

When it Rains, it Flows: Avenues for Risk Sharing during Sovereign Debt Restructuring

By:

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Abstract

This paper theoretically and empirically examines how conventional income smoothing tools could be applied during periods of sovereign debt restructuring. The study finds that non-conventional risk sharing techniques - information and communications technology (ICT), and innovation - can serve as effective buffers during crisis episodes, to help smooth the impact of reduced government consumption. This can partly be explained by the concept 'when it rains it flows'; the rain will not stop flowing to accommodate any individual who is not covered while being out in the rain. The rain will continue to flow. Therefore agents will comply with most arrangement when times are relatively bad because their input would make a difference.

1. Introduction

In principle, debt restructuring exercises should give countries the necessary breathing space to allow them to successfully address their insolvent or illiquid issues. Oftentimes incorrect debt resolution mechanisms and inefficient delays in the restructuring process may occur. The affected economy may experience longer than anticipated recessions and unintentional outcomes or even worse, find itself going through multiple crises. This can be largely attributed to the inherent risks associated with debt restructuring; the debtor's inability to fundamentally regain sustainability of the debt, coordination problems, market failures in the form of funding and adjustment inefficiency and reputation and domestic costs.

Debt restructuring practices might help a sovereign gain control over its debt, but there is no guarantee the economy would be hedged against the fundamental issue(s), such as illiquidity and insolvency. The key to a credible sovereign debt resolution framework is to reduce costs, limit risk, provide safety nets that limit contagion and sufficiently observe critical domestic shocks. As countries undergo debt restructuring they do not have to fully absorb domestic shocks on their own; instead, they can share domestic shocks by pooling risk. Risk sharing can be seen as a consumption smoothing mechanism. Some research contend that one of the most effective ways to smooth consumption is by smoothing GDP shocks through various risk channels (Sorensen and Yosha, 1997a).

Two groupings of “avenues for risk sharing” are presented: conventional and non-conventional risk sharing tools. The conventional tools refer to varying consumption smoothing mechanisms, such as price, credit/savings, financial-markets, capital, fiscal-transfers and self insurance. When countries decide to restructure sovereign debt, the strategy followed will likely be influenced by their economic conditions. These are mostly characterized by inflation, low growth, balance of trade deficits, low foreign reserves and high debt and deficits, lost of market access and reduced foreign investor confidence. Moreover, financial soundness indicators generally suffer due periods of prolonged recession and the debt restructuring. This implies that it would be relatively difficult to implement conventional risk sharing techniques during crises episodes.

Non-conventional tools focus on shifting risk across the domestic economy through the use of technology. They are also highly capable of addressing inefficiencies in the government balance sheet and hence act as a driver of illiquidity and insolvency alleviation. Non-conventional risk sharing mechanisms include: the use of big data; information and communications technology (ICT); and innovation (i.e. tools geared towards promoting private sector inclusion and citizen empowerment). The main idea put forward by this research is that non-conventional risk sharing avenues can help sovereigns mitigate the transmission of shocks into consumption, during debt restructuring to help smooth the impact of reduced government consumption. This can partly be explained by the concept ‘when it rains it flows’; the rain will not stop flowing to accommodate any individual who is not covered while being out in the rain. The rain will continue to flow. Therefore agents will comply with most arrangement when times are relatively bad because their input would make a difference.

Government debt defaults and restructuring are recurring phenomena in Caribbean economies. Over the period 2000-2018, at least 50% of the Eastern Caribbean countries have undergone major debt restructuring: Grenada (2005, 2013), St. Kitts and Nevis (2011), Antigua and Barbuda (2010) and Dominica (2004). If the islands of Montserrat and Anguilla are omitted from the analysis given their status as British Overseas Territories, our estimate could increase to 67%. Furthermore, across the Caribbean, other governments have restructured either domestic or foreign debt, or both: Belize (2006, 2013), Jamaica (2010, 2013), and, most recently, Barbados (2018). Some of the aforementioned countries – Jamaica, Belize and Grenada – restructured public debt at least twice within an 8-year period. The need to improve the tools used to address sovereign debt crises is of particular urgency. Not only must governments do more with less, but they must also be willing to abandon tools and techniques that no longer work. The discussions presented in this study are therefore critical additions to literatures on investigating solutions to address the debt and deficit dilemma in the Caribbean.

