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IMPACT OF INTEREST BEARING DEBT ON REAL SECTOR  
GROWTH: MEDIATING ROLE OF FINANCIAL SECTOR GROWTH

**Abstract**

This study examines the impact that debt has on real sector growth by taking financial sector growth as a mediating variable. A sample of 26 highly indebted economies is selected on the basis of debt-to-GDP ratio. Data are collected from the World Bank and OECD over a five-year period, with GDP disaggregated into the real and financial sectors. The four-step regression (Baron and Kenny 1986) is then applied. A significant negative relationship is found between debt and real sector growth and between financial sector growth and real sector growth. However, a positive relationship is observed between debt and financial sector growth, thus confirming the mediating role of financial sector growth between debt and real sector growth.

**JEL CLASSIFICATION:** E31; E43; G01; H63; O4; O5; P5.

**KEYWORDS:** DEBT; REAL SECTOR GROWTH; FINANCIAL SECTOR GROWTH; GDP; SAFE RETURN; FINANCIAL CRISIS.

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## **1. Introduction**

Real sector growth refers to the growth of productive sectors in an economy such as agriculture, industry and services (Sanusi 2011). By contrast, financial sector growth refers to the growth of stock markets, banking sector and non-banking financial institutions (Loayza and Ranciere 2006). However, financial growth is thought to be an illusion (Zaman 2014) because it leads to stock market growth with no actual investment in the real sector of the economy, resulting in financial crisis (i.e., 2007, Daly 2008). Daly (2008) observes that before the crisis, “paper exchanging for paper was 20 times larger than exchanges of paper for real assets” (p.16). The value of real assets was no longer sufficient to guarantee the increasing debt levels, creating a situation of debt deflation. Similarly, in the 1980s, the demand for financial assets rapidly increased, which caused financial inflation (Arrighi 1994) due to investors’ preference for financial assets over productive assets that earn higher and safer returns, particularly on interest bearing securities. In the 1970s, even non-financial companies diverted most of their reserves to financial investments instead of investing in real assets (Krippner 2011), causing financial inflation (Orhangazi 2008).

The Bank for International Settlements (BIS) predicts only a 1.6% growth rate in the USA, UK, and Japan over five years (from 2015 to 2020), which is lower than the 2.3% growth rate between 2001 and 2007 and is approximately half of the post-war 20th century average. Growth in emerging economies such as India and China is also expected to decline. The decline in real GDP is due to a reduction in business investment (BIS Quarterly Review 2015, p.1) caused by declining aggregate demand in the economy (Keynes 1936), mainly due to interest-based debt (Mian and Sufi 2014).

The financial sector protects debt-based borrowings on the pretext that it generates wealth by leveraging debt (Keen 1995). However, the banks’ product is a debt overhead that results in debt deflation and binds borrowers to service debts, causing significant reductions in investment and consumption. In reality, the banker’s business strategy is to convert a major part of the economic surplus into a stream of interest payments (Minsky 1992). However, paying debt obligations diverts the earnings from being invested in real capital, thus creating debt deflation and enforcing financial austerity (Keen 2000). Infrastructure and capital are additionally depleted to

save revenues to pay creditors and bankers, thus diminishing the economy's productive powers (Hudson 2012).

The literature (Hudson 2012; Milberg and Winkler 2013; Norgaard et al. 2009; Chapra 2009) supports the argument that conventional debt as a secure investment opportunity results in the financialization of the corporate sector and, in some cases, even the financialization of the whole economy, which negatively affects real economic growth. The "global credit bubble" of 2007 caused the worst financial crisis since the great depression, but debt did not stop growing. In fact, the level of borrowing to GDP is higher today than it was in 2007, which has created new threats to financial stability and global economic growth (Dobbs et al. 2015, p.10). Interest-bearing debt provides a great amount of money for non-productive purposes that eventually create financial market bubbles with harmful effects on real sector growth (Geanakoplos 2009).

The detrimental effects of the continuous growth of debt need to be examined to provide options for countries suffering from high indebtedness. Therefore, this study aims to provide empirical evidence that interest-bearing debt may promote financial growth through financial inflation while hampering real growth of the economy. Thus, the study intends to investigate the impact of interest-bearing debt on real sector growth of the economy while taking financial sector growth as a mediating variable. It specifically intends to meet the following objectives:

1. To determine the relationship between debt and real sector growth.
2. To determine the relationship between debt and financial sector growth.
3. To determine the relationship between financial sector growth and real sector growth.
4. To determine the mediating effect of financial sector growth between debt and real sector growth.

