Statistics- Mean Values- All Countries

COUNT-RIES	MEAN (CPS)	MEAN (POPG)	MEAN (AGRI)	MEAN (GDPG)	MEAN (TOPENNESS)	MEAN(NFDI)	MEAN(GSC)	MEAN(DEM)	MEAN(RL)
Algeria	13.4	1.8	9.6	2.6	56.0	0.9	0.2	-1.5	-0.9
Argentina	17.0	1.1	7.7	4.7	21.7	2.4	0.1	7.6	-0.4
Australia	92.4	1.3	3.3	3.2	33.7	2.6	0.2	10.0	1.7
Austria	105.0	0.5	2.2	2.2	87.8	3.1	0.2	10.0	1.8
Azerbaijan	9.4	1.2	17.1	4.4	83.6	17.3	0.1	-5.8	-0.9
Belgium	76.8	0.5	1.3	1.8	140.0	12.0	0.2	9.5	1.3
Brazil	48.6	1.3	6.3	2.7	22.9	2.3	0.2	8.0	-0.3
Bulgaria	48.4	-0.8	11.4	1.1	103.5	7.4	0.2	8.5	-0.2
Canada	129.8	1.1	2.3	2.3	65.6	2.7	0.2	10.0	1.7
Chile	65.9	1.3	6.0	5.1	62.9	6.0	0.1	8.9	1.2
China	107.9	0.8	15.7	10.0	51.4	3.8	0.1	-7.0	-0.4
Colombia	33.2	1.6	11.1	3.7	33.8	2.9	0.1	7.4	-0.7
Czech Republic	52.7	0.1	3.8	1.6	102.4	4.4	0.2	9.1	0.8
Denmark	118.6	0.4	2.3	1.5	82.1	2.8	0.3	10.0	1.9
Estonia	51.4	-0.7	4.4	5.7	133.8	7.8	0.2	7.7	0.8
Finland	74.0	0.4	5.1	1.8	68.3	2.8	0.2	10.0	1.9
France	121.5	0.5	3.4	1.6	47.0	2.2	0.2	9.0	1.4
Germany	107.1	0.2	1.3	1.7	65.1	1.3	0.2	10.0	1.6
Hungary	42.5	-0.2	7.2	0.9	125.6	8.9	0.2	10.0	0.8
Indonesia	35.8	1.5	16.0	5.1	75.3	1.0	0.1	1.8	-0.7
Iran, Islamic Rep.	23.8	1.4	13.6	4.8	39.2	0.7	0.1	-3.4	-0.7
Ireland	122.0	1.2	4.9	3.8	116.1	10.7	0.1	10.0	1.6
Italy	80.6	0.3	2.7	0.9	47.3	0.7	0.2	10.0	0.6
Japan	194.0	0.2	1.5	1.1	23.2	0.1	0.2	10.0	1.3
Jordan	72.7	3.2	3.9	5.3	111.4	6.1	0.2	-2.4	0.3
Kazakhstan	27.1	0.1	10.7	2.3	97.4	7.1	0.1	-4.7	-1.0
Korea, Rep.	99.8	0.7	4.8	5.2	62.4	0.6	0.1	7.3	0.9
Lebanon	71.7	2.2	6.8	6.7	69.3	10.7	0.2	7.0	-0.4
Luxembourg	125.4	1.5	0.7	3.7	261.5	17.8	0.2	10.0	1.8
Malaysia	116.4	2.2	11.0	6.0	176.8	4.3	0.1	3.9	0.5
Mauritius	62.5	0.9	7.4	4.7	136.2	1.7	0.1	10.0	0.9
Mexico	22.6	1.6	4.9	2.9	47.5	2.5	0.1	5.8	-0.5
Morocco	45.5	1.3	16.5	3.8	59.2	1.6	0.2	-6.3	0.0
Netherlands	138.3	0.5	2.7	2.2	115.3	4.9	0.2	10.0	1.7
New Zealand	112.3	1.1	6.8	2.5	52.2	2.9	0.2	10.0	1.8
Norway	70.9	0.7	2.1	2.5	70.2	2.4	0.2	10.0	1.9
Pakistan	24.3	2.2	23.8	4.2	32.7	1.3	0.1	2.5	-0.7
Panama	81.9	1.9	6.9	6.3	160.3	6.7	0.1	8.8	-0.2
Poland	30.5	0.1	5.6	3.7	60.2	3.0	0.2	9.1	0.6
Portugal	118.3	0.2	4.2	1.6	59.6	2.9	0.2	10.0	1.1
Romania	20.1	-0.4	14.5	1.2	59.4	3.2	0.1	7.6	-0.1
Senegal	21.5	2.8	17.8	3.4	63.1	1.6	0.1	3.8	-0.1
Serbia	32.4	-0.2	15.4	-0.7	58.1	4.2	0.2	8.0	-0.9
Slovak Republic	43.6	0.1	4.9	2.4	129.1	3.0	0.2	8.6	0.4
Slovenia	5736.9	0.1	3.6	1.8	111.4	1.6	0.2	10.0	1.0
South Africa	126.5	1.7	3.5	2.6	50.1	1.2	0.2	8.5	0.1
Spain	124.0	0.8	4.0	2.2	48.0	3.0	0.2	10.0	1.2
Sri Lanka	25.8	1.0	18.0	5.4	69.2	1.3	0.1	5.1	0.1
Sudan	6.5	2.9	36.4	4.4	33.4	5.0	0.1	-5.6	-1.5
Sweden	109.9	0.5	2.3	2.1	79.0	4.7	0.3	10.0	1.8
Thailand	117.9	0.8	10.6	4.7	107.6	3.0	0.1	6.4	0.2
Tunisia	62.5	1.3	12.1	4.4	87.7	2.8	0.2	-3.7	0.0
Turkey	24.4	1.4	12.4	4.2	42.2	1.2	0.1	7.6	0.0
Ukraine	25.8	-0.6	14.0	-1.4	103.4	2.8	0.2	6.4	-0.9
United Kingdom	144.7	0.4	1.1	2.0	50.4	3.9	0.2	10.0	1.7
United States	168.7	1.0	1.4	2.4	23.6	1.4	0.2	10.0	1.5
Uruguay	31.4	0.4	8.8	3.3	53.4	2.7	0.1	10.0	0.5