This paper aims to examine the extent to which risk sharing through consumption smoothing can serve as a strategic approach that sovereigns can adopt to aid them in successfully exiting debt restructuring exercises. It also rationalizes the contribution of technology and in particular smart economy can make to help sovereigns achieve higher levels of efficiency in the Caribbean. A regression is estimated in order to gauge progress in risk-sharing in the region. The analysis includes an analysis of St Kitts and Nevis and Grenada to investigate how risk sharing would have been achieved during period of restructuring. St Kitts and Nevis represents one of best success stories of income risk sharing during debt restructuring in the Caribbean, in recent years.

In 2014, St. Kitts and Nevis became the first country in the world to return a US\$40 million loan to the International Monetary Fund (IMF). The island's strong recovery primarily reflects fueled inflows under the CBI program,

The remainder of this paper is organized as follows. Section II discusses the theoretical achievements debated on the underlining topic. Section III presents a short survey of the literature on risk-sharing. Section IV discusses the methodology and results of the regression analysis. Recommendations and concluding remarks follow in Section V and VI.

2. Theoretical Background

Risk pool is a type of risk management mostly practiced by insurance companies. Risk management is the identification, assessment, and prioritization of risks, and the subsequent coordinated and economical application of resources to minimize, monitor, and control the probability and impact of losses. Governments can use risk management to focus efforts on being more effective. There are numerous direct and indirect international risk-sharing mechanisms. These include self-insurance at the national level, market-based tools (such as hedging, income associated with foreign assets, external borrowing from international markets, and current account adjustments), international labor mobility (such as through immigration and emigration), implicit hedges provided by macroeconomic flexibility, transfers, access to credit from international financial institutions (IFIs), and bilateral swap arrangements.

The key prediction of the theoretical literature is that risk sharing can be seen as a consumption smoothing mechanism. The notion of consumption smoothing is not entirely clear-cut. The most straightforward interpretation is that consumption is less volatile than income over time. In principle, there are several mechanisms for smoothing income and consumption within countries. The 'conventional risk sharing' literature typically concentrates on smoothing of consumption against output fluctuations. Consumption smoothing is manifested in the National Accounts as the difference between disposable income, Disposable National Income and total (private and government) consumption.

A simplified decomposition of the System of National Accounts (SNA) illustrates the variety of channels of risk sharing:

$$GNI = GDP + Net\ Factor\ Income \quad \text{Equation 1}$$

$$CONS = GNI - Gross\ National\ Savings \quad \text{Equation 2}$$

where GNI is Gross National Income, GDP is Gross Domestic Product is a measure of output, CONS is total (with depreciation) consumption of the government and private sector. Large Net Factor Income (NFI) flows are less correlated with GDP. NFI does not include social benefits and other current transfers that directly affect the level of disposable income and influence consumption; hence national income is less sensitive to GDP fluctuations. The composition of NFI makes it an "international diversification" component of GDP. It mostly consists of primary income flows resulting from cross-ownership of productive assets. NFI includes net property and entrepreneurial income (interest, dividends, rent etc). Government receipts from taxes on production and imports, and relatively small net labor income (compensation of employees) paid to resident workers in a country.

Pools generate innovation. Households can mitigate consumption through formal risk sharing arrangements, such as insurance and/or information mechanism, through transfers and remittance. Corporations market and individuals can manage domestic GDP shocks through various domestic consumption growth (“consumption smoothing”) channels. Capital channel is the use of net factor income payments from abroad (interest, dividends, profits, wages) or self-insurance in the form of accumulating foreign currency reserves. Credit channel is net borrowing from abroad (private and public). Price channel refers to net valuation effects of domestic relative to foreign produced goods on consumption. If these measures fail, governments can smooth consumption through fiscal channel, which is the net transfers from abroad (fiscal transfers, remittances).

Sovereign debt restructuring must create a stable debt situation while preserving the rights of creditors and, at the same time, promote sustained economic growth. Governments cannot rely solely on economic growth to alleviate distress, nor would it be wise for them to try to engineer growth by adopting more aggressive economic policies. Both the public and the private sector must be involved. There is a greater role for non-conventional tools, such as private sector involvement and investment and a stronger participatory approach towards citizens’ empowerment, all of which generally leads to more dynamic economic growth. Public Value Management model offer a new paradigm and a different narrative of reform.