The present study differs from previous research in various important aspects. Previous researchers examined only one component of total debt, i.e., foreign debt (Jenkins 1998; Greene and Delano 1993), public debt (Reinhart and Rogoff 2010), or domestic debt (Singh 1999), due to the non-availability of data on total debt and finance sector development for a large number of countries (Leung 2003). However, in the current study, the huge data bank of the World Development Indicator (WDI) is used to draw empirically reliable observations.

Second, previous studies investigated the relationship between the financial sector and GDP instead of real sector growth due to the non-availability of GDP data in dis-aggregated form. In such cases, a positive association between the two is almost certain, as the financial sector is a component of GDP. It creates a misconception because people's investments in debt-based contracts ultimately increase financial sector growth but reduce real sector growth (Christopoulos and Tsionas 2004). Therefore, the current study takes GDP minus the financial sector as a measure of the real sector (ISIC<sup>1</sup> Rev 4 2008) and determines the relationship between real sector growth and financial sector growth.

Third, there is a contradiction in literature that examines the impact of financial sector growth on real sector growth. Some studies (Christopoulos and Tsionas 2004; King and Levine 1993; Levine and Zervous 1998; Beck et al. 2000; Al-Malkawi and Abdullah 2011) observed a significant positive influence of financial sector growth on real sector growth, while other studies (Favara 2003; Haiss et al. 2011; Loayza and Ranciere 2006; Rousseau and Wachtel 2005; Rajan 2005) reported a significant negative impact of financial sector growth on real sector growth, primarily due to the use of different proxy variables to measure financial sector growth (Adu et al. 2013). Contrary to previous research, this study uses the actual measure (dollar value) of the financial sector instead of using proxy variables to measure the effect of financial sector growth on real sector growth, leading to more reliable results and, hence, acquiring paramount significance.

Finally, previous studies either investigated the relationship between debt and real sector growth or financial sector growth and real sector growth, but in the present study, all three variables are combined together to empirically test the mediating effect of financial inflation. This is probably the first attempt to do so.

## **2. Literature review**

After the longest and deepest global financial crisis in 2007, it was expected that the world's economies would reduce their debt levels (Schularick and Taylor 2012). However, debt has continuously increased in almost all nations (Dobbs et al. 2015, p.10), resulting in a debt overhang effect, with the current debt stock exceeding a nation's future capacity to

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<sup>1</sup> International Industrial Classification Standards, Revision 4

repay it, which negatively affects investment and economic development (Krugman 1988; Sachs 1990; Karagol 2012). Moreover, repayment of external debt or debt servicing cost results in crowding out, leaving very little to make investments for growth purposes (Karagol 2012; Diaz-Alejandro 1981). Many authors (Chowdhury 2004; Clements et al. 2003; Elbadawi et al. 1997) found that large amounts of interest-bearing debt reduces investment and ultimately diminishes real sector growth, which is important for the economic development of a country (Lucas 1988). Therefore, hypothesis ( $H_1$ ) is formulated to examine this relationship.

$H_1$ : There is a significant negative relationship between debt and real sector growth.

In boom-bust periods, attractive financial innovations induce people to borrow more thereby increasing the debt level in the economy. This is followed by the breakdown of stock market bubbles eventually leading to a great recession (Fisher 1937, p. 41). According to Mian and Sufim, (2009), interest-based mortgage loans combined with insurance offering risk-free returns to the lender creates stock market bubbles that ultimately result in financial crisis. Mortgage credit is extended with only 5% or less as equity, resulting in a higher leverage factor of 20 to 1. Such a practice enables both speculators and optimists and finances a larger bubble that ultimately bursts in a global financial crisis (Acharya and Richardson 2009). A 100% reserve system instead of the fractional reserve system may resolve the debt overhang issue and eliminate excessive debt from the economies (Fisher 1937, p. 41).

According to Chapra (2009), extreme competition and stockholders' demands for higher yields trapped the banks to issue credit to subprime borrowers who usually did not qualify for credit under prime loaning criteria. The issuance of loans for speculation or non-productive purposes created higher levels of inflation due to excessive money supply and eventually resulted in the financial crisis of 2007. Wilson (2009) also supported the argument that the presence of sub-prime borrowers was a main reason behind the financial crisis. However, the preference for financial assets (especially interest bearing debt) over real assets creates excessive financial sector growth at the expense of real sector growth (Krippner 2005). The risk-free returns on conventional debt enhance financial sector growth and ultimately reduce real sector growth (Hudson 2012). Similarly, investment in the stock market is more lucrative for corporations than is investment in real assets due to higher earnings from more liquid financial

assets. Consequently, business firms do not reinvest the majority of their profits in real productive investment, leading to financial sector growth (Robert 2016). The following hypothesis (H<sub>2</sub>) is developed to investigate this argument.

