

Deficit Financing – Causes, Consequences and Potential Cures

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The interest in the level of National Debt accumulated by countries has peaked recently due to difficulty in repayment of maturing debt experienced by a number of countries. Current efforts in determining a sustainable level of debt are focused on setting a global standard for sustainable level of debt and annual deficit as per cent of GDP, irrespective of the specific economic structure of a country. This paper attempts to identify specific economic factors that contribute to national debt, identifies a number of early warning indicators and suggests a portfolio of fiscal, financial, and regulatory corrective measures for avoiding default.

INTRODUCTION

The analysis undertaken in this paper disaggregates the issue into two subcomponents. First, debt servicing analysis is undertaken to determine the balance between debt servicing requirements and budgetary resources available to meet these annual charges. This exercise also establishes conditions for incurring annual budgetary deficit. Second, debt causation analysis is undertaken to identify the underlying factors that contribute to accumulated deficits. This analysis leads to identification of early warning indicators of an approaching unsustainable level of national debt and also recommends measures to avoid a potential default.

Fiscal, financial, and regulatory intervention is necessary to reduce annual as well as accumulated deficits because an economy creeping towards oligopolistic structure does not automatically generate corrective measures to reduce or eliminate this imbalance, particularly when deficit is 'structural'. Effectiveness of such intervention also depends on the share of the public sector in gross domestic product.

The scope of this study includes international comparison and individual country analysis of data for Greece and the U.S. Analytical techniques used in this analysis include multiple regression and VAR.

LITERATURE REVIEW

Academic interest in sovereign defaults is not new. Researchers have studied this phenomenon for many years. It appears that data is available for loans to sovereign governments from private foreign creditors dating back to the 1820s (Tomaz and Wright, 2007). A country's tolerance for debt is often the result of many factors including the size of the debt, history of previous defaults, balance of payments weaknesses, its inflation history and weak political institutions.

Research studies have focused on sovereign debt from various angles including causes of defaults, the effects of defaults, prescriptions to solve defaults, and early warning systems to predict pending defaults. Although this paper outlines an early warning system, the main emphasis is on understanding the causes of unsustainable national debt that could lead to sovereign defaults.

Political risks in the form of instability and/or more polarized experience have known to cause higher defaults (Citron and Nickelsburg, 1987; Brewer and Rivoli, 1990; Balkan 1992, and Cuadra and Sapriza, 2008). Other researchers have determined that sovereign liquidity crises are mainly driven by economic fundamentals or by sudden shifts in private creditors' default expectations (Calvo, 1988; Alesina et al., 1990; Detragiache, Cole and Kehoe, 2000; Detragiache and Spilimbergo, 2004).

Another area that has drawn some attention is the link between debt crisis and currency destabilization, especially among countries that have severe debt problems at the same time (Herz and Hui, 2008). The currency crisis models have looked at the effects of fixed exchange rates on sovereign debts. Because, fixed exchange rates might lead to an expansionary fiscal policy resulting in an incompatible monetary policy which in turn might give rise to a successful speculative attack against the exchange rate peg (Krugman, 1979; Flood and Garber, 1996). The collapse of the Mexican peso in December 1994; is a good example of such interventions gone wrong.

The economic crises faced by a few Latin American countries in the 1990s and the falling bond prices of these countries was influenced by global, regional and country specific factors. In a study conducted by Diaz and Gemmill, the authors estimated that each country's distance-to-default on a monthly basis for 1994–2001 could explain up to 80% of the variance of the estimated distance-to-default for each Latin American country (Diaz and Gemmill, 2006). A country's banking system is another factor that might contribute to sovereign debt problems. For example, Kaminsky and Reinhart showed that debt crisis is often initiated by both a weakness in the banking sector combined with currency crises (Kaminsky and Reinhart, 1999). Based on review of the literature, it is apparent that the causes of sovereign default are varied and not one factor alone can explain the reasons for defaults. This might be one of the reasons that researchers have had difficulty in developing early warning systems to predict sovereign defaults.

One way to avoid sovereign defaults is by developing a system that is able to warn the serial defaulting countries of an impending crisis. Many systems have been proposed and they appear to focus on single variables or specific situations. For example, one possible approach is to identify benchmarks that evaluate the level of optimal foreign debt and a maximal foreign debt (debt-max), when risk is explicitly considered. Using an application of the stochastic optimal controls models Stein and Paladino were able to explain how a country could anticipate default risk. In their research, the authors tried to measure 'vulnerability' to shocks, when there is uncertainty concerning the productivity of capital (Stein and Paladino, 2001). Another warning system proposed by Stein uses the dynamic programming/stochastic optimal control (DP/SOC). In his research, Stein used variables such as the optimal foreign debt, consumption, capital and the growth rate of GDP. By comparing the actual debt to the optimal debt he was able to derive a measure of the sustainability of the debt and vulnerability to default problems (Stein, 2005).

Research has also shown that focusing on foreign currency borrowings could be a useful early warning system, especially for developing countries. Most developing countries borrow in world capital markets. Typically this borrowing is denominated in one of the major currencies that require periodic servicing. The foreign exchange required to meet the service obligation is often dependent on the export of one or a small number of commodities. This demand usually competes with a number of other claims on export earnings, including both consumption and import of capital goods. Therefore, if a developing country uses commodity-linked borrowing and the interest and/or principal payments on external debt are linked to the price of a country's principal exports, the risk of default is multiplied (Chamberlin, 2006). Although there are many early warning systems proposed, the fact that countries continue to default on sovereign debt assumes that these systems are not employed to forestall defaults.

