INDIAN JOURNAL OF ECONOMICS AND DEVELOPMENT

RESEARCH ARTICLE

# An empirical analysis on the impact of non-performing loans on investment and economic growth and the role of political governance

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OPEN ACCESS

**Received:** 25 July 2020

**Accepted:** 13 September 2020

**Published:** 26 September 2020

**Editor:** Dr. V Shanthi

**Citation:** SenGupta S (2020) An empirical analysis on the impact of non-performing loans on investment and economic growth and the role of political governance. Indian Journal of Economics and Development, Vol. 8, Article ID: IJED-2020-27, Pages: 21. Doi: https://doi.org/10.17485/IJED/v8.27

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**Funding:** None

**Competing Interests:** None



Published By Indian Society for Education and Environment (iSee)

**ISSN**
Print: 2320-9828
Electronic: 2320-9836

## Abstract

**Objective:** To empirically analyze the link between nonperforming loans and investments along with the role of political governance. **Methods:** The estimation technique used is the fixed effects model including both the country and time fixed effects. The dataset consists a panel of 103 countries with annual data over the period from 2000 to 2017. A unique composite political governance index has been prepared combining the six existing governance indicators via Principal Component Analysis (PCA). **Findings:** It is found that NPL has significant negative impact whereas, governance has significant positive impact on investments as per expectations. However, it is found that the negative impact of NPL on investment gets stronger in presence of good governance. This is a paradoxical result and further attempts has been made to rationalize the outcome. **Applications:** The study empirically proves the theory of negative impacts of NPL on investment in the economy. Furthermore, the role of political governance has been scrutinized. No prior works have been carried out on this topic. The paradoxical result in this study has opened up new areas for research. An extensive literature review has been provided along with a detailed discussion on the possible measures to tackle with the problems.

**JEL Classification:**C3, E6, G0

**Keywords:** NPL; investment; political governance institutions; fixed effects model; composite political governance index

## 1 Introduction

*"Finance is, as it were, the stomach of the country, from which other organs take their tone."* – William Ewart Gladstone (Former British Prime Minister)

September 15, 2008, marked the beginning of a dark chapter in the global economy as the Lehman Brothers filed for bankruptcy. With $619 billion in debt and $639 billion in assets, Lehman's bankruptcy was the largest in history surpassing the previous bankrupt giants such as Enron and WorldCom [(1)]. The collapse was followed by closing down of its London office and several other international subsidiaries. The Lehman's demise

catalyzed the U.S. subprime-mortgage financial crisis that plagued the global financial market in 2008. The Lehman bankruptcy along with the 2008 crisis sent shock waves across the global financial markets with a widespread ripple effect and was wreaking havoc on the global economy. Lehman Brothers had been a major issuer of short-term debt in the form of commercial paper and its crash caused a credit freeze of this vital lending source throughout the world. Decrease in consumer spending, investment and exports to the United States massively affected manufacturing, flow of goods and job growth in Europe and Asia. On the other hand, the crisis caused an erosion of over $2 trillion from financial institutions alone, while the diminished growth as a result of the crisis and consequent recession has been estimated at over $10 trillion, which was just over one-sixth of the global GDP in 2008. The year 2009 was the first on record when global GDP contracted in real terms. Stock markets plummeted, leaving the world economy in turmoil. The world has not seen a worse economic downturn like this since the Great Depression of 1930s. The chair of the Federal Reserve (the US' central bank), Ben Bernanke, called it "the worst financial crisis in global history". Oxenford [(2)] mentions that even to this day, several direct effects of the crisis remain active concerns. He further informs that debt levels in advanced economies are still far above where they were before the crisis, though declining (Gross debt across advanced economies stands at 106% of GDP in 2016, compared to 72% in 2007). The unemployment in Mediterranean Europe remains incredibly high (over 15% in Spain and 20% in Greece). Even now, many eurozone banks retain pre-2008 non-performing loans on their books. Over the past decade, the credit quality of loan portfolios remained relatively stable across most countries in the world until the crisis hit. According to World Bank Estimates, over 4% of eurozone loans are still non-performing loans, with figures as high as 17% in Italy [(2)].

Against this backdrop, racking up of Non-Performing Loans (NPLs) (which can also be regarded as Non-Performing Assets or NPAs) in the banking sectors and the threat it possesses to the financial system of an economy, has been a rising concern ever since. For instances, NPLs have continued to increase in absolute terms between 2011 and 2014 by 122% in Nigeria [(3)]; the percentage of NPLs rose from around 5% in 2008 to above 10% by the end of 2011 in the Bahamas and the rest of the Caribbean Countries [(4)]; in Central and Eastern and South-Eastern Europe (CESEE) economies, NPLs rose way up to 11% by the end of 2011 from 3% in 2007 [(5)]; in India, it rose from 2.45% in 2008 to 9.19% in 2016; in Italy, the figure was as high as 18.06% in 2015 as compared to 6.28% in 2008 and it rose from 7% in 2009 to 45.57% in 2017 in Greece (World Bank and IMF estimates). Actually, rising magnitude of NPLs has recently been identified as one of the major obstacles against economic expansions in underdeveloped countries in particular [(6,7)]. For convenience, nonperforming assets/loans will be mentioned as NPL in the rest of the study.

While the definition of NPL is subjected to a change across various countries, in the global financial stability report of the IMF [(8)], a general definition has been provided. A loan is considered as non-performing if payments (principal and/or interest) due have not been paid for at least 90 days. In simpler words, loans which stop generating incomes for the banks and have become liabilities. Loans are classified into five grades: pass, special mention, substandard, doubtful and virtually lost by the Bank of International Settlement (BIS) five-tier system of classification. The last three types are classified as NPLs. While pass loans are considered as healthy, there might occur unforeseen difficulties (like sudden death of the borrower or unforeseen events such as crisis in the economy, a breakout of war) in the collection of special mention loan even if there exists no outstanding payment. Such loans are referred to as being 'impaired' by Sound Practices 7 and 11 of the Basel Committee on Banking Supervision and the International Accounting Standard (IAS) 39. The fact that NPL weakens the financial systems and has the potential to sabotage economic growth and development, calls for investigation on this matter. Acknowledging that, this paper makes an effort to analyze the impacts of NPLs on the economy extensively.

It cannot be debated that a well-functioning financial system in an economy lays the foundation for sustained economic growth and development by optimally linking savings with investments, promoting investment opportunities, improving financial decisions, increasing efficiency of resource allocation, diversifying risks among others [(9)]. From evidence throughout history, it can be seen that a faulty financial system along with erroneous regulations might lead to economic catastrophes. Schumpeter [(10)] first introduced the idea that the financial sector plays a key role in economic growth and this theory gathered support later on from leading economists like Goldsmith [(11)], McKinnon [(12)] and Demirguc-Kunt [(13)].

Just as a well-functioning financial system induces economic growth, a feeble financial system battling with NPLs and insufficient capital could impede economic growth [(14)]. It is important to note here that the level of NPLs assume a very critical position in determining financial stability since it demonstrates resource allocation inefficiency and credit risks to potential investments. Zeng [(15)] notes that loans boost total consumption in an economy, yielding a positive social utility whereas NPLs are considered as polluting elements to the financial system [(16–18)] which negates social utility. Zeng mentions about two economic implications of NPLs. Firstly, accumulating NPLs decline economic growth resulting in resource allocation inefficiency. Secondly, the growth of NPLs leads to an increase in capital requirements because of capital erosions, making it difficult for the bank to finance new and economically viable ventures and hence, there is shrinkage in investment. Amin et al. [(19)] supported the claim by saying that the unresolved bad debts put pressure on banks' balance sheets, earnings and capital

adequacy and form a system-wide perspective, weakening the restricted credit supply, banking sectors' stability and slowed down the overall economic prosperity. It is obviously, an irrefutable fact that the condition and functioning of the banking system have effects on the overall economy because the banks are the sources which finance job opportunities, new ideas, research and leads to economic prosperity [20]. However, accumulating NPLs can mark the onset of banking crises [21]. If NPLs keep accumulating and are continuously rolled over, the resources get stuck at unprofitable sectors. Also, the impairment for bad loans reduces the solvency position and risk profile of the banks. Abstaining from lending, through decreased consumption and bankrupt companies, further lowers investment or other economic activities which in turn produces more NPLs. So, the banking system and the whole economy gets trapped in a vicious circle which harms the economy as a whole [22].