Table 2. Descriptive Statistics for All Variables

Variables		Mean	Std. Dev	Min	Max	Observations
CPS	Overall	172.1862	960.69384	1.166045	15788.26	N=1311
	Between		751.5921	6.546282	5736.89	n= 57
	Within		605.7517	-5529.643	10223.55	T= 23
POPG	Overall	0.9022825	.9803194	-2.57432	11.18066	N=1311
	Between		0.86133312	-0.762369	3.157808	n= 57
	Within		0.4812422	-1.686991	8.925131	T= 23
AGRI	Overall	8.071236	7.288579	0.2961092	46.80178	N=1311
	Between		6.691987	0.6984814	36.44948	n= 57
	Within		3.015421	-3.891291	29.36305	T= 23
TOPENNESS	Overall	77.1302	48.47751	12.33528	442.7595	N=1311
	Between		43.83468	21.6701	261.5093	n= 57
	Within		21.46763	-1.110276	394.8966	T= 23
GDPG	Overall	3.198954	4.805711	-30.50847	38.20071	N=1311
	Between		1.93967	-1.396306	10.01304	n= 57
	Within		4.404715	-26.5673	34.68566	T= 23
NFDI	Overall	4.034005	9.190077	-161.2402	172.7155	N=1311
	Between		3.698894	0.1404834	17.77489	n= 57
	Within		8.426474	-174.9811	158.9746	T= 23
GSC	Overall	0.1706048	0.0528244	0.0314636	0.360623	N=1311
	Between		0.0494791	0.0764791	0.2951336	n= 57
	Within		0.0195794	0.071725	0.3157497	T= 23
DEM	Overall	6.378185	5.437572	-8	10	N=1311
	Between		5.180863	-7	10	n= 57
	Within		1.782309	-5.056598	13.1463	T= 23
RL	Overall	0.5137518	0.9821338	-1.63	2	N=1311
	Between		0.9798497	-1.472805	1.935391	n= 57
	Within		0.1435453	-0.425152	-1.952626	T= 23

The Hausman test to decide between FE and RE models is given in Table 3:

Table 3. Hausman Test to decide between FE and RE Models with sigmamore

Variables	Coefficients			
	B FE	B E	b-B Difference	sqrt(diag(V_b -V_B)) S.E.
POPG	-15.69665	-24.75033	9.53679	9.684827
AGRI	-3.332525	-3.105211	-0.2273142	1.492836
TOPENNESS	-5.838822	-0.4088235	-0.1750587	0.2710991
GDPG	8.852317	8.319239	0.5330781	0.3980669
NFDI	0.980383	-0.526031	0.1506414	0.1705991
GSC	-162.8541	123.3665	-286.2205	310.3628
DEM	1.490094	4.897171	-3.407071	3.64715
RL	-180.2724	-51.15148	-129.721	88.4497
b= consistent under H_0 and H_a; obtained from xtreg B= inconsistent under H_0 and H_a; obtained from xtreg Test H_0 : difference in coefficient not systematic Chi2(8) = (b-B)'[(V_b -V_B) (-1)] (b-B)= 4.37 Prob> chi2 = 0.08221				