Objective

This paper proposes to develop a set of criteria which could be customized to develop a model for a country specific sustainable level of national debt, warning indicators when this critical level is being approached, and corrective fiscal, financial, and regulatory measures that can avoid national default. Role of regional economic groups (EU) as well as international financial institutions such as the World Bank and IMF as an external stabilizing force is also incorporated as additional policy variables when internal measures are insufficient to accomplish the objectives. For the purposes of this paper deficit is defined as government spending that is in excess of government receipts. This paper focuses on both the annual budgetary deficit and gross national debt.

Rationale

The objective in seeking deficit financing is to finance the shortfall between government expenditures and tax receipts. Tax increases are not politically palatable. Governments often resort to deficit financing when other components of GDP such as private consumption decline during recessionary periods. Such deficits, if undertaken for a short period with an action plan to create equivalent surplus in near future, could reverse decline in real GDP and stimulate growth in real GDP for the benefit of citizens of the nation. Structural deficits are indicative of inability to reduce entrenched government expenses.

The sustainable level of accumulated deficits can also be determined with reference to both the deficit servicing requirements and deficit servicing sources. This analysis will entail identification of cause and effect relationships that determine the factors influencing each of these two areas. As shown by other researchers, the explanatory variables leading to deficits include domestic budgetary receipts; tax structure; budgetary endowments; budgetary discretionary expenses; trade deficit; growth in real GDP; private consumption; domestic capital formation; and foreign direct investment flows. Deficit servicing requirements analysis takes into account accumulated deficit; expected additions to deficit; deficit held by Government Accounts, by Federal Reserve System, by public-domestic entities, by overseas public & governments, maturity term; and cost of debt.

Current Situation

The current debt crisis has produced some conflicting arguments in identifying and dealing with this global issue. Some economists feel that when aggregate demand is far shorter than required for reaching full GDP potential, deficits are justified (Krugman, 2010). As economy resumes growth, demand for goods and services as well as tax receipts will increase to generate offsetting budgetary surpluses. If a country does incur deficits, one way to address the issue is by introducing radical fiscal reform to reduce budgetary expenses and deficits while increasing taxes. This would result in increasing the confidence of both consumers and business leaders - a necessary precondition to improve the overall economy. The assumption is businesses fear deflation and uncertainty more than cyclical deficits (Ferguson, 2009). In contrast, some economists feel that spending cuts, specifically by reducing social transfers and government payroll, is a preferred solution (Hassett, et al., 2009). These economists observe that “cold shower” treatments, i.e., immediate reduction, in expenditure produces better results as compared to cumulative cuts in government spending over the consolidation years.

In a study of the OECD countries on fiscal adjustments, Alesina and Perotti concluded that successful adjustments are mainly expenditure based, with a focus on primary current expenditure (Alesina and Perotti, 1995). On the other hand, Larch and Turrini in their research of the European Union countries found that fiscal consolidation did not reduce debt due to resurgence of expenses (Larch and Turrini, 2008). Interestingly, based on a study of forty countries, Reinhart and Rogoff suggest that as long as the gross debt to GDP ratio is between 30% and 90%, the negative impact of higher public debt is likely to be modest. Ratio above 90% reduces GDP growth. (Reinhart and Rogoff, 2010).

On the practical side, evolution of Euro as a common currency in 17 EU countries has brought forth a new set of issues. The financial policy of the Eurozone countries is common but the fiscal policy of each country is different. Thus these countries cannot employ full spectrum of remedies (i.e., devaluation of currency) needed to resolve problems consequential to unsustainable national debt. The bailout of

countries on the brink of insolvency by EU and IMF comes with imposition of a few common fiscal policy restrictions that may not take into account country specific economic situation.

Causes of Deficit

The preceding sections listed causes of deficit and corrective actions as presented in research studies that investigated the deficit issues. In this section, a discussion of the causes of deficit is presented from theoretical as well as structural perspective.

From a theoretical point of view the causes of sovereign deficits are equally diverse. Primary cause of deficit is that some components of government spending have a built-in growth multiplier that is much higher than the rate of growth of tax receipts. Government expenses can be broken down into discretionary and non-discretionary. Over time, non-discretionary component grows as a percentage of total budgetary expenses, thereby reducing government's ability to reduce expenses without disenfranchising the electorate. Deficits incurred to meet national emergencies present a special case where the expenditure is incurred without any considerations for fiscal sacrifices. Secondary causes of deficits include shifts in government spending, changes in the competitive environment, globalization, presence of shadow economies, fraud in government programs, role of multinationals, and income distribution that affects private consumption expenditures.

During periods of economic downturn, governments often tend to stimulate demand through either direct expenditure on specific projects or through reduction in direct taxes. Stimulation through direct expense is intended to increase employment or save jobs, while stimulation through reduction in direct taxes is aimed at increasing disposable income and, therefore, consumption as well as investments. Reduction in taxes does not necessarily lead to increased consumption and its impact on increasing employment has a longer lag than that of direct expenses. Reduction in taxes on higher income groups and corporations has not always increased investment since higher savings could be hoarded in bank accounts or in retained earnings by corporations. It should be noted that once taxes are reduced, it is difficult to raise them for reducing the budget gap at a later date.