To this regard, it is worth noting that investment is one of the key channels through which finance induces economic growth. It has already been an established theory that investment leads to economic growth because investment means expenditure on capital spending which allows for more research and development. This raises the productive efficiency of labor leading to economic growth. A rise in investment also enhances GDP manifold through multiplier effect. There also exist empirical evidence to back the theory of positive correlation between investment and economic growth. Ahmad et al. [23] found out that a 1% increase in investment leads to a 0.89% increase in GDP in Pakistan. Epaphra and Massawe [24] claimed that domestic private investment and FDI have a positive impact on growth in Tanzania. Makuyana and Odhiambo [25] concluded that public and private investments played a major role in economic growth in both developed and developing countries. A close connection between the level of investment and rate of economic growth has also been established in other studies in order to bolster the investment-growth theory [26–29]. Therefore, it would be absolutely safe to assert that an increase (or, decrease) in investment implies an increase (or, decrease) in economic growth.

Financial systems vary from being extremely fragile to relatively stable and from being rudimentary to quite sophisticated, across various countries in the world. Some of the major deciding factors responsible for these variations are the legal and policy structures, level of corruption, efficient governance, type and composition of the government, institutional development or in simple words, the governance or the public sector structural efficiency. Incompetent governance along with excessive risk-taking may indeed, undermine the banking system stability, contributing to an economic downturn. The 2008 U.S. subprime crisis is a hard-hitting example of that. From the investments point of view, new projects and investment decisions require a stable and secure environment. Good political and governance institutions are considered as the means to achieve that by reducing uncertainties and promoting efficiency [30]. This claim was also supported in the World Bank [31] reports. There, it was mentioned that better political and governance institutions make the investment climate better by enhancing bureaucratic predictability and performance. Apart from that, maintaining a good governance in an economy ensures a lower level of NPLs [32]. Even if an economy faces threat financial instability, an efficient government manages to eliminate the threats from NPLs and recover from the situation. As Colin Powell (statesperson and former United States National Security Advisor) quotes, " What we have to find is the right level of regulation of our financial system so that it has the incentive to invest in things, but at the same time, it is sufficiently regulated so it can't get in the kind of trouble that we have seen in the past and we have seen recently".

Though there exist studies which analyze the impact of NPLs on economic growth, no works have been done on the NPL and investment relationship exclusively. This paper aims to bridge the gap in the existing literature by examining the impact of NPLs on investment. As mentioned earlier that investment corresponds to economic growth, this paper would not separately analyze the impact of NPLs on economic growth. For adding further to the available literature, it will be analyzed how the political governance come into play and impact on investment when NPLs start piling up in the economy. The analysis is prepared collecting yearly data of a panel of 103 countries over the period between 2000 and 2017 (inclusive). For estimation, the fixed effects model is used with both time and country fixed effects.

## 2 Literature review

In the past decade, a lot of studies have been prepared linking finance and economic growth. There exist four schools of thought: supply-leading or finance-led growth, demand-following or growth-led finance, the bi-directional and the independent [33,34]. The independents believe neither causes the other [35]. The supply-led view supports that financial development leads to economic growth [36–38]. The demand following theory states that economic growth leads to financial development [39]. Lastly, the bi-directional causality school of thought believes that both cause each other. Whatever it might be, this study focuses on the effects of finance on economic growth or in a subtle tone, the supply-led school of thought.

Theoretically, finance affects growth through three channels. The first one operates through a boost of savings which in turn, increases loanable funds. The second one functions through efficient savings allocation, which paves the way for fruitful investments. The third one operates through the enhancement of the social marginal product of capital. Hondroyiannis, et al. [40] mentioned that economic growth rate is affected by financial development through growth in productivity and capital efficiency. The banks in the financial systems play a critical role in growth by efficiently allocating resources in an economy [41]. A smoothly

functioning financial system has the ability to drive efficient allocation of resources and accelerated growth when the market information is enhanced and the transaction costs are tempered[42–44]. The endogenous growth model supports the supply-leading argument suggesting a positive long-term relationship between financial intermediation and steady-state economic growth[45]. However, the view that finance has monotonically increasing effect on economic growth, has been challenged. It has been argued that after reaching a threshold of financial and economic development, the positive impact of an additional unit of value addition in the financial sector on the real economy disappears[46]. This view was supported by Gruendler[47]. He says that there is a negative effect of finance on growth and it is mainly driven by advanced economies. He further explains that in early stages of development, finance fosters investment, entrepreneurship and education but as the economies develop, the positive influence dissipates. This is also termed as the "vanishing effect of finance". Panizza, et al.[48], in their empirical analysis, found out that finance starts having a negative effect on output growth when credit to the private sector reaches 100% of GDP. Their results also conformed to the "vanishing effect of finance".

Existing empirical analyses on the finance-growth nexus also shed some light. De-Gregorio and Guidotti[49] identified a positive long-run impact on growth by financial development in a large sample of countries, but found diversified effects across countries. They concluded that financial development leads to economic growth. This conclusion was supported by Rajan and Zingales[50] and Darrat[51]. Hondroyiannis, et al.[40] after analyzing from both market-based and bank-based perspectives in Greece, found out a bi-directional causality. Naceur and Ghazouani[52] carried out an analysis with 11 countries of the Middle East and North Africa (MENA) region using GMM estimators and concluded that the underdeveloped financial system in the region dampened growth. Beck and Levine[53] used GMM model on a 23-year data set. They used a system of panel estimator[54] and found out that banks have positive influence on economic growth. Nyasha and Odhiambo[55] carried out a study on the Australian economy. They used annual data for 32 years and for estimation, Autoregressive Distributed Lag (ARDL) estimation technique was used to test both market-based and bank-based financial development's effect on economic growth. Their results suggested a short-run positive impact on growth using bank-based approach, but no significant impact with the market-based approach. Gilchrist and Zakrajsek[56] investigated the relationship between credit supply and bank lending conditions in the US economy over the period of January 1952-April 2010 using VAR estimation techniques. They claimed that the first reaction of banks to the financial problems is the rejection of loan applications and the reduction of credit amount in their balance sheets. Mimir[57] analyzed the U.S. banking sector over the period between 1987 and 2010 and one of his main findings was that financial shocks not only affect financial variables but also macro variables.

Specifically speaking about NPLs, most of the work has been devoted to the determinants of NPL along with their macroeconomic impacts. Espinoza and Prasad[58] examined the extent to which macroeconomic factors affected NPLs of various banks within the Gulf Cooperative Council (GCC) countries using VAR models. They found out that the NPL ratio of the banks deteriorated as interest rate rose and non-oil economic growth slowed down. It was also found that previous periods of high credit growth might lead to increased NPLs in the upcoming future. The authors also noted a strong but short-lived feedback effect from NPLs to economic growth. Klein[5] evaluated the determinants of NPLs and feedback effects in CESEE economies over 1988-2011 through panel VAR analysis. His results confirmed that with a higher GDP growth rate of the euro area, the level of NPLs fell. He further suggested that an increase in NPLs has significant negative impact on real GDP growth along with inflation, unemployment and credit growth in the period ahead. Similarly, Jordan and Tucker[4] used Vector Error Correction (VEC) model in their analysis based in the Bahamas and found out that economic growth reduces NPLs in both short and long-run and there exists a feedback effect from NPLs to real GDP. Erdogdu[59], in his study in Turkey over the period of 1998Q1-2015Q3, found out that growth in economic activity decreases NPL level but, there is also a feedback effect from NPLs to economic growth.

The literature analyzing the impact of NPLs on economic growth are mostly unanimous. In line with Schumpeter[14], Hou and Dickinson[60] mentioned that the effect of NPLs on the economy is that the resources are stuck in unproductive sectors resulting having detrimental effects on the economic growth and economic efficiency. This has negative impacts on the banking system's lending behavior which finally leads to credit crunch[61]. Banks now take a defensive stance and shy away from providing loans. This defensive action by financial institutions leads to obstructed credit extension which implies curtailment of investment on potential projects and thus, limits the economic growth performance. Hou and Dickinson[60] further mentioned that when the economic cycle is out of a boom period, the effects of NPLs worsen as economic agents, whose operational expansions have been reduced by limited loanable funds, finding it difficult to survive and perform the existing financial obligations. This scenario highlights the crucial role of changes in NPLs affecting on the allocative efficiency of the financial systems. Impavido, et al.[62] also mentioned that hindering credit growth is the channel by which level of NPLs adversely impacts on the economic growth. Jayaratne and Strahan[63] analyzed the panel data set of 50 U.S. states between 1972 and 1992. They found that there is a relationship between bank's loan quality and economic growth. Jakubik and Reininger[64], in their study on the banks in the Central, Eastern and Southeastern European countries, found out that there is a negative

correlation between NPL ratio and economic growth. Nkusu [65] examined the relationship between NPL and macroeconomic variables for 26 developed economies over the period of 1998-2009. Using VAR estimation techniques, he concluded that a sharp increase in NPL sets off a long-lived tailwind that incapacitates macroeconomic performance from several fronts. Ahmad, et al. [66] found a significant negative relationship between NPL and GDP in their study. Morakinyo and Sibanda [3] investigated the dynamics of NPL and economic growth in Nigeria from1998 to 2014. He used ARDL estimation method and found out that long-run economic growth of Nigeria could be affected by NPLs.