Smart Cities have emerged as one response to the challenges and opportunities created. There are different digital technology models for cities, from Digital Cities to Intelligent Cities to Smart Cities, which are incorporated according to the degree and nature of digital technology capacity of the city. Digital Cities integrate digital technology into the city’s core infrastructure systems, while Intelligent Cities rely on the Digital City infrastructure to build intelligent buildings, transportation systems, schools, enterprises, public spaces, and public services, and integrate these into intelligent urban systems. Smart City policy work is also primarily conducted in developed countries, with most policy organizations based in the United States (37%) and United Kingdom (14%), and only eight percent in developing countries like Chile, China, India or Russia. The lack of indigenous policy organizations means that developing countries tend to adopt policy frameworks provided by and tested in developed countries, which is not optimal for different country contexts and risks advancing the interests of provider countries over local interests.

Developing countries tend to pursue Smart People and Smart Governance dimensions less - arguably the areas of their most pressing need. The study found that Smart City developments in developing countries typically pursue Smart Environment, Smart Living and Smart Economy dimensions. Smart city approach is an innovative solution—not limited to but mainly based on the ICT. The initiatives leverage data and services offered by digital technologies, such as cloud computing, open data sets, or the Internet apparatus to help connect city stakeholders, improve citizen involvement, offer new or enhance existing services, and provide context-aware views on city operations. City approaches are influenced and facilitated by Big Data.

Big Data can be seen as one of the most powerful non-conventional risk sharing method. Big data is not a technology itself. It refers to collections of data so large, varied, and dynamic that

they cannot be handled by conventional data processing technology. It is generated and made available online and in digital media ecosystems (Constantiou & Kallinikos, 2015).

3. Literature Review

The risk sharing literature evolves from the work of Asdrubali et al. (1996). Predominantly the central thrust of the literature is that “channels” of risk sharing are capital and credit (Sorensen and Yosha, 1998). The authors examine the contribution of “total” consumption risk sharing and found that Individuals can share risk with others in well-functioning financial markets through cross-ownership of financial assets (“capital market” channel) and through borrowing and lending (“credit market” channel).

Researchers, such as Yosha (1998), are of the view that the largest part of consumption smoothing can be through the financial-markets channel, followed by the credit/savings channel and the fiscal-transfers system. Yosha (1998) among other found that for EU and OECD countries the bulk of smoothing can be attributed to the credit/savings channel, whereas the fiscal-transfers channel is almost irrelevant and the financial-markets channel smoothens a limited fraction of risk; the overall degree of insurance is much lower than that registered for U.S. federal states.

Several studies are of the view that one the most valuable ways to smooth consumption is by smoothing GDP shocks through various risk channels. Obstfeld (1995) and Yakhin (2005) argue that net output could be a more relevant measure for consumption risk sharing. Sorensen and Yosha (1997a) found that 50% of GDP shocks were smoothed through government budget deficits and the remaining 50% through corporate saving (dividend) smoothing. Access to world capital markets and net investment income flows between countries help protect national income from country-specific output shocks, capital gains and investment income as risk sharing channels. There has been some evidence to suggest that debt restructurings can have a negative impact on output, trade, foreign direct investment and private sector access to credit, among others (e.g., Eaton and Gersovitz 1981, Bulow and Rogoff 1989, Cole and Kehoe 1998, Aguiar and Gopinath 2006, Arellano 2008). De Paoliet al (2009) finds that the output loss could be as much as 5% of GDP, and can persist for up to 10 years, depending on the duration of arrears.

A widely used literature measures risk sharing with the degree to which aggregate regional or national consumption is insulated from fluctuations in regional or national income (e.g., Lewis 1996 or Asdrubali et al. 1996). Asdrubali et al. (1996) empirically analyze the degree of risk sharing in the US between 1964 and 1990. They highlighted the importance of risk sharing for the sustainability of monetary unions. Their argument is similar to the theory of optimum currency areas (OCA), developed by Mundell (1961), McKinnon (1963) and Kenen (1969), which has been used extensively in the debate on a single currency in Europe, and more generally to evaluate proposals for exchange rate stability, currency boards, and dollarization. OCA theory has been applied to Asia by Eichengreen and Bayoumi (1999).

Mitigation approaches such as risk pooling can allow for direct and timely relief to help countries cope with domestic shocks. Van Wincop (1994, 1996), Lewis (1996a) Shiller and Athanasoulis (1995), Obstfeld (1994) note that welfare gain can be had from risk sharing. They

also note that it is useful in reducing the exposure and the costs of sudden stops and capital flight crises.