The role of competitive forces in allocation of resources and setting prices, especially in free market economies, has been diminishing. Competition has been replaced in reality by oligopoly where a few firms dominate a business sector. Although the number of buyers is large, product is not necessarily homogeneous; information is asymmetric; and the seller has considerable control in setting prices and output level. Oligopolistic firms influence elections and issues to their own benefit by funding elections and lobbying on issues. This often leads to either unintended direct government expenses or increased tax expenditures contributing to deficits. Similarly, increased globalization tends to reduce the effect of domestic multipliers for income and employment due to leakages beyond the borders of a country. Thus growth of a business in a country does not necessarily mean increase in employment in the country as anticipated by historical income and employment multipliers. Presence of shadow economy also accounts for some problems as this unaccounted portion of GDP outside the reach of fiscal measures increases deficit by reducing potential tax revenue.

Another factor that might influence deficits is fraud in government run programs that often leads to unintended excess government expenditure. Government bureaucracies can also be included in the list of factors that affect deficits. Bureaucracy often leads to redundant government agencies that essentially perform the same tasks resulting in an increase in government expenses without providing any additional benefits or services.

Income distribution impacts both consumption and investments in a country. A summary measure of inequality of income is Gini index. The more unequal a country's income distribution, the farther its Lorenz curve from the 45 degree line and the higher its Gini index. If income was distributed with perfect equality, the Lorenz curve would coincide with the 45 degree line and the index would be zero; if income was distributed with perfect inequality, the index would be 100.

TABLE 1
INCOME DISTRIBUTION IN 2010

Country	GDP US\$ trillion	Gini Index	Population below poverty line	Population decile	% income in each decile
Greece	0.3	33.0	20%	Lowest 10%	2.5%
				Highest 10%	26.0%
India	1.7	36.8	25%	Lowest 10%	3.6%
				Highest 10%	31.1%
U.S.	14.9	46.0	15%	Lowest 10%	2.0%
				Highest 10%	31.0%

A number of studies have linked fiscal deficit as one of the causes of current account trade deficit (Gupta and Jadhav, 2009). A few other studies have concluded that fiscal deficits are caused by trade deficit (Aridyato, 2006). With an increase in openness of economies to external trade, i.e., globalization, it is desirable to treat trade deficit as a contributor to fiscal deficit. Trade deficit could be viewed as deferred exports. Thus it has an intertemporal dimension, which is not inherently self-correcting. As seen here, the causes of deficits are varied and quite difficult to assess.

A variable that increases expenditure without generating compensating revenues is aging population. For the U.S., current median age is 36.8 years and is expected to be higher in future. Future entrants in labor force will be a smaller number while population over 65 years of age will grow considerably. As a result, domestic consumption will diminish and Social Welfare as well as healthcare expenses will increase. Unfortunately, there is very little that a country can do to change its population pyramid.

METHODOLOGY

Data for selected countries was obtained from the U.S. Bureau of Economic Analysis, CIA database, European Commission, and IMF. The level of accumulated deficit is measured in absolute terms for statistical analysis and in relative terms as a percentage of GDP for international comparison. Other variables considered include domestic savings and investment balance, private consumption, government consumption, interest rate, current account trade balance, unemployment rate, and foreign direct investment. The analysis was conducted by utilizing multiple regression and VAR techniques.

If a causal relationship between deficit and contributing factors can be established by identifying factors that contribute significantly to the level of deficit, then it will be possible to identify early warning benchmarks prior to national debt reaching the default point.

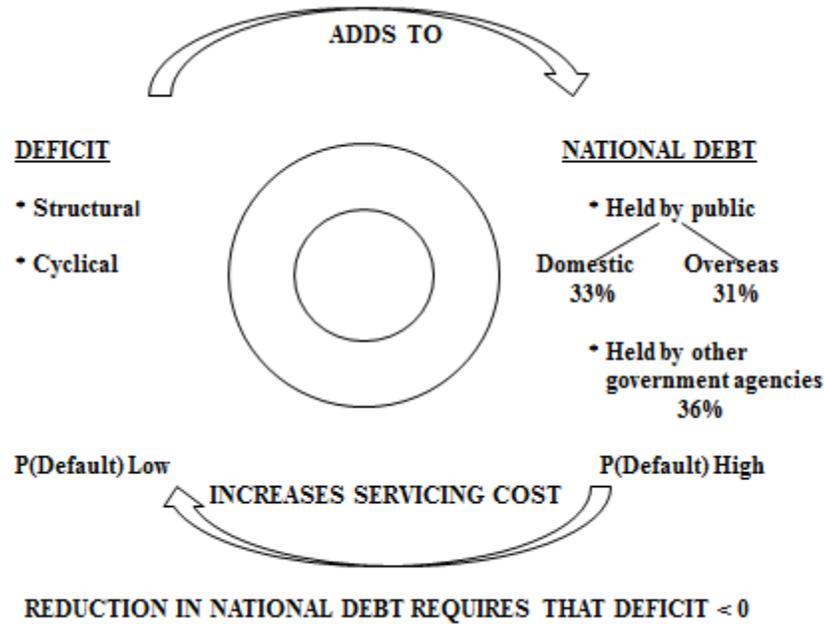
This analysis will decompose the issue into two areas:

1. Debt servicing analysis; and
2. Debt causation analysis;

Debt Servicing Analysis

Ongoing budgetary deficits increase national debt and lead to increased debt servicing burden, which in turn leads to even higher deficits due to higher interest payment on outstanding debt. The situation is made worst if the principal is to be refinanced at a higher rate of interest. The sustainable level of accumulated deficits can be determined in flow terms with reference to both the National debt servicing requirements and fiscal resources available for debt servicing. It is important to note that effective deficit is the national debt held by public. However, analysis of deficit undertaken in this study is based on total deficits. National debt can be reduced only through successive budgetary surpluses. The percentages in Figure 1 relate to U.S. national debt at the end of 2010.