Accumulation of NPL, for sure, is a nuisance in the economy. If looked at it from a broad and different perspective, it would not be a grave mistake to insinuate that the political governance has influence over the NPL scenario, just like any other economic phenomenon. Likewise, the quality of political governance is also a part of the financial stability in a country. Detragiache, et al. [67] argued that political instability along with corruption are the major factors behind the poor and unstable financial system in low income countries. Aysan et al. [68] found out that political and governance institutions are positively associated with investment decisions. Wisniewski and Pathan [69] found out that excess government spending obstructs the inflows of FDI and foreign investors showed favoritism towards left-wing executives and tended to discriminate weakly against rightists and strongly against centrists. They further noted that a prolonged stay in power by a single party was negatively associated with direct investments and FDI tends to flow more into countries with long trends of democracy. Podpiera and Weill [70] analyzed the link between cost-effectiveness and NPL of the banking system in the Czech Republic over the period of 1994-2005. They provided convincing supporting evidence for mismanagement hypothesis and claimed the need for regulatory authorities in developing economies to focus on managerial performance to enhance the stability of the financial system by reducing NPL level. Ahmad, et al. [71] carried out an analysis with the banking sector of Pakistan between the period of 1996 and 2007. They found out that the NPL level decreased significantly during dictator regimes. A comparative evaluation with private and public sector banks in India from 2001 to 2013 revealed that public sector banks witnessed a continuous increase in gross and net NPAs in comparison to private sector banks and there exists a statistically significant difference in the man of gross and net NPA of the two categories of banks [72].

Clearly, the aspect of piling up NPL in financial systems globally in the recent years (Figure 1) is a matter of concern as it might threaten the economic well-being of a country. Also, the governance (or political scenario) most certainly plays a crucial role in determining investment decisions and put a restraint on and recover from piling up NPL problems. Hence, the following sections will provide an insight into the magnitude of NPL effects on investment and shed light about how the political governance takes part in it.

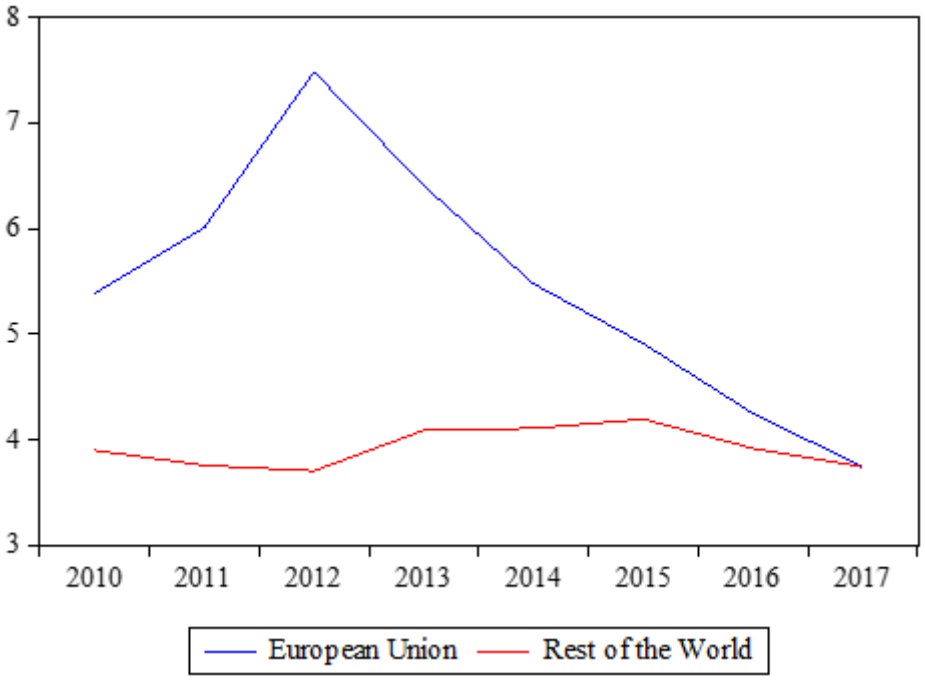


**Fig 1.** NPL to Gross Loan (%). Source: EBF, based on IMF and World Bank Data

## 3 Theoretical framework

This section intends to discuss the mechanism of NPL and how it exerts deleterious effects on the economic health theoretically with the help of two models. The entire framework has been constructed with reference to Samayita [73].

The model has been structured based on the modified Closed Economy IS-LM framework where the debt market (led by commercial banks) replaces the traditional money market. Here, the economy comprises of real sector based on the goods market and the financial sector based on the loan market wherein loan market equilibrium determines the interest rate and this in turn, calibrates the investment demand enabling an interaction between the real and financial sector.

Let us now first examine the loan market where the supply new loans ($\mathbf{L_S}$) is generated by the accumulation deposits (**D**) made by the public with the commercial banks net of reserves to be held by the commercial banks with the central banks. Hence, the supply new loan is defined as,

$$L_{St} = dD_t - dR_t + f(i_t - i_g)$$

where,

$dD_t$ is change in deposit stock at time **t**

$\mathbf{dR_t}$ is the total reserve held by commercial bank with central bank at time **t**

$\mathbf{i_t}$ and $\mathbf{i_g}$ are the interest rates at period **t** and **g**

Now, given that **r** is the Required Reserve Ratio, it can be written that

$$R_t = D_t r$$

Assuming credit extended by the Central Bank is used for financing Government Expenditure ($\mathbf{G_t}$), it can be written that

$\mathbf{dR_t = G_t}$ [holding the Central Bank's balance sheet identity]

Hence, we get the supply side of the loan market as

$$L_{st} = (1-r)dR_t/r = (1-r)G_t/r + f(i_t - i_e)$$

Now, the demand side of the loan originates from the demand for investment which is determined by interest rate **i** and profit expectation $\beta$ (More interest rate negatively affects investment demand and more profit expectation rises investment demand ) i.e.,

$$L_{Dt} = I(i_t, \beta)$$

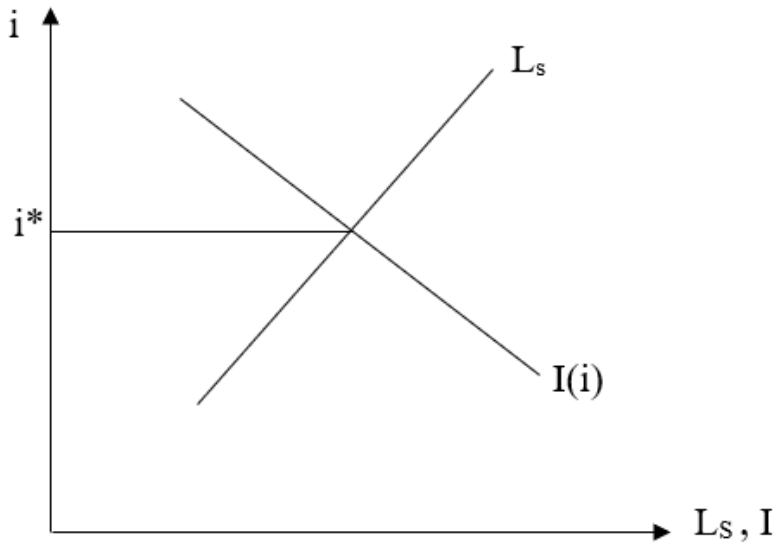


**Fig 2.** Demand-Supply Equilibrium in Loan Market

Hence, the loan market equilibrium is expressed as

$$I(i_t, \beta) = (1-r)G_t/r + f(i_t - i_g) \quad \text{(i)}$$

The condition determining the equilibrium interest rate is depicted in Figure 2 where **i** * is the equilibrium interest rate.

Now, the goods market remains like the traditional IS-LM model where the equilibrium condition is given by

$$Y_t = AD_t = C(Y_t - T_t) + I(i_t, \beta) + G_t$$

Replacing **I** in the goods market equilibrium expression from loan market equilibrium, we have modified goods market equilibrium expression as

$$Y_t = C(Y_t - T_t) + G_t/r \quad \text{(ii)}$$

The equilibrium output is $\mathbf{Y_t}$ * as shown in Figure 3.