The relative importance of capital markets and governmental interventions has been debated by several researchers, e.g., Sala-i-Martin and Sachs (1992), von Hagen (1992), Italianer et al. (1993), Mélitz and Zumer (1999), Sorensen et al. (2001), Kalemli-Ozcan et al. (2003) and Asdrubali and Kim (2004, 2008). Atkeson and Bayoumi (1993) shows the US to benefit from a larger degree of capital mobility, compared to Europe, they also show the importance of federal transfers to insure against idiosyncratic shocks. Remittances can contribute to consumption smoothing. The importance of migrant workers' remittances as current transfers grew in importance for many developing countries (IMF, 2005)

Literature on risk sharing also suggests that portfolio equity (alongside FDI) is the main asset category through which cross-country risk sharing is taking place (Kose, Prasad and Terrones, 2007). Government saving provides risk sharing if it increases when GDP increases and decreases when GDP decreases and the same holds for private saving (in the Case of St Kitts and Nevis). Saving in good times and dis-saving in bad times is a form of self-insurance"against consumption fluctuations but the optimal amount of saving depends, from the point of view of models of forward-looking consumers, on the persistence of income shocks.

There has been limited empirical analysis on channels of risk sharing. The income channel has received some attention, in particular by Lane (2001), who analyses international investment income flows and finds limited evidence in support of such flows as a potential source of income smoothing at business cycle frequencies, and by Artis and Hoffmann (2006).

Kose, Prasad, and Terrones (2007) find little empirical evidence that international risk-sharing is at levels predicted by theory. In addition, they find that only industrial countries have attained better risk-sharing outcomes during the recent period of globalization. Developing countries have, by and large, been shut out from this benefit. The most interesting result is that even emerging market economies, which have experienced large increases in cross-border capital flows, have seen little change in their ability to share risk.

It is possible to design risk-sharing arrangements that minimize the trade-off between private and public sector benefits and cost. In many developing countries it has increased community engagement by genuinely involving people in the design of government services, increased benefit to the economy through the release of open data and reduced staff time spent on manual administration of processes. Advancements in innovative information technology (IT) solutions have enabled not only the private sector, but also public institutions to radically improve the way they perform their operational activities [Stragier, Verdegem, & Verleye, 10].

A Smart economy approach can offer the Caribbean region an opportunity for risk-sharing. Big data could aid governments in improving their efficiency, effectiveness and transparency (Milakovich 2012). For example, big data could enable better decision support information, more informed policymaking (Janssen and Kuk 2016), and improved services based on better insight into citizen demands and needs (Chen and Hsieh 2014). Such benefits could be a potent tool for solving social problems, transport congestion and by extension insolvency issues (Scholl

and Scholl 2014). Some commentators argue that most governments have not adopted the use of big data because they are uncertain about its impact and are not equipped to take advantage of the opportunities it offers (Malik 2013).

Innovative governments have been creating new ways for citizens to give them the ability to provide input into policy decisions. They have been implementing policies aimed at using digital technology to enhance the efficiency and delivery of goods and services; i.e. fostering smart economies and building smart cities [Rosario et al., 13]. Citizens can play an important role not just in the design but also in the delivery of public services. The UK government established a Behavioural Insights team. It was formed explicitly to use data about citizens' behavior to improve the effectiveness of government interventions. The team has identified interventions expected to save the UK government at least £300 million over the next five years. Private sector behavior, inclusive of households and individuals, can therefore play an important role in the future evolution of non-conventional tools. The Government of the United Kingdom created a "Digital by Default" initiative that radically rebuilt some of the most high-volume services to make them "digital by default". This helped save £3.56 billion for taxpayers during the period April 2012 to March 2015 (GOV.UK, 2017).

Reliable, clean data—Big Data—can inform the design or refinement of government initiatives. In the private sector the use of big data has been merged into everyday activities, for instance, for business intelligence (Chen et al. 2012). Retailers, such as Sears, use big data to better understand their customers and their buying decisions (Henschen 2012). Financial institutions, such as Morgan Stanley, use big data to predict market behavior and investment performance (Groenfeldt 2012).