**FIGURE 1
DEFICITS AND NATIONAL DEBT CYCLE**



Conceptually:

Available Funds = f (budgetary receipts; government expenses; foreign trade deficit; growth in real GDP; private consumption; private investment; net exports, etc.)

Deficit servicing requirements = f (annual deficit servicing cost; budgetary receipts; national debt; term of maturity; cost of debt; etc.)

Criteria for incurring new deficits:

A potential solution for managing deficits based on our analysis suggests that countries facing national debt default often have marginal rate of growth of annual deficit higher than its historical rate. It is, therefore, desirable to establish conditions for incurring new fiscal deficits. This is not to ignore the importance of reduction in government expenses and an iterative exercise may be necessary. Impact of deficit on GDP can be stated as:

$$\alpha D = \delta GDP - GDP = GDP (\delta - 1) \qquad \text{Equation 1}$$

Where, α is coefficient of deficit's (D) marginal contribution or stimulus multiplier to GDP where ($\alpha > 0$) and δ is growth multiplier to GDP ($\delta > 1$) as a result of stimulus from deficit. Levels of α and δ will depend on the extent of productive content of deficits. For a non-productive use of deficit, α will be closer to zero and δ will be closer to 1. As shown in Table 2, taking the case of the US, it is interesting to note that δ , the GDP growth multiplier, can also be an approximation of tax revenue multiplier τ depending on tax policy as evidenced in the growth patterns for the U.S. over the past three decades.

TABLE 2
SELECTED GROWTH RATES FOR THE U.S. ECONOMY

Period	National debt Growth	GDP Growth	Revenue Growth	Tax Policy
1981-1990	222.3%	85.5%	72.2%	Reduce
1991-2000	56.4%	66.1%	92.0%	Increase
2001-2010*	142.6%	42.9%	8.6%	Reduce

* The revenue and GDP growth is impacted by the recession of 2008 – 2010.

Designating ‘r’ for the expected rate of annual interest on new debt; net marginal contribution from the deficit (i.e., after deducting debt servicing requirements) to GDP can be stated as:

$$\text{Net [GDP}(\delta - 1)] = \alpha D - rD \quad \text{Equation 2}$$

Where rD denotes annual interest payments on new deficit or new debt servicing requirements. Since it is imperative that $\delta > 1$, except when deficit is needed for mitigating a national emergency, this formulation enables development of a minimum critical condition for incurring new deficit as:

$$\alpha D > rD \quad \text{Equation 3}$$

Therefore, α must be greater than r. ‘ τ ’, the revenue growth multiplier, which is observed to be only marginally lower than δ , also has to be higher than 1 and could be restated as:

$$\alpha D \cong \tau \{ \text{tax revenues} \mid \text{tax policy} \} \quad \text{Equation 4}$$

Another implication of the data in Table 2 is that growth of GDP does not automatically reduce deficit unless reduction in government expenses is higher than reduction in taxes or taxes are increased concurrent with reduction in expenses. During 1991-2000 periods, the tax increase exceeded government expenses, thereby reducing deficit and creating budgetary surpluses. Please note that the effect of α on δ and τ are lagged, lag depending on the severity of recession. Additional empirical studies are necessary to estimate values of α , δ , and τ .

The above analysis suggests that the true magnitude of deficit should be measured in comparison with budgetary expenses for the same period rather than as a per cent of GDP. Relating deficits to GDP underestimates the severity of the situation. Therefore, implications and key conditions for incurring new deficit are:

- a) New deficit and accumulated deficit or national debt will require different remedial measures and should be analyzed separately.
- b) It may be necessary to introduce different criteria for the relative measurement of new deficit. New or marginal deficit should be related to contemporaneous budgetary expenses rather than GDP.
- c) Stimulus multiplier of new or additional deficits for government receipts must be greater than the interest rate on new debt. Simply stated new deficit must be used for productive expenditure and generate new revenues greater than the new deficit servicing requirements, albeit with a short lag.

This will discourage incurring deficits for non-productive purposes, contribute to reduction of accumulated deficit, and require that the government put forth a deficit elimination plan at the time deficit is incurred.

- d) If new deficit is necessary to meet a national emergency, it should be made budget neutral over a short period. The deficit plan should include a phased short-term plan to reduce other expenses or a temporary tax increase or some combination of the two until the deficit is completely eliminated. Budget neutrality of such deficit may not be contemporaneous, but should be accomplished with a short lag.