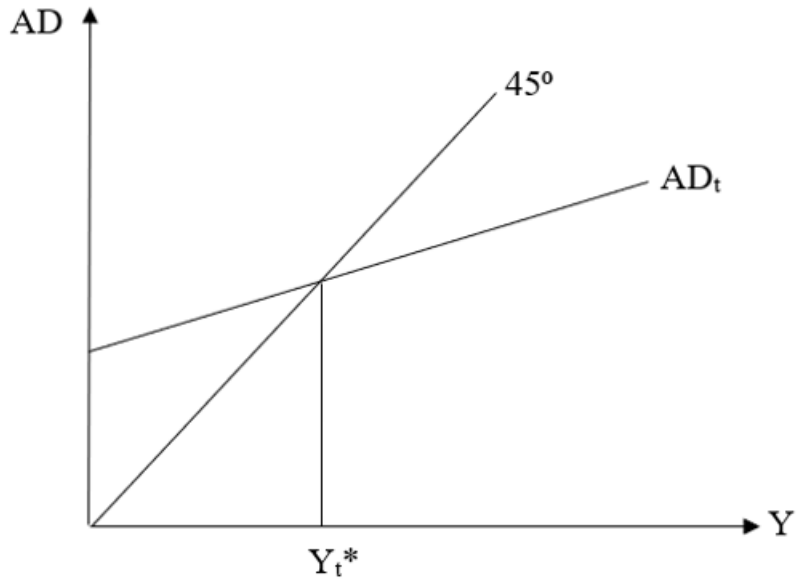


**Fig 3.** Equilibrium in the goods market

In figure 3, the equilibrium output is $\mathbf{Y_t}$ * which is a function of **G**, **T** and **r**. A rise in **G** leads to an upward shift of the **AD** line indicating an expansionary fiscal policy and rise in **r** leads to the downward shift of the **AD** line indicating contracting monetary policy.

To demonstrate the impact of NPL on the macroeconomic conditions, the discussed framework until now is slightly modulated. The accumulation of NPL cripples the bank's credit creating capacity in terms of the provision that banks keep to compensate for the loss occurring due to the defaults. Let **P** be the provision kept by the commercial banks for the loss due to defaulted loans. The equation of the supply of new loans in period **t** will get adjusted as

$$\mathrm{Lst} = (1-\mathrm{r})\mathrm{G_t}/\mathrm{r} - \mathrm{P_t} + \mathrm{f}\left(\mathrm{i_t} - \mathrm{i_g}\right)$$

where, $\mathbf{P_t}$ is the provision due to the default on the new loans made in the period **t-1**

Now, given that the likelihood on part of the firms to default on loans is determined by the state of aggregate demand in the sense that a contraction of **AD** and resultant recession in period **t-1** will prohibit the firms to achieve the expected revenue making it difficult for them to repay the loan. One can consider the loss provision **P** being a decreasing function of the previous output level $\mathbf{Y}_{t-1}$ provided that the real aggregate output is demand determined. Moreover, there could be other reasons for the increase in loss provision such as corporate failure of domestic firms, introduction of more strict norms related to banking supervision, moral hazards related to undue discretionary favor in extending credit and others. Accordingly, we find the revised loan market equilibrium condition with $P_t = P(Y_{t-1}, \varphi); P < 0:.$

$$I(i_t, \beta) = (1-r)G_t/r - P_t + f(i_t - i_g)$$

The determination of **i*** can be explained as: for given level of equilibrium output $\mathbf{Y}_{-1}$ obtained from the goods market, the supply of new loans will interact with the investment demand to determine **i***. As shown in Figure 4, in the presence of NPL, the schedule for the supply of new loans will shift to the left from $\mathbf{L}_{St}$ to $\mathbf{L}_{St}^{'}$ causing the equilibrium rate of interest to rise from **i*** to **i*** '.

Hence, an increase in interest rate will thwart investment affecting the production, aggregate output and consequently, overall economic growth. As illustrated in Figure 5, including **P** into the loan market equilibrium makes the aggregate demand schedule $AD_t = C(Y_t - T_t) + G_t/r - P_t(Y_{t-1}, \varphi)$ flatter and lowers real aggregate output from $\mathbf{Y_t}^*$ to $\mathbf{Y_t}^{**}$. Thus, accumulation of NPL results in the contraction of real output and the real aggregate output in the modified goods market equilibrium becomes a function of output of the previous year ($\mathbf{Y}_{t-1}$), ceteris paribus. Therefore, it follows:

$$Y_t = \mathrm{F}\left(Y_{\mathrm{t}-1}, \varphi, \beta, r, \dot{\mathrm{i}}_{\mathrm{g}}\right) \tag{iii}$$

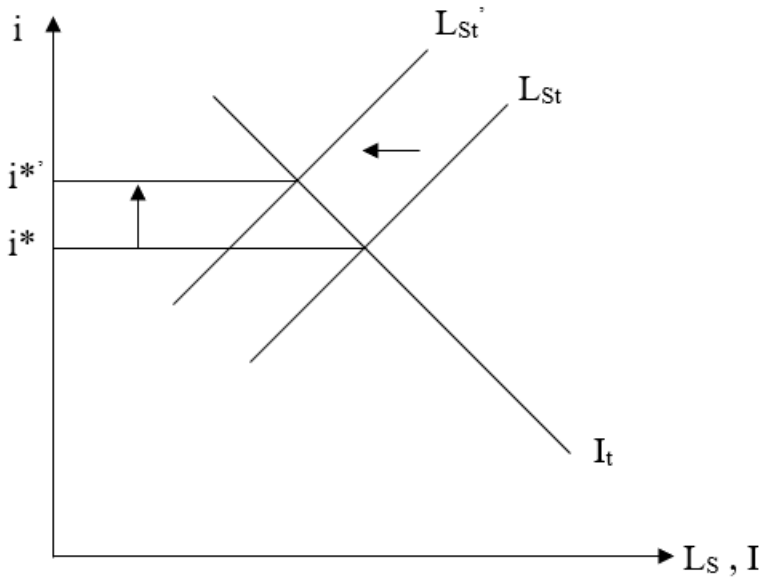


**Fig 4.** Interest rate equilibrium in presence of loan market

Now, the extent to which Y get contracted following the rise in NPL pile-up can be derived by comparative static operation, where NPL adjusted goods market equilibrium is differentiated totally. Thus, we have

$$\mathrm{dY_t} = \mathrm{C}^{'}\mathrm{dY}_t - \mathrm{P}^{'}\mathrm{dY_{t-1}}$$
$$\text{or, } \mathrm{dY}_t/\mathrm{dY_{t-1}} = -\left[\mathrm{P}^{'}/\left(1-\mathrm{C}^{'}\right)\right] > 0; \text{ since } P^{'} < 0$$

The result above signifies the self-perpetuating nature of effective demand problem and this occurs due to NPL accumulations. In other words, a sudden drop in effective demand causes overproduction and excess capacity accumulation causing trouble for the firms to refinance the loans which in turn leads to defaulted loans in banks. As a result, the banks need to set aside a part of additional deposits as a backup plan for such bad debts and hence, are left with fewer funds to create credit leading to a rise in the interest rate and fall in the investment, finally causing a detrimental effect on economic growth. This is how bad loans might lead an economy to recession or financial crisis and make it more vulnerable. Any recession breaking out in the economy, gets magnified in the presence of accumulated NPLs because of the increased provision for loss that banks are required to keep in face of loan defaults and resultant contraction of lending and investment. This phenomenon can also be referred to as the problem of effective supply failure.

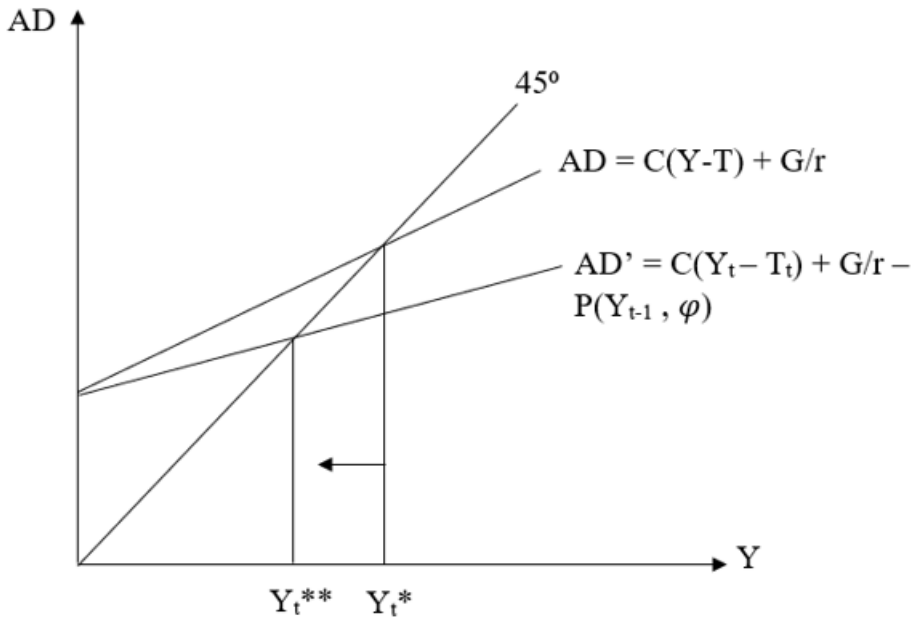


**Fig 5.** Aggregate output equilibrium in presence of NPL

## 4 Empirical analysis

### 4.1 Model specification and variable description

In this study, a panel data consisting of 103 countries have been used. In this scenario, simple estimation techniques like OLS is likely to be inefficient since it does not take into account and control for the unobservable individual effects. Hence, more advanced technique like Fixed Effects (FE) model is used. There exist several reasons for the increasing dependence on panel data models. A crucial one is that they capture both intertemporal and inter-country variations providing us the possibility to discover dynamics and information which are difficult to detect with other estimation techniques. Added to that, the large number of observations is an additional benefit which increases the degree of freedom and the variability of the model making it more accurate.