4. Methodology and Data

This paper adopts the approach to income smoothing, put forward by Sorensen and Yosha (1998) in order to conduct an empirical investigation into the "when it rains, it flows" hypothesis. Consequently, estimation is carried out by considering the following identity:

$$GDP = \frac{GDP}{GNP} * \frac{GNP}{NI} \frac{NI}{DNI} \frac{DNI}{C+G} (C + G) \quad \text{Equation 3}$$

where all the magnitudes are in per capita terms, and *i* is an index of countries. The national accounting identities that are relevant here are $GNP = GDP + \text{net factor income}$, $NI = GNP - \text{capital depreciation}$, $DNI = NI + \text{international transfers}$, $C + G = NI - \text{net saving}$. If there is smoothing through net factor income flows, namely, income smoothing via cross-country ownership of productive assets, then GDP/GNP should vary positively with GDP . Similarly, if depreciation of capital further smooths income, then GNP/NI should vary positively with GDP . If net transfers from abroad contribute to income smoothing, then NI/DNI should vary positively with GDP . If saving further smooths total consumption, then $DNI/(C + G)$ should vary positively with GDP . Finally, to the extent that not all the shocks to GDP are smoothed, $C + G$ will be positively correlated with GDP .

4.1 Var Model

A VAR model describes the evolution of a set of k variables (called endogenous variables) over the same sample period ($t = 1, \dots, T$) as a linear function of only their past values. The variables are collected in a $k \times 1$ vector y_t , which has as the i th element, $y_{i,t}$, the time t observation of the i th variable. A p -th order VAR, denoted VAR (p), is a vector Autoregressive (VAR) model is employed to see the joint effects of the lags of the variables. A 3×3 matrix form of the vector is represented as follows.

A p -th order VAR denoted VAR (p) is

$$y_t = c + A_1 y_{t-1} + A_2 y_{t-2} + \dots + A_p y_{t-p} + e_t, \quad \text{Equation 4}$$

A vector Autoregressive (VAR) model is employed to see the joint effects of the lags of the variables. A 5×5 matrix form of the vector is represented as follows:

$$\begin{bmatrix} y_{1,t} \\ y_{2,t} \\ y_{3,t} \\ y_{4,t} \\ y_{5,t} \end{bmatrix} = \begin{bmatrix} c_1 \\ c_2 \\ c_3 \\ c_4 \\ c_5 \end{bmatrix} + \begin{bmatrix} A_{11}, A_{12}, A_{13}, A_{14}, A_{15} \\ A_{21}, A_{22}, A_{23}, A_{24}, A_{25} \\ A_{31}, A_{32}, A_{33}, A_{34}, A_{35} \\ A_{41}, A_{42}, A_{43}, A_{44}, A_{45} \\ A_{51}, A_{52}, A_{53}, A_{54}, A_{55} \end{bmatrix} \begin{bmatrix} y_{1,t-1} \\ y_{2,t-1} \\ y_{3,t-1} \\ y_{4,t-1} \\ y_{5,t-1} \end{bmatrix} + \begin{bmatrix} e_1 \\ e_2 \\ e_3 \\ e_4 \\ e_5 \end{bmatrix} \quad \text{Equation 5}$$

By solving the above matrix the following equations are derived.

$$y_{1,t} = c_1 + A_{11} y_{1,t-1} + A_{12} y_{2,t-1} + A_{13} y_{3,t-1} + A_{14} y_{4,t-1} + A_{15} y_{5,t-1} + e_1 \quad \text{Equation 6}$$

$$y_{2,t} = c_2 + A_{21} y_{1,t-1} + A_{22} y_{2,t-1} + A_{23} y_{3,t-1} + A_{24} y_{4,t-1} + A_{25} y_{5,t-1} + e_2 \quad \text{Equation 7}$$

$$y_{3,t} = c_3 + A_{31} y_{1,t-1} + A_{32} y_{2,t-1} + A_{33} y_{3,t-1} + A_{34} y_{4,t-1} + A_{35} y_{5,t-1} + e_3 \quad \text{Equation 8}$$

$$y_{4,t} = c_4 + A_{41} y_{1,t-1} + A_{42} y_{2,t-1} + A_{43} y_{3,t-1} + A_{44} y_{4,t-1} + A_{45} y_{5,t-1} + e_4 \quad \text{Equation 8}$$

$$y_{5,t} = c_5 + A_{51} y_{1,t-1} + A_{52} y_{2,t-1} + A_{53} y_{3,t-1} + A_{54} y_{4,t-1} + A_{55} y_{5,t-1} + e_5 \quad \text{Equation 8}$$

The VAR model specified here in our model, focuses on four variables; gross domestic product, net international transfers (measured as the difference between disposable national income, national income), disposable income, and gross national product. As suggested by equations (6)-

(8), these variables are a minimum of variables that are necessary to identify three structural disturbances; aggregate demand, supply and oil price shocks.