Debt Causation Analysis

GDP could be divided into three components, public, private and external sectors (Keynesian theory). Since public sector expenditure has rarely showed any decline, economic slowdown was traced to downturn in private aggregate demand. Keynes also ascribed deflation to private hoarding. In contrast, economists led by Prof. Frederick Hayek were of the opinion that a reduction in private aggregate investment was the culprit in recessions (Ebeling, 2010). Empirical evidence suggests that private investment lags private and public consumption. This analysis considers a broader interpretation of Keynesian theory and does not assume that government has to increase its expenses to make up the entire shortfall in consumption. Government can also initiate measures that lead to an increase in private consumption and investments. Following this approach:

$$Y = C + I + G + (X - M) \quad \text{and also}$$

$$Y = C + S + T$$

Where Y is GDP, C is private consumption, I is private investment, G is government spending, (X - M) gives foreign trade balance, S is savings of private sector; and T represents taxes.

Combining the equations, deficit will equate to:

$$(T - G) = (X - M) - (S - I)$$

Where (T - G) represents fiscal deficit, (X - M) denotes current account trade deficit; and (S - I) describes difference between domestic savings and total investment needs.

Collapsing and elaborating the functional relationships enumerated above into a single equation will enable development of the final specification of the model through a 'test down' approach. Care is exercised in retaining the final set of explanatory variables that could be influenced through policy decisions. Policy variables could be further dichotomized into domestic and international. A country could exercise control over domestic policy measures. Involvement of institutions such as IMF, World Bank, and WTO will be necessary for dealing with international variables. However, such institutional assistance may impose stringent conditions on a country. In order to qualify for EU and IMF bailout, Greece and Ireland had to undertake budgetary expense cuts leading to considerable social unrest. Irish bond investors could also be required to share the burden after 2013.

A cross section data for 2009 for 31 European countries was analyzed through stepwise multiple regression technique. Treating deficits in positive terms, the variables that impact government deficits significantly are shown in the following stepwise regression coefficient matrix.

**TABLE 3
MULTIPLE REGRESSION COEFFICIENTS**

Government Deficit	Constant	Government Expenses	Real GDP Growth	Current Account Trade Balance	Interest Rate	Unemployment Rate	R ²
=	-12.078	0.129	-0.284	0.46	2.579	0.987	0.909
=	-11.748	0.128	-0.307	0.46		1.051	0.908
=	-11.666	0.128		0.464	0.007	0.858	0.908
=	-11.646	0.128		0.464		0.858	0.908
=	-5.167	0.128	0.333	0.483			0.905

't' values suggest that government expenses, current account trade deficit, and unemployment rate have significant impact on government deficit.

VAR analysis for the U.S. data (1960 to 2009) and Greece (1980 to 2009) was conducted with lags varying from one year to six years. Partial results for optimum lag are given in the following table.

**TABLE 4
VAR MATRIX EXCERPTS**

First row of the U.S. 7x7 VAR matrix. Deficit in positive terms.

	Lagged Deficit	Domestic S - I	Private Consumption	Government Consumption	Net Exports	Unemployment rate	FDI
Deficit	3.246	3.139	- 0.479	4.137	- 0.658	21.639	- 1.412

First row of Greece 5x5 VAR matrix. Deficit in positive terms.

	Lagged Deficit	Trade Deficit	Private Consumption	Unemployment rate	Net Foreign Direct Investment
Deficit	0.192	0.001	0.0001	1.209	-2.648

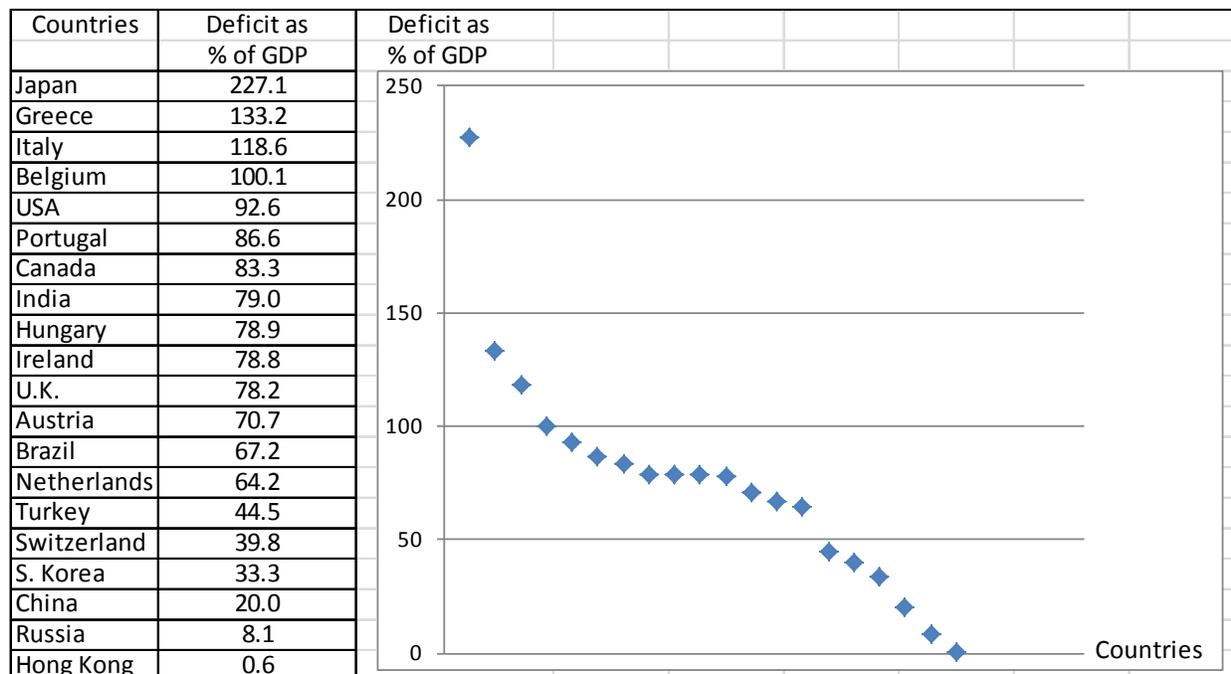
Explanation of VAR matrices is not easy; however, the first row often indicates the magnitude and nature of relationships between the dependent and independent variables. Government consumption, unemployment rate, and domestic savings shortfall are important contributors to deficit in the U.S. For Greece, unemployment rate and net FDI are significant variables. Private consumption is not very important in Greece since annual government consumption is about 50 per cent of GDP of the country.