H<sub>2</sub>: There is a significant positive relationship between debt and financial sector growth.

It is the continuously growing size and importance of financial transactions and financial markets in the economy and dominance of financial assets, particularly debt securities, that leads to the financialization of the economy (Krippner 2005, p. 173; Dore 2008, p. 116-117). It is the growing dominance of the financial economy over real economy (Wade 2005). For instance, the vast increase in money and credit throughout 2007 increased the asset prices that were used as mortgage to obtain loans, thus further increasing the money supply but not leading to more investments (Gennaioli, Shleifer and Vishny 2012), resulting in the financialization of the economy. People searched for capital gains from inflated asset prices and bought those assets whose prices were increasing at higher rates; to support their purchases, further loans were available at lower interest rates (Hudson 2012). This phenomenon led to a decreased rate of saving and increased rate of interest-bearing debt in the economy, converting the economy's circular flow into a vicious circle eliminating all rationalities behind the realistic ability to pay (Keen 1995). In this process, the non-financial corporate sector acts more like a financial sector by giving high priority to shareholders' value rather than to innovativeness and growth of productive assets. This new business model aims to reduce production-side risk by cutting costs of R&D, which is required for innovation, leading to the critical long-term impact of financialization on production growth (Milberg and Winkler 2013, p 237). The returns on real sector investments either become lower than the risk free returns on debt securities or do not cover the risk-adjusted cost of capital, resulting in a preference for financial assets over real assets, leading to a huge decline in real sector growth (Bloom, Bond and Reenen 2007; Guiso and Parigi 1999). This implies that financial sector growth accelerates financial inflation as both financial and non-financial sectors of the economy invest in financial assets for the sake of fixed and safe returns on debt securities, resulting in negative impacts on real sector investment (Orhangazi 2008). Therefore, the following hypothesis (H<sub>3</sub>) is established.

H<sub>3</sub>: There is a significant negative relationship between financial sector and real sector growth

Major companies use credit to finance their corporate buyouts and increase the price of products to service their debt. Paying financial charges leaves less available for real investment. Similarly, for the economy as a whole, an increase in levered debt increases interest payments and fees to bondholders and bankers, thus leaving little to spend on goods and services. In this way, financial overhead grows, slowing new investment and squeezing out the real economy (Hudson 2015). Lazonick (2014) observes that corporate profitability does not increase economic prosperity because corporate executives spend their profits in stock repurchases. Financial wealth is generated by increasing the stock prices, not by creating more goods. The situation becomes worse when employment, tangible capital investment and R & D expenditures are cut back to provide purely financial returns rather than expanding productions by investing in real assets (Milberg and Winkler 2013). For instance, in 2007, a mortgage-backed new financial security was created to meet the high growth in demand of dollars with insurance against default. Rating agencies assigned AAA ratings to that security, certifying them as extremely safe (Loayza and Ranciere 2006). Consequently, the mortgage debt doubled from \$7 trillion to \$14 trillion over a five-year period from 2002 to 2007, generating a huge amount of “toxic debt” (Geanakoplos 2009).

A negative correlation is observed between an increasing debt-to-GDP ratio and economic growth (Cohen and Sachs 1985; Clements et al. 2003) and between foreign debt and economic growth (Chowdhury 2004) due to the negative effects of debt on the “efficiency of capital and labor” (Cunningham 1993), thus exposing the highly indebted economies to debt overhang problems (Sawada 1994). Many other studies (Chowdhry 2001; Siddiqui and Malik 2001; Easterly 1999, 2001, 2003; Sen et al. 2007) also observe the negative effects of higher debt levels on economic growth. However, an optimal debt ratio of 38.4% encouraged economic growth in the early 1980s, but a higher debt ratio of 40.7% to 50.9% negatively affected economic growth from 1986-93 (Smyth and Hsing 1995). A lower growth rate was found in economies with a public-debt-to-GDP ratio of more than 90% (Reinhart and Rogoff 2010). Further, in developing economies, a gross external-debt-to-GDP ratio above 60% decreased the annual growth rate by 2 percent, but an external-debt-to-GDP ratio above 90% cut the annual growth rate in half (Reinhart and Rogoff 2008). Cohen and Sachs (1985) observe that an increase in foreign debt is not advantageous to economic growth. Similarly, Alesina and Tabellini (1988)