To decide between fixed effect model or random effects model, we run simple Hausman test where the null hypothesis is that the random effect model is more efficient vs. the alternative hypothesis the fixed effect model is more efficent. The Hausman test implies (incorrectly) the use of the random effects model formulations. Because, a drawback of this Hausman test is, that the difference of covariance matrices may not be positive definite.To correct this problem we have applied the Hausman test with sigmamore option which based on both (co)variance matrices on disturbance variance estimate from efficient estimator. The Table 3 shows the value of chi-square is 4.37 which indicates that we reject the null hypothesis that the country random effect modelis more consistent and accept the alternative hypothesis that the country fixed-effects model is consistent and efficient.

As the Hausman test is in favor of Fixed Effect Model, we run regression for Panel Fixed Effect and the results are given in Table 4

Table 4. Panel Regression with Fixed Effects

Fixed-effects (within) regression Number of obs = 1311 Group variable: cid1 Number of groups = 57 corr(u_i, Xb) = -0.3127						
CPS	**Coef.**	**Std Err.**	**T**	**P>|t|**	**[95% Conf. Interval]**	
POPG	-15.69665	35.94221	-0.44	0.662	-86.21058	54.81728
AGRI	-3.332525	6.205478	-0.54	0.591	-15.50687	8.841815
TOPENNESS	-0.5838822	0.8331626	-0.70	0.484	-2.218439	1.050674
GDPG	8.852317	4.031391	2.20	0.028	0.9432542	16.76138
NFDI	0.980383	2.058794	0.05	0.962	-3.941047	4.137124
GSC	-162.8541	892.736	0.18	0.855	-1914.286	1588.578
DEM	1.490094	9.769293	0.15	0.879	-17.67599	20.65617
RL	-180.2724	124.2221	-1.45	0.147	-423.9801	63.43518
-CONS	340.8031	219.875	1.58	0.121	-90.56301	772.1692
sigma_u | 789.23807 sigma_e | 619.17263 rho |. 6190146 (fraction of variance due to u_i)						
F test that all u_i=0: F(56, 1246) = 32.94 Prob> F = 0.0000						

The rho value is 0.61901 which indicates that there is 61.91% variance is due to difference across the panels (country). Moreover, it also suggests that almost all the variation in credit to private sector as percentage to GDP is due to countries initial conditions. Only the real GDP growth rate has statistically significant as the t-value indicates while population growth rate, agriculture share in GDP, trade openness as percentage of GDP, net foreign direct investment to GDP, government current spending as a percentage to GDP, democracy index and rule of law index are statistically insignificant.

The Panel Random Effect and the results are given in Table 5:

Table 5. Panel Regression with Random Effects

Random-effects GLS regression Number of obs = 1311 Group variable: cid1 Number of groups = 57 Wald chi2(8) = 6.15 corr(u_i, X) = 0 (assumed) Prob> chi2 = 0.6304						
CPS	**Coef.**	**Std Err.**	**Z**	**P>|z|**	**[95% Conf. Interval]**	
POPG	-24.75033	34.61281	-0.72	0.475	-92.59019	43.08953
AGRI	-3.105211	6.023239	-0.52	0.606	-14.91054	8.70012
TOPENNESS	-0.488235	0.7878231	-0.52	0.604	-1.952928	1.13528
GDPG	8.319239	4.01169	2.07	0.038	0.4564722	16.18201
NFDI	-0.526031	2.051714	-0.03	0.980	-4.073888	3.968682
GFC	123.3665	837.0499	0.15	0.883	-1517.221	1763.954
DEM	4.897171	9.062967	0.54	0.589	-12.86592	22.66026
RL	-51.15148	87.22262	-0.59	0.558	-222.1047	119.8017
-CONS	198.9483	222.0185	0.90	0.370	-236.1999	634.0965
sigma_u | 772.91689 sigma_e | 619.17263 rho |. 6190146 (fraction of variance due to u_i)						

The Table 6 shows the adjusted results for fixed-effects model calculated with Driscoll-Kraay (1998) standard errors are more accurate for the variance-covariance matrix due to the presence of serial as well as spatial correlation (Camarero et al, 2010).