4.2 Variance Decomposition

There is a general variance decomposition formula for $c \geq 2$ components. For two conditioning random variables the variance decomposition formula is given as:

$$\text{Var}|Y| = E(\text{Var}|Y|X_1, X_2) + E(\text{Var}|E|Y|X_1, X_2|E(\text{Var}|Y|X_1, X_1) + \text{Var}|E|Y|X_1|), \quad \text{Equation 9}$$

The following forms the law of conditional variance.

$$\text{Var}|Y|X_1 = E(\text{Var}|Y|X_1, X_2) + \text{Var}|E|Y|X_1, X_2|X_1|. \quad \text{Equation 10}$$

In our case Y represents the Gross Domestic Product and X1 and X2 represent either domestic credit or exports to other countries. Note that the conditional expected value $E(Y | X)$ is a random variable in its own right, whose value depends on the value of X. Notice that the conditional expected value of Y given the event $X = x$ is a function of x (this is where adherence to the conventional and rigidly case-sensitive notation of probability theory becomes important!). If we write $E(Y | X = x) = g(x)$ then the random variable $E(Y | X)$ is just $g(X)$.

By taking logs and time differences, multiplying both sides by $\Delta \log \text{GDP}$ (minus its mean), and take the average, the following variance decomposition is obtained and estimated:

$$\Delta \log \text{GDP}_t - \Delta \log \text{GNP}_t = v_{f,t} + \beta_f + \Delta \log \text{GDP}_t + \epsilon_{f,t}, \quad \text{Equation 11}$$

$$\Delta \log \text{GNP}_t - \Delta \log \text{NI}_t = v_{d,t} + \beta_d + \Delta \log \text{GDP}_t + \epsilon_{d,t}, \quad \text{Equation 12}$$

$$\Delta \log \text{NI}_t - \Delta \log \text{DNI}_t = v_{j,t} + \beta_j + \Delta \log \text{GDP}_t + \epsilon_{j,t}, \quad \text{Equation 13}$$

$$\Delta \log \text{DNI}_t - \Delta \log (C_t + G_t) = v_{s,t} + \beta_s + \Delta \log \text{GDP}_t + \epsilon_{s,t}, \quad \text{Equation 14}$$

$$\Delta \log (C_t + G_t) = v_{u,t} + \beta_u + \Delta \log \text{GDP}_t + \epsilon_{u,t}, \quad \text{Equation 15}$$

The β coefficients are interpreted as the incremental percentage amounts of smoothing achieved at each level, and β_u , as the percentage of shocks not smoothed. If $\beta_u = 0$, there is full risk sharing and the remaining coefficients sum to 1. Otherwise, they sum to less than 1. If there is dis-smoothing at some level, it will be reflected in a negative value of the β coefficients.

4.3 Data

Data for St Kitts and Nevis the period 1980-2015 is used in carry out the estimation of equations (11-15). The statistics is drawn from Eastern Caribbean Central Bank database they include, Net international transfers measured as the difference between Disposable National Income (DNI)

and National Income (NI), disposable income, DNI, and total (private and government) consumption; gross domestic product (GDP) and gross national product (GNP).

4.4 Stylized Facts

St Kitts and Nevis was chosen as the sample country as it represents one of the few successful debt restructuring programmes conducted in the Caribbean, in recent years. Grenada and Jamaica have also effectively implemented reforms to bring down their debt levels (See Table 1). St. Kitts and Nevis' home-grown programme ran from 2011 to 2014. In 2014, St. Kitts and Nevis became the first country in the world to return a US\$40 million loan to the International Monetary Fund (IMF). There were significant growths in deposits, reflecting government savings from the Citizenship By Investments (CBI) inflows (See Figure 1 & Figure 2). This also increased pressure on bank profitability. CBI fee receipts increased to an estimated 13 percent of GDP in 2013 from 2.3 percent of GDP in 2010. The strong recovery primarily reflected construction boom fueled by inflows under the CBI program, government and SIDF investment and expenditure, largely on the People Employment Program, and continued recovery in tourist arrivals. A large portion of CBI budgetary revenues were saved and used to build precautionary buffers. The country's experience with the CBI programme represents is prime example of risk pooling during debt restructuring. Namely, investment income as risk sharing channels.