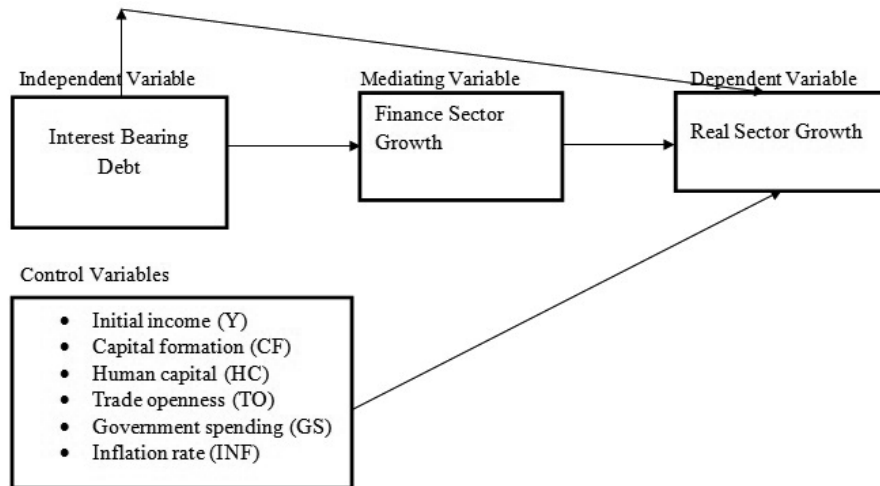
and Dornbusch (1988) observe that foreign debt effects economic development by changing economic policies. For instance, to repay foreign debt, the tax rates are increased, which leads to capital flight from the country and discourages domestic investment. Dornbusch (1988) holds the opinion that foreign debt impacts economic growth through inflation rates instead of tax rates. However, Burguet and Fernández-Ruiz (1998) consider that domestic debt is more expensive compared to concessionary external debt. Abbas and Christensen (2007) observe that a domestic debt above 35 percent of the bank deposits ratio weakens economic growth. Governments' domestic borrowings reduce the funds for private sector investment and results in decreased growth, welfare and capital accumulation (Diamond 1965; Hauner 2006). Generally, a high debt level increases default risk and results in restricted credit, reduced confidence and decreased investment (Greene and Delano 1993; Jenkins 1998; Leung 2003) due to an increase in domestic economic uncertainty (Khan and Haque 1985).

Economic growth is affected by a number of other factors, including increasing initial income (Romer 1986), international trade openness (Harrison 1994, 1996), inflation (Phillips 1958; Umaru and Zubairu 2012), government expenditures (Sala-i-Martin 1990), investment in human capital (Denison 1961; Benhabib and Spiegel 1994) and gross capital formation (Shuaib and Danial 2015). These variables are all controlled (Favara 2003; Cecchetti et al. 2011; Akram 2011) to minimize their effects (Kothari 2004) on the relationship between debt and real sector growth.

The theoretical framework developed for the purpose of this study is given in figure 1, which explains the variance in real sector growth due to interest-bearing debt. The growth trend of total-debt-to-GDP ratio is determined to find its negative impact on real sector growth. Financial sector growth is included as a mediating variable (Hudson 2012; Loayza and Ranciere 2006), which results in the financialization of economy and activates a negative relationship between debt and real sector growth. This relationship is represented in the form of the following hypothesis (H<sub>4</sub>).

H<sub>4</sub>: Financial sector growth mediates the relationship between debt and real sector growth.



**Figure 1. Theoretical framework.**

### 3. Research methodology

This study intends to examine the impact of debt on real sector growth by taking financial sector growth as a mediating variable. Hence, the study is based on hypothesis testing. The E-Views software is used for data analysis. The study combines a cross-country analysis with a 5-year time series to generate panel data. The time series data for five years (2010 - 2014) are collected from the official website of the World Bank for 26 economies in the world. The 26 economies are selected from the list of 47 economies ranked on the basis of their debt to GDP ratio by BIS and the IMF.

In case of secondary data, it is important to gather data from reliable sources to have accurate estimations about the results (Kothari 2004). Therefore, data for all the control variables and central government debt are collected from WDI<sup>2</sup>, whereas the data for the real sector, private sector debt and the financial sector are collected from national accounts on OECD<sup>3</sup>

<sup>2</sup> <http://data.worldbank.org/>

<sup>3</sup> <http://stats.oecd.org/>

statistics. From OECD statistics, insurance and financial services are taken as the financial sector, and the remaining sector-wise aggregate of GDP is taken as the real sector (ISIC, Rev 4 2008). The growth rate of the financial sector and real sector is calculated by taking down the lag difference of respective series. Table 1 shows the description and sources of different dimensions used in this study.