International Comparison

The most likely scenario for default of national debt is a country's inability to repay the principal on its maturity. International cooperation for avoiding a national default has reduced the probability of such an event but not without strict conditions. Another way of looking at default is a country's inability to raise new debt to repay the principal at maturity. Payment for debt servicing can be handled through an adjustment in budget either through increased taxes and/or reduction in expenses or through a tide over loan and may not constitute default. The following figure represents a sample of countries (IMF Staff

Paper, 2010) and ranks them on a scatter diagram on the basis of the level of national debt as per cent of GDP for the year 2010.

FIGURE 2
NATIONAL DEBT AS A % OF GDP FOR SELECTED COUNTRIES



The comparison depicted in the above diagram suggests that the critical level national debt as per cent of GDP will vary for different countries based on the underlying economic situation.

Consequences of Unsustainable National Debt

- a) A country’s solvency is degraded. Credit rating is lowered, making it difficult to raise additional debt either to finance new deficits or replace retiring national debt. Greece has \$186 billion debt maturing in 2015 and has requested EU and IMF to extend repayment of assistance loan of \$145.7 billion from 2015 to 2024. Refinancing requirements over 2011-2013 period for Ireland are placed at \$89 billion, for Portugal at \$70 billion, and for Spain at \$47 billion.
- b) Government bonds will no longer be considered risk free and the cost of government debt will increase. EU and IMF rescue packages have raised average cost of Euro zone countries’ debt to 5.2% which could be as high as 5.8% for Greece and to 6% for Ireland. Prof. Ferguson views bond market performance as an early indicator of economic growth. Currently, bond market is comparatively good to the U.S. because European economies are not doing well in comparison to the U.S. economy. Once European economies improve, cost of sovereign debt in the U.S. will increase. Currently the U.S. is paying average interest on national debt at 2% but this could go up to 4%. Mega-deficits could reduce creditworthiness of a country and push up long-term interest rates, thereby lowering the pace of recovery. U.S. municipal bonds, worth \$2.8 trillion at the end of 2010, are no longer risk free and are experiencing an increase in interest rate. 30-year AAA municipal bond yield was 4.66% in December, 2010 as compared to 3.86% in October, 2010.
- c) Internal solutions are often insufficient to remedy the situation. This requires financial assistance from friendly countries or international organizations such as EU and IMF. EU has established a European Financial Stability Fund of \$583 billion. External assistance often comes with restrictive

conditions for raising taxes and reducing expenses that may not be acceptable to citizenry. Greece assistance package of \$145.7 billion has strict conditions and Ireland's rescue package of \$89 billion has an additional condition that existing investors accept some losses after July 2013.

- d) These conditions often result in forced cuts in government payroll, salaries, pensions, and social security safety net. This invariably leads to social discontent and unrest. U.K.'s budget cuts amount to \$127 billion over 4 years beginning 2010. Budget deficit in 2010 is placed at \$155 billion or 11.5% of GDP. British budget reduction includes education, home office, defense, and Business Innovation & skills. Britain plans to integrate defense with France. British retirement age will be raised from 65 to 66 in 2020. A Goldman Sachs analysis (Phillips 2011) released in February, 2011 estimates that a \$61 billion reduction in U.S. Federal government expenses will reduce GDP growth by up to 1.5% and affect 1 million jobs. The study, however, points out that the rate of growth will be back to earlier level once the economy adjusts to lower government expenditure.
- e) In the U.S., state governments plan to reduce budget gaps by cutting assistance to state universities, hospitals, local bodies, and schools. States and local bodies are also considering privatization of roads, parking places, and other public services.
- f) If government is a significant employer in a country, reduction in employment could lead to higher unemployment through multiplier effect. Britain estimates loss of 490,000 jobs by 2015. Spanish unemployment rate has already risen to 21%. Austerity measures have a potential to reduce growth of economy.
- g) Efforts to repay national debt through printing new currency can result in spiraling inflation. A number of countries that did not suffer consequences of global recession but increased their national debt are facing increased inflation. These countries are raising short-term interest rates to combat inflation. China and Singapore, countries with minimum deficits, were the first to raise short-term interest rates to combat inflation. Reserve Bank of India has raised short-term interest rate to 6.25%. Australia has raised the prime rate to 4.75%.
- h) Increased oversight of the financial sector will be one of the most likely measures implemented by countries to avoid future financial crisis which did contribute to fiscal deficits.