Figure 1 SIDF Activity

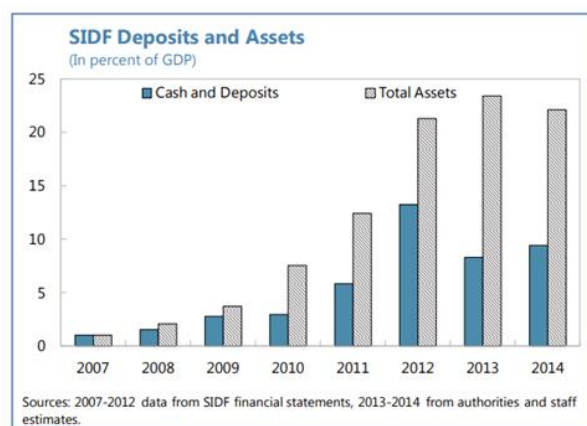


Figure 2: Banking Deposits

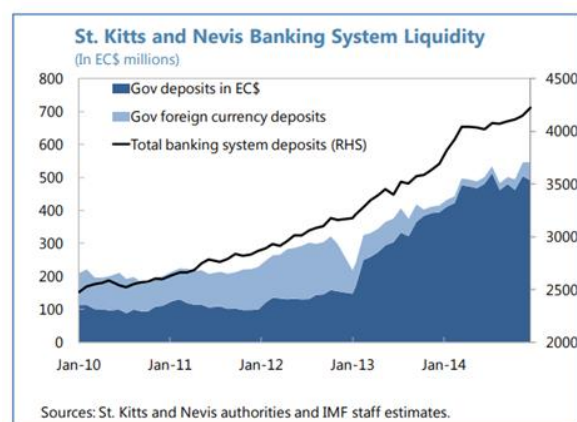


Table 1: Selected Indicator for St Kitts and Nevis Macroeconomic Analysis

Indicator	2010	2011	2012	2013	2014
Public debt to GDP	159.3	146.6	137.9	101.0	81.4
Mercandise exports	54.4	16.7	-7.2	-10.0	5.9
Merchandise imports	-4.0	-1.1	-8.4	7.1	9.4
Foreign currency Deposits/GDP (in percent)	19.4	18.1	25.1	29.7	38.1
Central government deposits (EC\$ million)	224.7	302.9	343.4	537.8	663.1

Source: IMF 2017 Article IV Consultation—Press Release; and Staff Report

4.5 Results

This finding shows that there is also very little smoothing via international transfers, resulting in almost no income smoothing. The only operative smoothing mechanism is consumption smoothing through saving. (See Table 2).¹

Table 2: Income Smoothing during ‘when it rains, it flows’ for St Kitts and Nevis over the period 1980-2016 (VAR Model)

Channels of Income and Consumption Smoothing (percent)	
Factor income (β_f)	.02
Capital depreciation (β_d)	.05
International transfers (β_I)	.26
Saving (β_S)	1.6
Not smoothed (β_U)	2.8

No. of observations **36**
R-Squared **0.46**

5. Policy Recommendation

Making progress on two of Caribbean sovereigns’ biggest problems – illiquidity and insolvency –requires governments to draft survival strategies which make better use of data, involve citizens, and collaborate with the private sector. In brief, herein described are suggestions for surviving any debt restructuring process, as well as an outline of how government can improve private financial risk sharing in the Caribbean. Governments should:

- Enact risk sharing methods that rely heavily on private sector involvement. The trend toward participatory government will only gain strength by engaging and empowering citizens. Governments can not only better meet citizens’ needs and shift some of the burden of accountability from the state to the people, allowing high-quality delivery of services in an environment that is constrained by its resources.
- Maximum diversification to help to minimize domestic shocks through ‘Smart City’ initiatives such as:
 - Smart infrastructure: city facilities (e.g., water and energy networks, streets, buildings etc.) with embedded smart technology (e.g., sensors, smart grids etc.).