**Table 1. Description and Source Variables.**

<b>Variables</b>	<b>Description</b>	<b>Source</b>
GDP	Gross Domestic Product (Current LCU)	WDI
GDP Deflator	GDP Deflator (base year varies by country)	WDI
Financial Sector (FS)	Insurance and Financial Services (Current LCU)	OECD stats, National Accounts
GDP per capita	GDP per capita (Constant LCU)	WDI
Private Sector Debt	Private Sector Debt (% of GDP)	OECD stats, National Accounts
General Government Debt	Central Government Debt (% of GDP)	WDI
Exports (X)	Total Exports (% of GDP)	WDI
Imports (M)	Total Imports (% of GDP)	WDI
Consumer price index (CPI)	Consumer Price Index (2010=100)	WDI
Capital Formation (CF)	Gross Fixed Capital Formation (% of GDP)	WDI
Human Capital (HC)	Gross Secondary School Enrolment Ratio (%)	WDI
Government spending (GS)	Government Final Consumption Expenditure (% of GDP)	WDI

### 3.1. Measurement of variables

This research applies the exact volume of the financial sector (dollar value) instead of proxies from available data sources such as the WDI and OECD statistics.

GDP is a combination of the agricultural sector, manufacturing sector and service sector. The service sector includes transport & communication, insurance and financial services (Shahzad 2015). Thus, the financial sector, comprising insurance and financial services, is itself a part of GDP. Therefore, the study disaggregated GDP into real and financial sectors to obtain a more accurate measure of growth. Table 2 gives the statistical formulas used to measure the variables of this study.

**Table 2. Variable Derivation by Statistical Formulas.**

Variables	Proxies/formulae	Source
Nominal Size of Real Sector	$rs_t = GDP_t - fs_t$	ISIC Rev 4, (2008)
Price Size of Real Sector	$RS_t = \frac{rs_t}{(Gdp\ deflator)_t} \times 100$	Anderson (2012, p. 27)
Price Size of Financial Sector (FS Real)	$FS_t = \frac{fs_t}{(Gdp\ deflator)_t} \times 100$	Anderson (2012, p. 27)
Real Sector Growth (RSG)	$RSG_t = \frac{RS_t - RS_{t-1}}{RS_{t-1}} \times 100$	(Reilly and Brown 2011)
Total debt as % of GDP	$TD_t = PSD_t + GGD_t$	(Cecchetti et al., (2011)
Financial Sector Growth (FSG)	$FSG_t = \frac{FS_t - FS_{t-1}}{FS_{t-1}} \times 100$	(Reilly and Brown 2011)
Initial Income (Y)	$Y_t = \ln(GDP\ per\ capita)_t$	(Levine 1993; Favara 2003)
Trade Openness (TO)	$TO_t = X_t + M_t$	(Frankel and Romer 1999; Levine 1993)
Inflation Rate (INF)	$INF_t = \frac{CPI_t - CPI_{t-1}}{CPI_{t-1}} \times 100$	(De Gregorio 1993; Levine and Zervous 1993)

### *3.2 Sampling technique and sample size*

In this study, purposive sampling is used in which part of a population is selected as a sample that conforms to the specific criteria set by the researcher (Neuman 2002). OECD economies with more than 100% of debt to GDP ratio are selected owing to the harmful effect of such a higher debt to GDP ratio on the economy (Cecchetti and Kharroubi 2013). Thus, the economies of Japan, Ireland, Portugal, Belgium, the Netherlands, Greece, Spain, Sweden, Denmark, France, Italy, the United Kingdom, Norway, Finland, the United States, Hungary, Austria, Australia, Poland, Canada, Germany, Israel, Slovakia, China, the Czech Republic and Turkey are included in the sample for this study. Further, in purposive sampling, a quota sampling technique is used to ensure that certain groups are adequately represented (Kothari 2004). Therefore, the 9 powerful economies, including the USA, the UK, Japan, France, Australia, Canada, Israel, China and Germany, due to their influential impact on the global economy, are made part of the sample. Thus, 26 economies over the last five years comprise the sample size for this study. Cecchetti et al. (2011) analysed a sample of only 20 economies.

## **4. Data analysis and discussion**

### *4.1. Descriptive statistics*

Table 3 reports the observations of mean, median, standard deviation of debt, real and financial sector growth of the selected economies. In cases of debt, mean > median (1.367>1.198), reflecting a negatively skewed distribution (Isotalo 2001), which means that a large number of countries have higher debt rates. The standard deviation does not indicate any major differences between debt rates of the selected countries. According to the maxima and minima values [(23.06) - (-8.31)], the rate of debt could fluctuate within the range of 31 and could take the highest value of 23.06 and the lowest value of (-8.31).