In fixed effects model, the intercept varies across individuals (countries in this study) and hence, it depends on variation within individuals and not between them. In this approach, it is assumed that if not controlled for, something within the individual may impact or bias the predictor or outcome variables which is the justification of the assumption of the correlation between entity's error term and predictor variables. In other words, the consistent estimation in the fixed effects model does not impose that the unobserved heterogeneity is uncorrelated with the explanatory variables. Therefore, the fixed effects model is a step above and addresses the discrepancies of the random effects model. Considering all the facts, fixed effects model with both country and time fixed effects has been employed for estimating the impact of NPLs on investment.

The model used is specified as follows:

$$\begin{aligned}\mathrm{GCAPF}_{it} = {} & \alpha_0 + \alpha_i + \alpha_t + \beta_1 \mathrm{NPL}_{it} + \beta_2 \mathrm{GOV}_{it} + \beta_3 \mathrm{IVAR}_{it} + \beta_4 \mathrm{GCON}_{it} + \\ & \beta_5 \mathrm{INF}_{it} + \beta_6 \mathrm{RINT}_{it} + \beta_7 \mathrm{DCRPS}_{it} + \beta_8 \mathrm{SSEN}_{it} + \beta_9 \mathrm{LIX}_{it} + \beta_{10} \mathrm{GDPPC}_{it} + \\ & \beta_{11} \mathrm{TR}_{it} + \varepsilon_{it}\end{aligned}$$

where,

**GCAPF** is gross capital formation as a percent of GDP and the dependent variable. The main independent variables of interest are: **NPL** which is bank nonperforming loans to total gross loans; **GOV** is the composite index of political governance prepared (details in the following section) and **IVAR** is the variable representing the interaction between **NPL** and **GOV**. Following several literatures, a set of control variables has been carefully selected [68,69,74–76]. The control variables used are: **GCON** denotes general government final consumption expenditure as a percent of GDP; **INF** is annual inflation rate (GDP deflator); **RINT** represents real interest rate; **DCRPS** indicates domestic credit to private sector as a percent of GDP; **SSEN** is secondary school

enrollment ratio (% gross); **LIX** indicates life expectancy at birth; **GDPPC** is GDP per capita (constant 2010 US$) and finally, **TR** is total trade as a percent of GDP. $\alpha_0$ is the constant term; $\alpha_i$ is the country fixed effect which captures for the unobservable heterogeneity across countries; $\alpha_t$ is the time fixed effect or the time unobservable effects that varies by year and is fixed across countries and $\varepsilon$ is the error term. Country and time are represented respectively by **i** and **t**.

Gross capital formation, **GCAPF** is used as the standard proxy for investment. **NPL** is expected to have a negative sign since nonperforming loans negatively impact economic growth and investment as it is a pollutant in the financial system. **GOV** is used here as a proxy for the political governance institution which is responsible for supporting and ensuring smooth functioning of economic activities. A strong political governing system ensures stability in the country and creates a healthy and ideal environment for investment and economic growth. A stable, properly functioning and well-governed economy not only encourages domestic investments but also attracts foreign investments. Hence, **GOV** is expected to have a positive sign. The interaction term, **IVAR** between NPL and governance is anticipated to have a positive sign. NPL accumulation in an economy cannot be attributed only to the incompetence of the political governance. There are several other determinants of NPL which are sometimes out of the jurisdiction and control of the political government. Aspects of corporate governance like credit risk management, careful assessment and supervision of the functioning of the private banks also regulate the NPL level[77]. Ikram, et al.[78] mentioned that bank-specific factors like branch age, duration of loan, credit policy and others regulate NPL accumulation. Along with the internal factors, international aspects like global volatility, exchange rate, oil price movement, financial crisis amongst others were also found to have major effects on NPL level in a country's economy[2,79–82]. Therefore, it can be asserted that an economy can rack up NPL even if the nation has an efficient and well-functioning government. The rationale behind the interaction variable having a positive sign is that a potent government is likely to dampen the detrimental effects of NPL on investment. **GCON** is employed in this model as a measure of fiscal policy, and can have both the positive or negative sign depending on certain factors. For instance, increased government spending on education, training, R&D, infrastructure is more likely to equip the population with enough skills and make them aware of optimal investment decisions. Not only that, country with good R&D, infrastructural and technological development makes the economy a lucrative environment for investment which attracts both the domestic and foreign investors leading to rise in investment. However, if the government chooses to spend more on welfare benefits, that most certainly would reduce the level of inequalities but that could potentially reduce the incentives to take risks, invest and work. Also, if the government expenditure is more on fields like military, that might repel away foreign investors because they deem such settings as hostile[69]. **INF** is predicted to have a have a negative coefficient because inflation poses a threat to investors because it chips away at investment returns and real savings. Most investors have the target to increase their long-run purchasing power and inflation puts this goal into risk because investment returns must first keep up with the inflation rate for increasing real purchasing power. **RINT** is likely to have a negative coefficient because higher rates increase the borrowing cost and require investment to have a higher return rate to be profitable. **DCRPS** is used to control for financial development in the economy and should have positive sign because more the available funding, easier it would be to take up new investment projects. King & Levine[36] showed that the share of credit and investment have positive correlation. Oshikoya[83] also concluded in his study that credit availability is an important of private investment. **SSEN** and **LIX** are used as proxies for human capital development. Both of these variables are expected to have positive coefficients. Human capital tends to stimulate capital formation by increasing the profitability of investment. The skilled workforce is better in dealing with organizational changes and productive technologies. Thus, human capital provides the enterprises or potential investors to expand or enter into new ventures. Besides, more educated people with higher life expectancy have more time to engage themselves in productive activities after finishing their education and are capable themselves to invest in and initiate entrepreneurial projects which leads to economic growth. Jayachandran and Muney[84] mentions that longer life expectancy encourages educational investments because a longer life time increases the value of investment. Following this theory, it can be said that increased educational investments results in workforces getting more productive and make people capable of making optimal investment decisions. Per capita GDP is used as a control for economic growth or development. With the increase in per capita GDP, individuals will likely to have more resources left after fulfilling their basic needs and they will tend to invest in a pursuit for further consumption expenditures. A growing economy corresponds to increased aggregate demand. More investments are made in an attempt to meet the demand. Hence, **GDPPC** is likely to have a positive sign. Lastly, trade openness or trade (**TR**) is used here as a way for measuring structural reforms and can have either a positive or negative coefficient. Trade reforms constitute another factor which influences investment decisions[85,86]. Trade openness is at the root of the economies of scale and of productivity gains. Besides, helping in providing positive externalities in the form of collateral for external financing[87], trade openness not only enhances the availability of external credit. There are also evidences which indicate that greater trade openness and increased competition improves political and governance institutions[88–93]. Hence, trade openness through the channel of political governance institution might also boost investment. Opening up markets might help to reduce rents and weaken vested interests derived from pre-existing

institutional and economic set-ups. All these factors explain why trade openness might have a positive sign. On the other hand, opening up trade in less developed economies with weak governance can prove to be counterproductive. Many small and sick industries might perish facing the global competition and that could further dissuade potential domestic investments. Thus, it would not be very surprising to have a negative coefficient for trade openness.