¹ Estimation results are preliminary draft numbers which is incomplete and should be read with caution

- Smart Transportation (or smart mobility): transportation networks with enhanced embedded real time monitoring and control systems
- Smart Environment: innovation and ICT incorporation for natural resource protection and management (waste management systems, emission control, recycling, sensors for pollution monitoring etc.).
- Smart Services: utilization of technology and ICT for health, education, tourism, safety, response control (surveillance) etc. service provision across the entire city.
- Create and deploy digital services in key areas of public interest.
- Reduce costs associated with doing business with government by removing costly manual processes. Instead, increase customer satisfaction through simple, smart and digital services.
- Adopt the use of big data – to create a more open and transparent public administration, and open doors to citizens' involvement in priority setting and policy making. This could help to increase community engagement by genuinely involving people in the design of government services.
- Engineer more fundamental adjustment mechanisms to generate innovative foreign investment income. These should be pursued in a manner which stimulates growth in national saving, contribute to infrastructural development and technological enhancement. A country's saving balance is equal to the difference between domestic saving and domestic investment spending. A country that saves more than is needed to support domestic capital expenditures sends the surplus abroad to purchase foreign assets. Conversely, a country where domestic saving is insufficient to finance domestic capital expenditures must borrow from abroad to make up the shortfall.
- Promote financial literacy - this can help to stimulate investment in more productive assets than bank deposits. In order to be effective, probably stronger financial and economic education would have to be introduced in secondary school curriculums
- Generate liquidity by building foreign reserve through export of service. Investment in human capital can contribute to national development through return via remittances.
- Focus on raising exports through improved competitiveness. Stronger export growth means that funds once borrowed from abroad could be replaced, at least in part, with higher export revenues. The most straightforward means of improving competitiveness is through a weaker exchange rate, to make domestically produced goods cheaper in foreign currency terms.
- Focus on Sustainability. Leverage existing practices for risk management purposes. Be Pragmatic. Customized strategy should be supported by simple and efficient methods that meet the needs of, and add value to, managers.

6. Conclusion

Sovereign debt restructuring should be designed to alleviate the debt burden in a way that the country can eventually autonomously pay its liabilities and regain access to market funding. It is necessary to have a high number of participating creditors and buy-in from the countries' citizens. In other words, if agents do not comply with the arrangement when times are relatively good by giving up some consumption, they will be left alone in the future to deal with the shocks. This argument is supported by Thomas and Worrall (1988), Ligon, Thomas, and Worrall (1997), and Kocherlakota (1996).

The ability to share risks is particularly important during volatile times when economies are experiencing sudden downturns. Innovative and most forward-thinking governments have shifted risk by engaging and empowering citizens, involving them in the design—and, in some cases, the delivery public services. These shifts not only increases consumer choice and well-being, but also boost government productivity, with the help of technology and the use of open data. If done correctly, risk pooling could allow government to improve policy and enhance program effectiveness. To varying degrees, governments require the political appetite and willingness to reform and a readiness to try things that have not been tried before, and to quickly abandon ineffective ways of working.

Efforts to improve the ways sovereign debt problems get resolved need to be grounded in a clear diagnosis of how to gain efficiency and reduce deficiencies. In developing countries, the private sector has used technology and innovation to smooth their consumptions in response to unanticipated idiosyncratic shocks. If we consider big data, smart economy, and ICT as a particular way of sharing certain risks, the idea entails a diverse risk pool. These types of risk-sharing activity, facilitated by technology can serve as an apparatus that countries can use to reengineer their approach towards stabilizing their disposable income and consumption, improved social welfare, and, by extension, help to narrow the insolvency gap. As a related to developing a Smart economy/city, there are no off-the-shelf solutions. Every country is at a different level of maturity and would require different dimension, strategies and priority areas. Solution must to be adapted and validated within the local context, and any strategy for implementing undertaking a Smart City approach must be formulated and owned by the citizens.

The private sector, households and individuals understand that 'When it rains it flows' as economic activities must continue. Governments must find ways and means to provide essential goods and services during crisis mode. With more constrained resources than usual citizens will be forced to accommodate risk sharing tools. It is however easier to accommodate non-conventional tools as they require less financial input from both the private and public sector. Technology which is plays a primary role is largely available in the public domain (smart phones, tables, ipads, laptop computers, smart watches). They help to contribute to the continuous influx of data in different formats, such as images, free text, video, and sound, among others. Risk sharing avenues should therefore be contemplated during the debt restructuring process, with a greater emphasis on non-conventional methods.

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