Real sector growth has a positively skewed distribution, with a mean < median [(-1.130) < (-0.515)], indicating that a large number of countries have smaller real sector growth rates. The relatively small value of standard deviation shows small differences in real sector growth in the sample countries. The maxima and minima values [(10.06)-(-7.50)] for real sector

growth indicate a range of 17, with the highest value of 10.06 and the lowest value of -7.50.

Financial sector growth is negatively skewed distribution, which a mean > median (1.950>1.486), which indicates a large number of countries with higher financial sector growth rate. The standard deviation is higher for financial sector growth than it is for the other two variables, indicating greater variation among countries for their financial growth rates. The maxima and minima [(30.43) - (-16.51)] for financial sector growth show a large range of 46, within which the rate of financial sector growth could fluctuate, with the highest value of 30.43 and the lowest value of -16.51, which indicates higher level of volatility.

**Table 3. Descriptive Statistics of Debt, Real and Financial Sector Growth.**

Descriptive Statistics Analysis	Debt	Financial Sector Growth	Real Sector Growth
Mean	1.367	1.950	-1.130
Median	1.198	1.486	-0.515
Standard Deviation	3.69	7.15	2.94
Maxima	23.06	30.43	10.06
Minima	-8.31	-16.51	-7.50
Range	31.37921774	46.95254219	17.57179768

The descriptive statistics show that the debt and financial sectors have the highest volatility compared to real sector. A high level of volatility is dangerous for the global economy, as exemplified by financial crisis of 2007, when the abnormal growth and sudden decline of debt brought more volatility in the financial sector, which ultimately hampered economic growth in various economies (Loayza and Ranciere 2006).

#### 4.2. Correlation

Table 4 shows the correlation between debt, financial sector growth and real sector growth. A moderate negative correlation of 0.69 (Greene 2003) is

observed between debt and real sector growth. The result is supported by the findings of Cohen (1993), Clements et al., (2003), and Chowdhury (2004). Similarly, a moderate negative correlation of 0.62 (Greene 2003) is observed between financial sector growth and real sector growth. Arcand et al. (2012), Haiss et al., (2011), Loayza and Ranciere (2006) find a similar correlation between the two. However, a moderate positive correlation of 0.53 (Greene 2003) is observed between debt and financial sector growth. Geanakoplos (2009) and Gennaioli, Shleifer and Vishny (2012) also find a positive correlation between debt and financial sector growth.

**Table 4. Correlation between Debt, Financial Sector and Real Sector Growth.**

Variable	Debt	Financial Sector Growth	Real Sector Growth
Debt	1		
Financial Sector Growth	0.532804	1	
Real Sector Growth	-0.69299	-0.62871	1

#### *4.3. Jarque-Bera Test of Normality*

Table 5 shows the results of the Jarque-Bera test applied to test the volatility of debt, financial sector growth and real sector growth (King and Levine 1993).

**Table 5. Jarque-Bera Test of Normality.**

Test of Normality	Debt	Financial Sector Growth	Real Sector Growth
Jarque-Bera	396.3359(0.0000)	12.9943(0.0015)	59.7849(0.0000)

( ), shows probability

For all three variables, including debt, financial sector growth and real sector growth, the p-value of the Jarque Bera statistic is significant at the 1%

level of significance, implying that the distributions are not normal. It is therefore concluded that there is much volatility in debt, financial and real sector growth rates across countries and time. More volatility means more risk, which may not be good for the global economy (Favara 2003).

#### 4.4. Redundancy Test

A redundancy test is applied to exclude unimportant and insignificant variables from the model (Asteriou and Hall 2015). A Wald restriction on coefficient test is used to test the hypothesis that a variable is insignificant. The results of the Wald test of joint significance for independent and control variables are given in table 6. Real sector growth is the dependent variable for all the Wald tests. It is observed that only human capital (HC) is found to be highly insignificant in the given model. Therefore, human capital is excluded from the model for further analysis. All other variables are found significant at the 0.01 and 0.05 levels of significance.

**Table 6. Wald Test Results.**

Method: Wald test for restrictions on coefficients						
Dependent Variable: RSG						
Variables	F-Statistic	P-Value	T-statistic	P-value	Chi-square	P-value
DG	118.2645	0.0000*	-10.87495	0.0000*	118.2645	0.0000*
FSG	83.66653	0.0000*	-9.146941	0.0000*	83.66653	0.0000*
Y	4.108118	0.0448**	2.076967	0.0398**	4.108118	0.0427**
CF	14.10683	0.0003*	3.755905	0.0003*	14.10683	0.0002*
HC	0.021182	0.8845	-0.145542	0.8845	0.021182	0.8843
TO	4.018144	0.0471**	2.067352	0.0407**	4.018144	0.0450**
GS	17.34107	0.0001*	-4.164260	0.0001*	17.34107	0.0000*
INF	3.939702	0.0493**	2.104228	0.04518**	3.939702	0.0472**

\*,shows significance at 1 percent

\*\* ,shows significance at 5 percent

#### 4.5. Regression Analysis

This study applies the four-step regression approach proposed by Baron and Kenny (1986) to investigate the relationship between debt and real

sector growth, with financial sector growth used as the mediating variable (Wahba and Elsayed 2015).