CONCLUSIONS

Empirical evidence and generalized statistical analysis suggest there is no single indicator that can act as an early warning benchmark to warn of approaching unsustainable level of national debt. The same holds true for any single corrective measure. Therefore, these benchmarks should not be treated as standalone indicators but they should be properly weighted and combined in a manner that takes into account a country's unique economic situation. This subject will be evaluated in detail in future research planned by the authors. Overall conclusions of the current research are:

1. When unemployment level is below 6 %, it is an indication that the economy is near its full potential. Current unemployment rate for Spain is 21%, it is 12.9% for Ireland, for Portugal 10.2%, and for Turkey at 11.6%. When unemployment rate is below 6%, new deficit is structural and should not be incurred.
2. Following practical interpretation of new deficit criteria, critical benchmark for inflation and can also be placed 5%, indicating growth phase of the economy, beyond which no structural deficit should be incurred. 5% rate of inflation could translate into a 6% or higher long term interest rate.
3. Using deficit to government expenditure ratio, an empirically observed rule indicates that when new deficit exceeds 15 per cent of government expenditure, it is an early warning of impending unsustainable addition to the national debt. U.S. deficit to government expenditure ratio is about 30 % in 2012. For Greece it stands at 36%, it is 29% for Spain and 18% for Portugal for the year 2009. At 34%, Turkey is flirting with insolvency.

4. Current account trade deficit above 8% of GDP is another danger point. Greek trade deficit is 14% of GDP, Portugal is at 12%; and Spain is at 8%. U.S. current account trade deficit fell to 27% of GDP in 2009 from earlier much higher level.
5. A country's financial rating determines its ability to refinance maturing national debt at a reasonable rate of interest. Since EU and IMF bailout of EU nations will require sacrifice by investors after 2013, increased risk will mean higher rate of interest. This will inevitably raise the cost of servicing national debt. Mere passing of extension of tax cuts (implying increase in deficit) in the U.S. congress raised 10-year bond interest from 3.24% to 3.3%. Irish cost of bailout fund stands at a higher rate of 6%, for Portugal the interest cost has risen to 4.5%. Spain must refinance \$ 230 billion of its national debt in 2011. Empirical evidence shows that this is a lagging indicator and the critical point in time is when financial rating is lowered. A country should monitor credit ratings assigned by agencies like Moody, Standard and Poor, and Fitch closely to avoid this consequence. When the rating falls below 'good', it will be difficult to avoid higher refinancing cost.
6. Domestic savings and investment balance could not be analyzed in detail because of lack of availability of data in a number of countries. As long as a country's financial rating is good or better, the imbalance will be made up by foreign direct investment. It should be noted that such rating for countries is more a ranking than absolute level. Thus, the cost of debt has not gone up too much in the U.S. because of foreign capital finding the U.S. as a better prospect for investment. In this context, a fall in FDI level is a good benchmark for initiating measures to reduce national debt.
7. Heavy dependence on consumption, domestic and net exports, is often a source of growth of GDP which in turn improves tax revenues and keeps deficit lower. Increase in income inequality in favor of highest income groups reduces total domestic consumption and often increases imports. Exports have been a major source of economic growth for European countries such as Germany. Recessions often lead to declining personal consumption expenditure but also reduce current account trade deficits. The best early indicators for consumption level can be found in income inequality GINI index and migration of population pyramid. GINI index of 30 can be considered a warning point for decline in domestic consumption. Similarly, when per cent of population in 65 and above age group exceeds per cent of population below 19 years of age, it is a certain indicator of not only decline in total consumption but also an increase in social welfare and healthcare expenses.

TABLE 5
SUMMARY OF WARNING INDICATORS

Indicator	Unemployment rate	Long-term Interest rate	Annual deficit as % of government expenditure	Current account Trade deficit as % of GDP	Country's financial rating	Foreign Direct Investment	GINI Index
Warning	Below 6%	Above 6%	Above 15%	Above 8%	Lowered	Decreased	Above 30
Action	No new structural deficit	No new structural deficit	Reduce annual deficit	Increase exports and/or reduce imports	Reduce national debt	Reduce national debt	Tax structure & expenses rationalization

Potential Solutions

Having suggested both the criteria for incurring new deficits, causes of deficit; and benchmarks after which the national debt could reach unsustainable level, the solutions are aimed at the common goal of

reducing deficits. As indicated at the beginning of ‘Conclusions’, the solutions suggested below should be packaged in a country specific solution. This aspect will be handled in the follow up research planned by the authors.

Expense Reduction

It is advisable that expense reduction should be undertaken in preference to any tax increase with a caveat that the reduction in economic growth due to lower government expenses is minimized or offset. Such reduction in expenses may require a simultaneous incentive to increase private consumption through appropriate tax structure changes, again with a caution that tax reduction does not add to the deficit. Expense reduction is often talked about in macro terms but the solution should identify specific areas of reduction with a phased approach rather than a cold shower wipeout. The process for determining optimum level of government should start with identifying services and service levels that a government should provide. The size of government and government expenditure should be derived from these conclusions. A reduction in central government expenditures should not be passed down as increased expenses to states, local bodies, and eventually to individuals who are already overwhelmed with mortgage debt. The brunt of austerity should not be borne by lower income individuals since it will further increase income disparity.