Table 6. FE Regression with Driscoll-Kraay Standard Errors

Regression with Driscoll-Kraay standard errors Number of obs = 1311 Method: Pooled OLS Number of groups = 57 Group variable (i): cid1 F(7, 22) = 42.09 maximum lag: 2 Prob> F = 0.0000 R-squared = 0.0193 Root MSE = 953.6283						
CPS	Coef.	Driscoll-Kraay Std Err.	T	P>|t|	[95% Conf. Interval]	
POPG	-65.43704 *	13.41789	-4.88	0.000	-93.26404	-37.61004
AGRI	-4.875887**	2.06687	-2.36	0.028	-9.162141	-0.5896325
GDPG	4.446572	2.963283	1.50	0.148	-1.698902	10.59205
TOPENESS	1.287962***	0.7027552	1.83	0.080	-0.1694628	2.75387
NFDI	-4.73335	3.259008	-1.45	0.161	-11.4921	2.025434
DEM	5.501435*	2.030456	2.71	0.013	1.290527	9.712343
RL	12.30306	13.46104	0.91	0.371	-15.61342	40.21955
-CONS	133.9519*	18.67359	7.17	0.000	95.22524	172.6786
Level of significance: *1%, ** 5%, *** 10% Note: government current spending as a percentage to GDP eliminated from analysis due spatial correlation						

From Table 6 the estimated model is:

$$(CPS)\hat{}_{it} = 133.951 - 65.43704 POPG_{it} - 4.875887 AGRI_{it} + 4.446572 GDPG_{it} + 1.287962 TOPENPER_{it} - 4.73335 NFDI_{it} + 5.501435 DEM_{it} + 12.3030679 RL_{it} + \varepsilon_{it}$$

The estimated model is interpreted as:

Even in case of zero value for all the independent variables (population growth, agriculture share in GDP, real GDP growth rate, trade openness, net foreign direct investment, government spending to GDP ratio, democracy index and rule of law index) all countries expected to have credit to private sector as a percentage to GDP is 133.951. The t-value of intercept depicts that intercept term has significant effect on CPS.

For one percent (the unit is in percent) decrease in population growth, credit to private sector as a percentage to GDP (CPS) is expected to increase by 65.437% holding all other variables constant as the t- value is 4.88 shows that POPG has significant effect on CPS.

For one percent (the unit is in percent) decrease in agriculture share in GDP, credit to private sector as a percentage to GDP is expected to increase by 4.875% holding all other variables constant as t-value is 2.36 means that sagriculture share in GDP has significant effect on CPS.

For one percent (the unit is in percent) increase in real GDP growth rate, credit to private sector as a percentage to GDP is expected to increase by 4.446% holding all other variables constant.

For one percent (the unit is in percent) increase in trade openness as percentage to GDP, the credit to private sector as a percentage to GDP is expected to increase by 1.287% holding all other variables constant at t-value is 1.83 means that TOPENESS has significant effect on CPS.

For one percent (the unit is in percent) decrease in net foreign direct investment as % to GDP, credit to private sector as a percentage to GDP is expected to increase by 4.733% holding all other variables constant.

For one unit decrease in democracy index, credit to private sector as a percentage to GDP is expected to

increase by 5.501% holding all other variables constant at t-value is 2.17 means that DEM has significant effect on CPS.

For one unit increase in rule of law index, credit to private sector as a percentage to GDP is expected to increase by 12.3036% holding all other variables constant.

5. Conclusion

Financial sector development is important as it makes available funds for the development of the country by efficient allocation of financial resources. The credit to private sector can be taken as a proxy of development in financial sector. In this research report, our objective was to explore the antecedents of credit to private sector by using panel data from 1990-2012 on 57 developed and developing countries. The finding indicates that the credit to private sector in all countries depends on population growth, share of agriculture sector in GDP, Real GDP growth, trade openness as percent of GDP, net foreign direct investment as percent of GDP, government spending as percent of GDP, Dem index of democracy, and RL is index of rule of law. The results from Fixed-effects model show that all independent variables; POPG, AGRI, TOPENNESS, GDPG and DEM have statistically significant effect on CPS as percentage of GDP (results are appropriate with Caballero, R. and Krishnamurthy, A. (2004), Hauner, D. (2006), Ali, K., Akhtar, M. F. and Ahmed, H. Z. (2011)),except NFDI and RL (results are deviating from Chakrabarti, A. (2001)and Nishat, M. and A. Aqeel (2005), due to entities and time differences). They do not have significant effect on credit to private sector. Hence, the demand and supply of credit to the private sector guarantees both financial development as well as economic growth.

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