In step 1, the regression is run between debt as an independent variable and real sector growth as the dependent variable. Table 7 shows the regression results. The results show that debt has a significant negative impact on real sector growth, at the 0.01 level of significance. The  $R^2$  and adjusted  $R^2$  values indicate that the independent variable, i.e., debt, accounts for 48% variance in the dependent variable, i.e., real sector growth. This confirms that a high debt burden and debt servicing cost reduce real sector investment and negatively impact economic growth (Elbadawi et al. 1997; Easterly 1999, 2001, 2003; Siddiqui and Malik 2001; Chowdhury 2001, 2004; Clements, Bhattacharya and Nguyen 2003; Sen et al. 2007). The result also confirms that a debt-to-GDP ratio more than 100% results in a sharp decline in real sector growth (Cecchetti et al. 2011; Cecchetti and Kharroubi 2012; Reinhart and Rogoff 2010).

**Table 7. Regression between Debt and Real Sector Growth.**

Parameter	Value
Coefficient	-0.552122
Standard error	0.050770
t-statistic	-10.87495 (0.0000)
R squared	0.480234
Adjusted R squared	0.476173
F-statistic	118.2645(0.000000)
Durbin Watson Stat.	1.485481

( ), shows probability

In second step, the regression is run between debt and financial sector growth. The regression result, given in table 8, shows that debt has a significant positive effect on financial sector growth at the 0.01 level of significance. The  $R^2$  and adjusted  $R^2$  values show that the independent variable, i.e., debt, accounts for 28% of the variance in the dependent variable, i.e., financial sector growth. The result is found to be consistent with those of Geanakoplos (2009), Gennaioli, Shleifer and Vishny (2012) and Mian and Sufi (2009), who find a positive correlation between debt and financial sector growth during the financial crisis of 2007.



**Table 8. Regression between Debt and Financial Sector Growth (Mediator).**

Parameter	Value
Coefficient	1.030655
Standard error	0.144688
t-statistic	7.123276 (0.0000)
R squared	0.283880
Adjusted R squared	0.278286
F-statistic	50.74106 (0.000000)
Durbin Watson Stat.	1.589017

( ), shows probability

In the 3<sup>rd</sup> step the regression is run between financial sector growth (mediating variable) and real sector growth. Table 9 shows the regression results, indicating that financial sector growth significantly affects real sector growth at the 0.01 level of significance. The R<sup>2</sup> and adjusted R<sup>2</sup> values show that financial sector growth causes a 39.5% variation in real sector growth. The results confirm a negative relationship between financial development and economic growth (Loayza and Ranciere 2006; Favara 2003; Rousseau and Wachtel 2005; Haiss et al. 2011; Arcand et al. 2012).

**Table 9. Regression between Financial Sector Growth and Real Sector Growth.**

Parameter	Value
Coefficient	-0.258948
Standard error	0.028310
t-statistic	-9.146941 (0.0000)
R squared	0.395275
Adjusted R squared	0.390551
F-statistic	83.66653 (0.000000)
Durbin Watson Stat.	1.638038

( ), shows probability

After finding significant results of regression between debt and real sector growth (step 1), debt and financial sector growth (step 2) and financial sector growth and real sector growth (step 3), Baron and Kenny suggest a 4<sup>th</sup> step for testing mediation through multiple regression. In this step, debt and financial sector growth are taken as independent variables, and real sector growth is taken as a dependent variable. Table 10 shows the results of the multiple regression and indicates that both debt and financial sector growth have a significant influence on real sector growth at the 1% level of significance. However, when using financial sector growth as a mediating variable, the level of significance of debt is reduced from 0.0000 (see table 4.5) to 0.0410 (see table 4.8). This result suggests that financial sector growth partially mediates the relationship between debt (independent) and real sector growth (dependent). The R<sup>2</sup> and adjusted R<sup>2</sup> values indicate that debt and financial sector growth cause a 57.4% variation in real sector growth.