#### *4.1.1 Political governance Index*

The Worldwide Governance Indicator (WGI) project defines governance as: "Governance consists of traditions and institutions by which authority in a country is exercised. This includes the process by which governments are selected, monitored and replaced; the capacity of the government to effectively formulate and implement sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions among them". They mentioned aggregate and individual governance indicators for six dimensions of governance, namely:

1. Voice and Accountability
2. Political Stability and Absence of Violence/Terrorism
3. Government Effectiveness
4. Regulatory Quality
5. Rule of Law
6. Control of Corruption

The indices are scaled from -2.5 to 2.5 with 2.5 being the most favorable. The definitions and details of the indices can be found in Worldwide Governance Indicators. Voice and Accountability (**VOAC**) represents the notion of the political rights and liberties available to the country's citizens as well as freedom of press, freedom of expression amongst others. Investment decisions are sensitive to the perception of the credibility and tenacity of the political regimes and policies, since fixed capital formation involves a certain degree of irreversibility[94,95]. Governments build up credibility with the help of public accountability which is a guarantee of transparency and more accessibility of information. Open elections, free political parties and freedom of press indeed contribute to the government's legitimacy and provide a voice to the citizens in the decision-making procedure. Such a transparent and participatory political system maintains a stability in the economy and manages to earn public support by gaining their trust. Consequently, such a political scenario creates a favorable economic environment which has the potential to attract investments. Pastor & Sung[96] showed a positive effect of various indicators of democratic institutions on private investment in the developing world. Now, when the government is democratic and transparent along with the existence of well-functioning media system, any intended government decisions and other information are likely to be available to the public. In such a framework, for instance, every angle of the government decision to finance massive projects of entrepreneurs or industrialists are likely to be scrutinized rigorously and if deemed infeasible, would be criticized and influenced to refrain from financing them. Transparence and public accountability are likely to prevent the government from providing undue favor to rich industrialists, or taking up economically infeasible, impractical or irrelevant ventures which might, in turn, prevent NPLs from piling up. Political stability and absence of violence (**POLST**) is a proxy for measuring government stability, socioeconomic conditions, internal or external conflicts, ethnic or religious tensions, military in politics and other factors. It is worth noting that political instability and existence of any kind of conflicts or violence raises the uncertainty in the economy and discourages risk-averse industrialists, both domestic and overseas, to act for profitable investment opportunities. Many empirical literatures support this claim and notes that various institutions associated with political instability has detrimental impact on aggregate investment and economic growth[97–102]. Unstable government along with terrorism and other conflicts have the ability to disrupt industries and economic activities which might ultimately lead to accumulation of NPLs. Hence, a stable governance ensures the smooth functioning of the economy and prevent bad debts. Government Effectiveness (**GOVEFF**), regulatory quality (**REGQ**), rule of law (**ROLW**) and control of corruption (**CONCOR**) constitute for the administration quality. The quality of administration is an important factor because it expresses the ability of the government to cater to potential investors with a reliable and investment-friendly environment by reducing the cost and risk of doing business. An efficient governance manages to reduce the impact of NPL by optimally administering loans. **GOVEFF** account for quality of public and civil service, bureaucracy quality and describes the capability of the government to implement and formulate good policies which makes the economy suitable for investments and also prevent and prepare for NPL hazards without drastic changes in existing policies and interrupting other government services. **REGQ** captures the government's attitude towards promoting private sector development and inward investment. Since investors make long term decisions, risk to operations and other uncertainties are hostile towards investment. Labor costs and taxations are also of high importance for the decision to invest. Proper government regulations make sure that projects are up and running properly and protect them from incurring losses and going bankrupt

which in turn, prevents NPLs from hoarding up. **ROLW** measures property rights, law and enforcement and the confidence of the citizens and agents in abiding by the norms of the society. Due to the forward-looking nature of investment, investors require institutions that preserve the rights of private property, laws to protect this right along with lucrative incentives to respect and enforce it. A sound judicial system, in particular, reduces the cost of transaction for business and sends positive signals to investors that the law is enforced in a just manner. Provided the fact that defaulting on a loan can take a serious toll on the financial system of a nation, strict and well-enforced laws would prevent financial institutions to sanction loan more carefully and also dissuade investors and people, in general to take loans for impractical purposes. This might prevent NPL formation at the very first place. Also, an effective judicial system can work as an invisible hand in preventing inefficiencies and financial market failure to a significant extent. **CONCOR** captivates the extent to which public power is exercised for private gain, or in other words, how the citizens are protected from all sorts of corruption. Corruption is often regarded as one of the major constraints facing enterprises in the developing world. It not only raises the cost of investment and operations for investors but also increases the uncertainties regarding the timing and effects of the application of government regulations. Additionally, corruption enhances the cost of public enterprises which leads to insufficient and low-quality infrastructure[(103)]. Acting strictly to control corruption might prevent NPL formation. The rationale behind is that sometimes, corrupted government officials help in sanctioning huge loans for big industrialists without running necessary diagnostics for their intended purpose of the loans. In other words, with less corruption, the loan extension mechanism would be more efficient where loans would be extended to more credit-worthy applicants. These claims are corroborated by Khwaja & Mian[(104)] in their study based in Pakistan. In the scenarios of the defaulted loans by influential personalities, they are sometimes safeguarded by the corrupted government and nothing significant is done to recover the loans.

From Table 2, it can be seen that all the indices are positively correlated to each other. For this reason, it would be inconvenient to use all of them in the single model. Also, if certain variables are used and the rest are left out, we would be missing out crucial information since all of them captures different important perspectives. Therefore, a composite political governance index (**GOV**) is constructed by calculating the weight of each indicator. The vital weights are calculated using Principal Component Analysis (PCA).

**Table 1.** Principal component analysis of governance index

| Eigenvalues: (Sum = 6; Average = 1) | | | | | | |
|---|---|---|---|---|---|---|
| Number | Value | Difference | Proportion | Cumulative Value | Cumulative Proportion | |
| 1 | 5.18474 | 4.82431 | 0.8641 | 5.18474 | 0.8641 | |
| 2 | 0.360429 | 0.09419 | 0.0601 | 5.545169 | 09242 | |
| 3 | 0.266239 | 0.154807 | 0.0444 | 5.811408 | 09686 | |
| 4 | 0.111432 | 0.0708385 | 0.0186 | 5.92284 | 0.9871 | |
| 5 | 0.0405932 | 0.0040261 | 0.0068 | 5.96343 | 0.9939 | |
| 6 | 0.036567 | —– | 0.0061 | 6.0000 | 1.0000 | |
| Eigenvectors (loadings): | | | | | | |
| Variables | PC 1 | PC 2 | PC 3 | PC 4 | PC 5 | PC 6 |
| VOAC | 0.3874 | -0.0863 | 0.9034 | -0.1178 | -0.0347 | 0.1060 |
| POLST | 0.3675 | 0.9038 | -0.0566 | 0.1932 | -0.0373 | 0.0781 |
| GOVEFF | 0.4238 | -0.2513 | -0.2636 | 0.0311 | -0.7827 | 0.2724 |
| REGQ | 0.4151 | -0.3207 | -0.1075 | 0.7268 | 0.4219 | 0.0837 |
| ROLW | 0.4310 | -0.0686 | -0.1134 | -0.1824 | -0.0177 | -0.8735 |
| CONCOR | 0.4209 | -0.0701 | -0.2944 | -0.6216 | 0.4544 | 0.3720 |
| Correlation Matrix | | | | | | |
| | VOAC | POLST | GOVEFF | REGQ | ROLW | CONCOR |
| VOAC | 1.0000 | | | | | |
| POLST | 0.6945 | 1.0000 | | | | |
| GOVEFF | 0.7969 | 0.7322 | 1.0000 | | | |
| REGQ | 0.8071 | 0.7034 | 0.9384 | 1.0000 | | |
| ROLW | 0.8395 | 0.7941 | 0.9519 | 0.9199 | 1.0000 | |
| CONCOR | 0.7856 | 0.7704 | 0.9390 | 0.8808 | 0.9515 | 1.0000 |

The eigenvalues display that the first principal component explains about 86.41% proportion of variation (Table 2). The second, third, fourth, fifth and sixth explains 6.01%, 4.44%, 1.86%, 0.68% and 0.61% standardized variations respectively. It is evident that the first principal component is superior against the other combination of variables because of the fact that it displays a higher level of variability. Hence, this paper uses the first eigenvector values as a weight to build a composite

governance index. The separate contributions of **VOAC**, **POLST**, **GOVEFF**, **REGQ**, **ROLW** and **CONCOR** are 38.74%, 36.75%, 42.38%, 41.51%, 43.10% and 42.09% respectively.

## 4.2 Data type and source

The study involves annual data from a panel of 103 countries ranging over the period from 2000 to 2017. All the data have been collected from World Bank World Development Indicators (February 2019), Worldwide Governance Indicators, IMF database, OECD database and FRED database. The real interest rate data for Denmark has been collected from the official database of Danmarks Nationalbank.

## 4.3 Estimation and analysis

The empirical examination is initiated by first examining the impact of NPL on investment without adding any other independent variables (Reg. 1; Table 3). Then, the other two variables of interests, the political governance institution variable and the interaction variable, are added (Reg. 2; Table 3). Afterward, the investigation is extended by adding control variables one at a time. The ulterior motive behind doing this is to check whether the outcomes regarding the variables of interest change. The benchmark regression results of this paper are plotted under Reg. 8 in Table 3. It is also observed that the explanatory power ($R^2$) significantly increases when control variables are added.