- a) For the U.S., initial targets should include reduction in fraud, in programs such as Medicare, Medicaid, defense contracting process, and foreign aid. The level of fraud was estimated at \$110 billion by OMB in July, 2010.
- b) Subsidies integral to a number of programs such as agriculture and oil exploration should be phased out. Care should be taken in not eliminating support for education because it has potential to reduce investment in human capital which will further lower skills of labor force much needed for productivity increase and innovation.
- c) Reduction in Federal/Central government bureaucracy can be achieved by eliminating redundant departments and streamlining functions of departments.
- d) Since current account trade deficit contributes to fiscal deficit, exports should be encouraged by reducing trade barriers and burdensome processes.
- e) Trust funds like Social Security and Medicare should be treated separate accounts and their receipts should not be integrated with General Funds. This will raise ‘on-budget’ deficit in the near future but will reduce future tax increases or subsidies to these funds when their receipts will be inadequate to cover expenses.
- f) Internal subsidies from EU to member countries and from federal government to states and local bodies in the U.S. should be phased out. Deficit reduction should not be limited to Federal or central government, each recipient of such within government subsidy should bear responsibility to reduce expenses and/or increase receipts.
- g) Participation in government social welfare programs should be made voluntary as of a future date.
- h) A government organized health care program should require universal participation in order to reduce health care expenses. If universal participation cannot be accomplished through a fiat, a non-participant should be treated on a pay as you go basis. There should be no subsidy from a participant to a non-participant. Healthcare programs like Medicare and Medicaid are essentially insurance programs operated by the government. Actual healthcare is provided by private sector.

Tax Rationalization

The level of optimum government and government expenses provides the basis for determining the amount of tax revenue necessary to cover the expenses. Tax revenue could be further broken down into current taxes and future taxes, i.e. deficit. For current taxes, a simplified tax structure should be devised which balances consumption as well as investment requirements and also reduces income disparity. This

is easier said than done. Simplified tax code can itself reduce the size of a department charged with administering taxes. The tax structure should have fewer taxable income groups with progressive flat tax rate levels. Such tax structure should also serve to reduce income inequality. Care should be exercised that reduction in federal taxes and expenses does not result in an increase in state and local taxes, because it will merely mean passing federal tax burden to state and local government with no relief in total taxes paid by individuals. Measures for stimulation of economy should integrate both expense reduction and tax rationalization measures. Recommendations on exact tax levels are beyond the scope of this study.

- a) Tax structure should be designed to be consistent with economic cycle. Taxes should be lower during downturn to increase consumption and higher during upturn of the economy to produce budgetary surpluses without hampering growth. Empirical analysis suggests that level of taxes is only one of the variables impacting economic growth and by itself has limited impact on growth of an economy.
- b) First steps should involve phased reduction in tax expenditures for both individuals and corporations. An exception could be tax credits for activities that generate positive externalities. This principle justifies tax credits for R & D.
- c) A potential increase in total tax as a result of elimination of tax exemptions can be adjusted through lowering of tax rates. This adjustment could be either tax receipts neutral or based on tax receipts requirements consistent with the phase of economic cycle.
- d) Certain taxes reduce negative externalities and should be given a fair hearing. An increase in gas tax will bring some reduction in domestic consumption, reduce trade deficit, encourage infrastructure improvements and use of efficient public transportation, reduce trade surpluses of oil producing countries as well as their support of nefarious activities around the globe. It is interesting to note that consumers accept price increases by oligopolistic oil companies with very little protest.
- e) Reduce or eliminate tax loopholes. Tax code should ensure that multinational corporations do not hide their income in tax haven countries. EU has already initiated activities in this direction.

Financial Policy Measures

The traditional remedy of lowering prime rate during recessionary periods may control inflation but not necessarily bring about an increase in GDP growth rate during recovery if lack of demand is the culprit. Additional measures may be necessary.

- a) Federal/Central Reserve Bank should link member bank reserve requirements to risk associated with the specific lending.
- b) If deflation is a near term possibility, a limited short-term increase in liquidity in domestic economy is justified. A side effect of this policy is de facto devaluation of currency which could increase exports and reduce trade imbalance. This option may not be available to countries within an economic union such as EU.

Streamlining of Regulations

The term regulation is often interpreted as stifling constraints on individual or corporate activities. Non-intrusive regulations should be treated similar to laws of the land that protect citizens from actions of those persons or companies who do not follow the norms of the society. For example, Food and Drug regulations have overwhelming health benefits for citizens.

- a) Appropriate rules should be formulated to reduce the size of shadow or non-monetary segment of the economy. This should reduce tax evasion and increase tax receipts.
- b) Foreign banks should be required to disclose the names and balances by individuals who have illegally transferred funds to avoid tax liability in home country. An experiment by U.S. tax

authorities for lenient tax treatment for those individuals who voluntarily disclose this information had met with some initial success.

Legislative Limitations

A few writers (Zakaria, Fareed, 2011) have pointed out the archaic rules that enable one senator to put a hold on a bill without giving any reason bring the democratic process to a halt. Two-year election cycle for U.S. House of Representatives is blamed for making the representatives preoccupied with reelection, be dependent on special interest funding for election, and focus on short-run maximization rather than on long range improvements in economy. An improvement in legislative processes could facilitate prompt implementation of measures to reduce national debt.

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