**Table 10. Results of Multiple Regressions.**

Parameter	Debt	Financial Sector Growth
Coefficient	-0.213	-0.149240
Standard error	0.099	0.028180
t-statistic	-2.15152 (0.041032)	-5.295919 (0.0000)
Summary Statistics for Multiple Regression		
R squared	0.574255	
Adjusted R squared	0.567551	
F-statistic	85.65046 (0.000000)	
Durbin Watson Stat.	1.483069	

( ), shows probability

It is observed that secure returns on debt securities promote the financialization of the economy and reduce the investment in the real sector (Hudson 2012; Milberg and Winkler 2013, p. 237), which may lead to a financial crisis, e.g., 2007 (Daly 2008; Norgaard et al. 2009). The results empirically confirm the mediating effect of financial sector growth between debt and real sector growth and supports all these theoretical foundations.

#### 4.5.1. Regression for Control Variables

Real sector growth, a dependent variable for this study, is also regressed against all the control variables i.e., Y, CF, TO, GS, INF (Favara 2003; Cecchetti et al. 2011), and the results are reported in table 11. Y, TO, and INF are found to be significant at the 5% level of significance, while the influence of CF and GS is at the 1% level of significance.

**Table 11. Regression for control variables.**

Variable	Coefficient	Probability (Sig)	Standard Error
Initial income (Y)	0.10821	0.0478**	0.0521
Capital formation (CF)	0.26694	0.0003*	0.071073
Trade openness (TO)	0.00623	0.0487**	0.003014
Govt. spending (GS)	-0.26023	0.0001*	0.062492
Inflation rate (INF)	0.24141	0.0451**	0.11472

\*, Shows significance at 1 percent

\*\*\*, Shows significance at 5 percent

## 5. Conclusion and recommendations

This study examines the relationship between debt and real sector growth with financial sector growth taken as a mediating variable in a sample of 26 highly indebted economies with debt-to-GDP ratios of more than 100% over a five-year period (2010-2014) by applying the Baron and Kenny (1986) mediation model.

The results indicate a significant negative relationship between debt and real sector growth. Financial sector growth assumes the form of financial inflation as the mediator enhances the negative relationship between the two. Financial inflation is observed through a positive relationship between debt and financial sector growth and a negative relationship between financial

sector growth and real sector growth. Excessive growth of the financial sector reduces investment in the real sector. These findings are supported by Favara (2003), Haiss et al. (2011), Loayza and Ranciere (2006), Rousseau and Wachtel (2005), Rajan (2005), who also observe a negative relationship between interest-bearing debt and economic growth.

It can be reasonably inferred from the findings of this study that increasing debt and financial sector growth at the expense of real sector growth increases income inequality and creates financial bubbles that result in financial crises, hitting the economy badly. Hence, it is concluded that increasing debt and debt servicing costs reduces the investment in real and productive assets. Greater financial sector investment causes a diversion of resources from the real sector towards the financial sector, which is not always productive for the economy (Guiso and Parigi 1999). If the investment in the financial sector exceeds that in the real sector, it may negatively impact the economy and cause a financial crisis (Kaminsky, Reinhart and Vegh 2003; Norgaard et al. 2009; and Gennaioli et al. 2010). Therefore, there is a need to balance between the growth of the financial and the real sector of the economy by encouraging investment in productive sectors of the economy instead of non-productive sectors.

The supporters of Islamic finance observe that the lack of PLS between creditors and borrowers creates unruliness in the financial system that leads to unnecessary and imprudent lending by conventional banks (Chapra 2009; Zaman 2014). Further, the central banks' role as the 'lender of the last resort' encourages imprudent lending by banks and leads to inflation (Chapra 2009; Kaye and Hassan 2011). The Islamic financial system may prove helpful in resolving the problem of financial inflation by eliminating interest (Ahmad 2010), discouraging investment for speculative purposes (Ahmad 2010; Gheeraert and Weill 2015), controlling unnecessary credit extension (El-Gamal 2004), promoting productive/real sector investment (Mounira 2008) through risk sharing (Azhar and Ashadi 2008; Gheeraert and Weill 2015), reducing financial market bubbles (Azhar and Ashadi 2008) and increasing employment and self-employment prospects and creating need-fulfilling products and services (Gheeraert and Weill 2015). Similarly, in Takaful, a group of people insure each other against individual failures but do not insure the group as a whole against systemic risk. Thus, if the group as a whole buys an asset bubble, they are not protected. Therefore, the lessons from Takaful may prove helpful in reducing financial bubbles and financial crises (Mian and Sufi 2014).

Changyong (2012) observes that the rate of transformation of foreign debt into domestic investment affects the economic growth of a country. Future research could be done that takes debt transformation rate as a mediating variable. Future research may also empirically compare the impact of interest-bearing debt with a PLS based system subject to availability of reliable data on the PLS system.

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