**Table 2.** Fixed effects estimation output

| **Dependent variable: GCAPF** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Ind. Variable** | **Reg. 1** | **Reg. 2** | **Reg. 3** | **Reg. 4** | **Reg. 5** | **Reg. 6** | **Reg. 7** | **Reg. 8** |
| **Constant** | 17.040*** | 20.5*** | 22.859*** | 23.597*** | 27.178*** | 27.103*** | 79.476*** | 80.598*** |
| | (3.985) | (2.861) | (2.969) | (2.977) | (3.125) | (2.926) | (14.217) | (14.235) |
| | [4.28] | [7.17] | [7.70] | [7.93] | (8.70) | [9.26] | [5.59] | [5.66] |
| **NPL** | -0.152*** | -0.20*** | -0.212*** | -0.215*** | -0.288*** | -0.290*** | -0.244*** | -0.233*** |
| | (0.026) | (0.028) | (0.028) | (0.028) | (0.040) | (0.038) | (0.041) | (0.042) |
| | [-5.68] | [-7.17] | [-7.45] | [-7.57] | [-7.15] | [-7.46] | [-5.93] | [-5.51] |
| **GOV** | | 2.532*** | 2.451*** | 2.322*** | 2.483*** | 2.484*** | 2.640*** | 2.572*** |
| | | (0.876) | (0.874) | (0.873) | (0.951) | (0.891) | (0.937) | (0.939) |
| | | [2.89] | [2.81] | [2.66] | [2.61] | [2.79] | [2.81] | [2.74] |
| **IVAR** | | -0.15*** | -0.157*** | -0.158*** | -0.222*** | -0.213*** | -0.191*** | -0.182*** |
| | | (0.030) | (0.030) | (0.030) | (0.039) | (0.037) | (0.038) | (0.039) |
| | | [-5.01] | [-5.19] | [-5.22] | [-5.60] | [-5.66] | [-4.95] | [-4.64] |
| **GCON** | | | -0.234*** | -0.278*** | -0.356*** | -0.279*** | -0.319*** | -0.320*** |
| | | | (0.082) | (0.084) | (0.092) | (0.088) | (0.102) | (0.102) |
| | | | [-2.83] | [-3.29] | [-3.87] | [-3.14] | [-3.12] | [-3.13] |
| **INF** | | | | -0.058*** | -0.131*** | -0.159*** | -0.163*** | -0.161*** |
| | | | | (0.024) | (0.037) | (0.034) | (0.043) | (0.043) |
| | | | | [-2.39] | [-3.55] | [-4.60] | [-3.76] | [-3.72] |
| **RINT** | | | | | -0.100*** | -0.125*** | -0.109*** | -0.111*** |
| | | | | | (0.037) | (0.035) | (0.043) | (0.043) |
| | | | | | [-2.70] | [-3.59] | [-2.51] | [-2.56] |
| **DCRPS** | | | | | | 0.001 | 0.005 (0.013) | 0.005 |
| | | | | | | (0.012) | [0.44] | (0.013) |
| | | | | | | [0.08] | | [0.42] |
| **SSEN** | | | | | | | 0.017 (0.025) | 0.015 |
| | | | | | | | [0.69] | (0.025) |
| | | | | | | | | [0.60] |
| **LIX** | | | | | | | -0.915*** | -0.913*** |
| | | | | | | | (0.229) | (0.229) |
| | | | | | | | [-3.99] | [-3.98] |
| **GDPPC** | | | | | | | 0.0003*** | 0.0003*** |
| | | | | | | | (0.0001) | (0.0001) |
| | | | | | | | [3.12] | [3.28] |

*Continued on next page*

*Table 2 continued*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **TR** | | | | | | | | -0.015*** (0.011) [-1.31] |
| **Regression summary** | | | | | | | | |
| **$R^2$** | 0.785 | 0.792 | 0.793 | 0.795 | 0.799 | 0.821 | 0.849 | 0.849 |
| **Adj. $R^2$** | 0.756 | 0.763 | 0.765 | 0.766 | 0.768 | 0.792 | 0.818 | 0.818 |
| **Hausman testparm i.year** | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | 0.0000 | 0.0000 | 0.0000 | 0.0007 | 0.0000 | 0.0000 | 0.0004 | 0.0002 |
| **Prob>F** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Obs. (N)** | 1015 | 1013 | 1013 | 1013 | 927 | 913 | 750 | 750 |

Note: ***, ** and * represent 1%, 5% and 10% significance level respectively. Standard errors are shown in () and t-statistics are shown in []

It is seen that NPL has a negative coefficient and is significant at 1% level in all the regressions (Reg. 1 – Reg. 8) just as expected. The political governance variable is found to have a positive sign and it is significant at 1% level without any exception in any of the regressions, which confirms the theory that better performance by the political government or a better political scenario in an economy enhances investments.

Surprisingly, the interaction variable (interaction between NPL and governance) is found to have a significant negative relation with investment, which is not as per expectation. The negative sign of the interaction variable implies that the negative effect of NPL amplifies as the political governance gets better, leading to a paradoxical result. There could be a few potential reasons for this baffling result. An efficient political governance has a role to play in keeping NPL in check or dampens its effects. Perhaps, there also exist certain other factors which can influence the system. When an economy is stable and smoothly functioning, good governance indeed eliminates any rising financial threats but there arises a conundrum when the economy is in turmoil (a good example would be the global financial crisis of 2008). Here, the political governance indicator is formed taking into account various aspects of the government like the form of government, political stability and others. While some aspects most certainly dampen the effects of NPL, there are others which might actually intensify the negative impacts on investment. To explain more lucidly, in situations of crisis, CEOs or entrepreneurs tend to take more risks in an effort to make up for all the losses they have incurred. The stable governance might cloud their judgment about the imminent threats, and they believe that the government would take care in case of any downturn. Failed ventures during times of recession are likely to pile up more NPL because the whole economy is in jeopardy and uncertainty. Essen, et al.[105] supported the claim by mentioning that some of the components of good governance stayed advantageous during the crisis. But others had an undoubtedly harmful effect as they encouraged for riskier ventures by executives in an attempt to maximize their own short-term pay in the face of rapidly declining economic situation. They also noted that continued strengthening of governance practices might prove to be "too much of a good thing" when the crisis occurs. Sometimes, controlling financial threats like NPL requires discipline and strict measures. Ahmad, et al.[71] confirmed that dictatorial form of government managed to reduce NPL in Pakistan and Rehman, et al.[106] also found out that democratic form of government is positively associated with NPL. If viewed from a different angle, good political governance also implies stronghold and regulatory powers on different sections of the economy. However, excess government intervention, control and scrutinization on corporate governance or the financial sector might deter investors. The reason behind is over-taxation and over-regulation increases business start-up and regulation costs. This might make companies and projects suffer losses and as a result default on loans. Perhaps, the situation gets worse during the time of recession because overtaxing (in an attempt by the government to tackle the crisis with increasing government consumption by levying taxes) firms or specifically, firms running on loss make them hit the rock bottom. This has the capacity to makes the NPL conditions worse or at least, stagnant. Another plausible explanation could be attributed to the increase in NPL level due to economic growth caused by better governance. Good political governance paves way for the economy to flourish by providing an environment which is stable and corruption-free, or in other words, an environment favorable for economic activities. This claim is corroborated by Samarasinghe[107] in his study which he based on 145 countries. He found out that good political governance is a critical factor which leads to economic growth. Though economic growth is one of the remedies for solving the nonperforming loan issue, sometimes the growth leads to the accumulation of NPL. Kedir, et al.[77] and Inekwe[108] bolstered this claim by concluding that economic growth leads to higher NPL. The reason behind is that a growing economy is followed by increased investments or investment capabilities. If the credits allocated for the investments are not monitored properly, the chances for defaulted loans increase. Bashir, et al.[109] in their analysis based in China also found out a significant positive relationship between NPL and real GDP. They further added that the high growth rate in China could be attributed to the government interference and government policies of higher infrastructure investments. Higher spending on infrastructure related projects leads to loosing

of credit policies, consequently leading to an increase in NPL. However, the possibility of endogeneity driving the result of the interaction variable in the model used in this paper, cannot be entirely ruled out. The fact that economic prosperity sometimes leads to NPL accumulation, increases the likelihood of an existing reverse causality.

The control variables are described referring only to the main regression (Reg. 8; Table 3). Government consumption is found to have a negative coefficient and is significant at 1% level. One of the reasons could be because increased government spending through increased taxation on industries is likely to reduce profit margin and discourage investors for taking up projects. Pressman[110] found that government consumption tends to reduce business productivity. Inflation has a negative sign and is highly significant at 1% level just as anticipated. Several empirical studies substantiate the claim that high inflation reduces the zeal for investments and finally hampers economic growth[111–113]. Increasing real interest rate is found have a negative coefficient and is statistically significant at 1% level which implies that increasing real interest rate exerts negative impacts on investment which is in line with existing theory. Domestic credit to private sector has a positive coefficient as predicted. However, it is not statistically significant. This result might be because only the corporate sector is taken into account and not the households. Credit growth also includes credit to the household sector. Secondary school enrollment ratio is used in the model as a human capital measure and it has a positive coefficient which is justified by the existing theory that human capital development leads to economic growth. But the variable is not significant. A possible reason could be an individual is not equipped enough after completion of secondary school in order to carry out investment ventures. Perhaps, a clearer result could be drawn if tertiary education is used as a proxy for literacy rate. Life expectancy at birth is found to have a significant negative relation with investment and the level of significance is at 1%. This is an absolute opposing outcome contradicting the existing theory of the relationship between human capital development and economic prosperity. Some of the possible reasons for this could be a smaller number of observations or endogeneity. GDP per capita has a significant positive relation indicating that investment increases with an increase in GDP per capita. Anwer & Sampath[114] in their study found evidence of causality from GDP to investment. Lastly, the trade variable has a significant negative coefficient. This is corroborated by Kind[115] and Kim[116] who concluded that trade liberalization or more trade negatively impacts economic growth and development in low income countries.

## 4.4 Robustness check

This section aims to analyze the validity of the outcomes obtained under different situations. Henceforth, the robustness of the empirical model prepared would be examined in different steps. The method of estimation remains exactly the same (fixed effects model with time and country fixed effects) and the estimations would be carried out using robust standard errors in all the steps.

Firstly, a new variable, broad money as a percent of GDP (**BRMON**) is added to the benchmark model following Jaramillo[76] and Ucan[117]. Broad money is used here as a measure of the size of the financial sector and as a measure of the financial depth. Countries with access to a deep and diversified pool of finance are in a comparatively better situation than those countries where private savings are low and financial system is repressed. Because of this reason, financial depth is a useful indicator of government financial flexibility. The regression outputs reveal that the coefficient signs and significance level of variables of interest do not change. Also, the outcomes of the control variables in the main model remain unaltered. However, **BRMON** is found to have a negative coefficient and is significant at 10% level at the borderline. This is a contradiction to the expected outcome since the theory suggests more the money supply, more is the finance and credit available for taking up investments and hence, with an increase in money supply, which implies economic expansion, investment is likely to rise.

In the next method, two new variables domestic credit provided by financial sector (**DCR**) and domestic credit to financial sector by banks (**DCRPSB**), are introduced along with the existing credit variable **DCRPS**. The reason behind adding these new variables of credit is to cover the credits available to all the sectors in a broader scale. However, these three variables are highly correlated to each other and there could arise a problem of multicollinearity if all three of them are used in the same model. Thus, a composite index, **CRED** is prepared using principal component analysis (see Appendix V). At first, **CRED** is used in the main model without the broad money variable. The results of the main independent variables along with the control variables are unaffected. **CRED** has a positive coefficient like expected but it is not significant. Next, both **CRED** and **BRMON** is added to the model and the output is recorded. The outcomes of the main model are discovered to be unaffected.

Subsequently, developed and developing economies are segregated and estimated using the variables of the benchmark regression. The countries are classified following the annex prepared by the Development Policy and Analysis Division (DPAD) of the Department of Economics and Social Affairs of the United Nations Secretariat (UN/DESA). For convenience, transitioning economies have been included in the group of developing economies (list of countries is mentioned in Appendix I and II). The first regression is run using the dataset of 32 developed economies. We find that the three main independent variables have the same coefficient signs as the main model. However, only the interaction variable (**IVAR**) is not significant

anymore. It is a close call because the significance level is at the borderline. This insignificance could be potentially attributed to the smaller number of observations. Another possible explanation could be that in developed economies, investment decisions are not dependent on political governance institutions and the corporate governance and economic conditions are powerful enough to diminish the negative impacts of NPL by themselves without having the need for the political governance to interfere.

In the final method, the benchmark regression has been carried out with robust standard errors following same estimation technique. Robust standard errors take into account the heteroskedasticity in a model's unexplained variation i.e., if the amount of variation in the outcome variable is correlated with the explanatory variables, these correlations are taken into account by the robust standard errors. Also, robust standard errors provide unbiased standard error estimates under heteroskedasticity. Usually, the robust standard errors are larger than the non-robust standard errors. It was observed that the results remain unaltered overall. The only observable deviation of result from the benchmark regression is that the trade coefficient is no longer significant.

After running tests on multiple levels, it is quite evident that the outcomes are consistent throughout. Therefore, it can be safely concluded that the results from the main benchmark model are robust and well-established.

## 5 Conclusion and remarks

Upon the advent of the global financial crisis, the world has witnessed a strong uptake in the non-performing loans in the banks' balance sheets. Their persistence at the elevated levels led to financial stability concerns including plausible damaging impacts on financial intermediation. Acknowledging the hostility of NPLs towards economic advancement, this paper attempted an in-depth analysis of the impacts of the NPL on economic growth and investment. Most of the existing works on this matter have taken into consideration the role of corporate governance. Negligible investigations have included political governance institutions. In order to fill in the void, the role of political governance has also been incorporated in this study. A composite political governance index has been prepared using principal component analysis combining the six governance indicators taken from the Worldwide Governance Indicators. The findings of this paper confirm that NPL has negative impacts on investments. As NPLs pile up, credit allocation of the banks and other financial sectors are impaired which in turn, puts a strain on fund availability for investments. Since investment is one of the most important drivers of economic growth, reduced investments hamper economic prosperity by diminishing or stalling economic growth. The results also suggest that better is political governance, more strengthened would be the investments in the economy. This finding is backed by the neo-institutional economists who claim that improving indicators of "good governance" is a mandatory criterion for creating the institutional conditions of reducing costs of transactions and hence, a competitive market is conducive to enhancing the efficiency in resource allocation and the pace of economic growth. However, it is revealed that the impact of NPL is amplified in the presence of good governance which is a sharp contrast to the expectations and reasonings. This outcome can be potentially attributed to specific aspects of political governance which might turn out to be counterproductive in the face of a disrupted economic environment. In order to confirm the soundness of the results, a series of tests have been employed. The tests confirm that the benchmark results are overall robust to different sample selections and inclusion of additional control variables. Taking into consideration that threats from NPL is a grave matter and improving political governance institutions is an uncompromisable requirement for the overall economic well-being, this paradoxical result calls for and opens up scope for further research more extensively.

Although clear answers could be achieved regarding the intended research question, it is worth noting that this study is not devoid of shortcomings. The first and foremost drawback is that there are high chances that the model is subjected to a degree of endogeneity. There is evidence that economic growth is one of the main determinants of NPL [109,118–120]. Hence, there could exist reverse causality and simultaneity affecting the results of the model. Second, there is a lack of availability of data for many countries and particular variables for a longer period. The existence of bigger dataset enables to obtain more reliable and accurate results. Third, in this study, certain factors like distribution of loans, bank specific factors (size, ownership and others), exchange rates, tax structures, deposit interest rates, geographical locations which might provide valuable cognizance, have not been incorporated.

To this regard, future research should address these issues and attempt to use more sophisticated estimation techniques like instrumental variables and dynamic GMM estimation techniques which would bring more understanding about the questions raised in this study. Along with that, it could reveal information on tackling the NPL obstacles if the functioning and effects of political governance on curbing financial constraints is explored more extensively, analyzing each aspect of it under the microscope. Lastly, country-specific researches should be carried out to examine the impacts which might open up additional insights into this matter, which in turn, might prove to be valuable for solving NPL problems. For instance, Bashir, et al. [109] found out that higher transparency in the Chinese banking system decreases poor quality assets but not in the case of government banks.

The non-performing assets or bad debts have continued impacting the economies around the globe. Sometimes the problem gets so severe, that it becomes one of the main drivers of banking crisis and all the economies around the world get affected since all the economies are connected in the era of the Globalization. Hence, precautionary measures should be taken and policies should be implemented in order to prevent and counter the bad asset issues. Some of the steps could be improving credit risk management techniques and procedures which would reinforce the resilience of Banks in faces of economic turbulences; improving bank regulations and supervisions to enhance the scrutinization process of classification of loans, loan initiations, foreign currency lending to unhedged borrowers, collateral management and borrowers' profiles; active monitoring of financial intermediation in the economies; paying extra attention and backing up banks with low operating efficiency and smaller capitalization along with political government making effective interventions like implementing strict policies to put a leash on intentional defaulters; and setting up lenient tax structure and abolishing legal impediments to help banks clean up their bad assets and survive the blow of the financial anomaly. Many studies have added precious insights into the topic of NPL prevention and solution. Petkovski, et al.[121] emphasized on streamlining banks to better manage risks taking into consideration the characteristics of individual banks. He further mentions that understanding the individual factors of the banks can prevent the escalation of credit risk. Further, resort to technology can be taken to handle the monitoring process and forecasting business cycles more efficiently.

There is still a long way to go before these problems are solved completely. But significant steps are taken in an attempt to combat the hostile situations in the economy. The central banks throughout the world have taken strict steps against nonperforming loans and efforts are being made to create a safer banking and financial environment. The Basel III norms by the Basel Committee and the Macroprudential Stress Testing framework developed by the International Monetary Fund are the results of that.

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