The Spiraling Costs of Debt

A Study on the Impact of Debt on GDP Growth and Long Term Interest Rates

Gant Elmore, Kent Kirkwood, Tarek Chehabi, Zac Evans

glendonTodd CAPITAL

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Executive Summary

- As US gross debt levels have grown from 63% of GDP in 2007 to 105% in 2013, the economic consequences and fiscal policy implication of high debt levels have become very relevant

- Our analysis has identified 'tipping points' where government debt levels begin to have a significant impact on economic performance and has quantified the impact of surpassing these tipping points
  - Gross debt / GDP between 80% and 110%
    - **147 basis point increase in long term interest rates**
    - **1.48% reduction in total investment**
  - Gross debt / GDP over 110%
    - **14 basis point additional increase in long term interest rates**
    - **0.68% additional reduction in total investment**
    - **1.3% drag on GDP growth**

- Based on the 'current trajectory' of the US economy as suggested from our research, US government debt / GDP levels will reach a tipping point in as little as 5 years
  - This will tipping a period of exponential growth in debt leading to debt as high as **350% of GDP by 2038**

Although US government debt levels are at near historic highs, the economy still has the ability to reach an economic 'escape velocity' through sound fiscal policy choices and avoid a debt spiral

Source: IMF 2012

Agenda

- **Thesis**
- Macroeconomic Backdrop
- Approach
- Review of Findings
- Implications
- Appendix

GTC Economic Project Thesis

Through analyzing the historical relationship of debt / GDP levels with other economics factors we can identify the 'tipping points' and economic consequences of too much debt

- We observe that in the US and globally the level of debt / GDP is rising
- We believe that historical data will show that once an economy reaches certain debt / GDP 'tipping point' levels, negative economic shifts can occur
  - A rising debt / GDP ratio has economic consequences
  - Debt / GDP ratios serve as tipping point mechanisms to signal imminent manifestations of these consequences
  - Other factors will impact the timing and magnitude of these tipping points
- By analyzing historical debt / GDP levels along with other economic metrics, we hope to demonstrate the potential states of the US economy based on different courses of action by US fiscal policy makers
- This will allow us to call out the importance of fiscal policy decisions today on future economic well-being and create a sense of urgency for action

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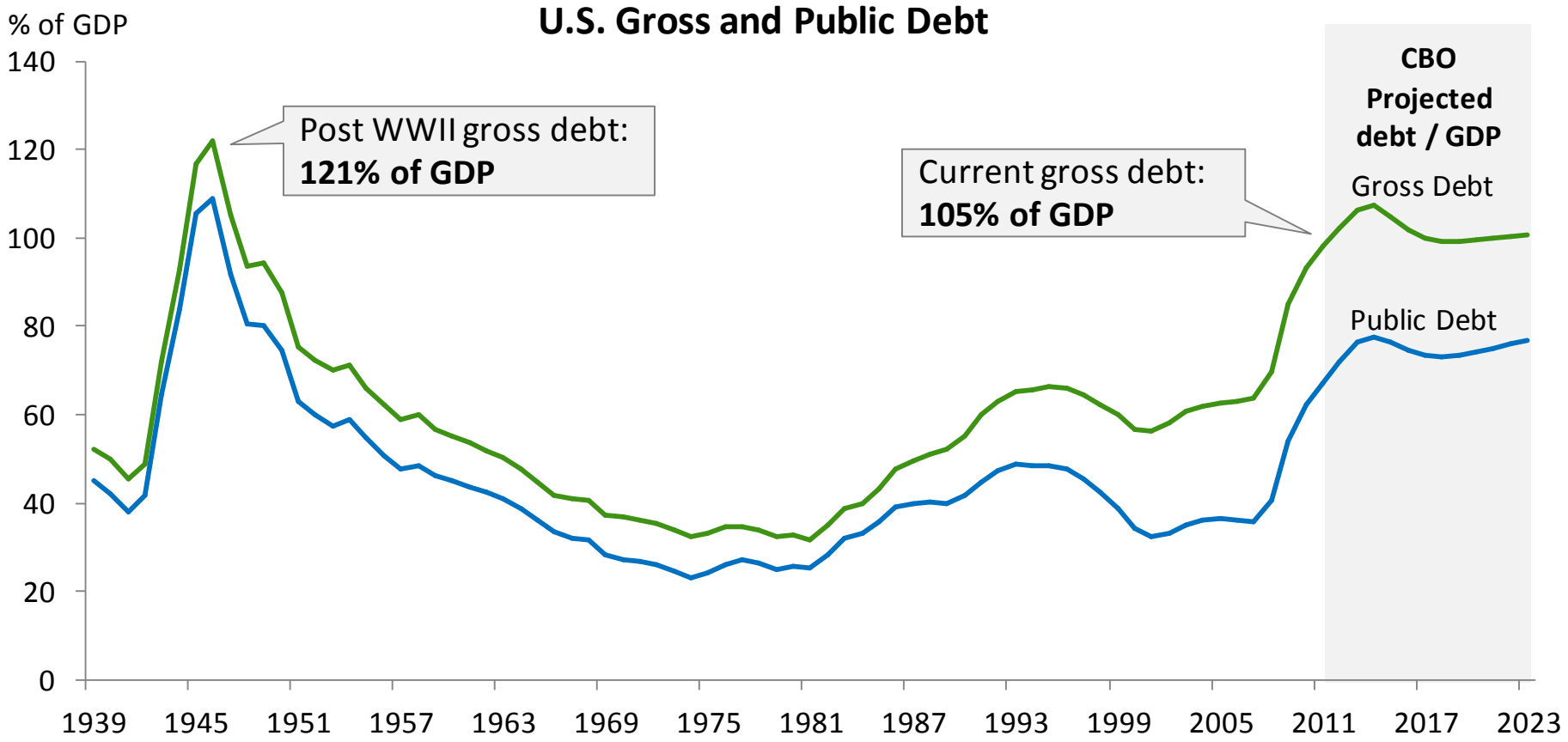
The recent sluggish economy and sharp rise in federal spending have pushed US debt / GDP levels to heights not seen since WWII

- Federal debt began to increase after the stock market crash of 1929, and rose above 40% of GDP in the depths of the Great Depression
- Federal debt rose during **World War II** to over **120% of GDP**, fueled by heavy deficit spending to fund the war
- After the war debt / GDP began a decline that bottomed out **at 32% of GDP in 1974**
- The US government has **run a budget deficit in 45 of the last 50 years** — only in 1969 and from 1998 to 2001 did the government run surpluses
- **As of March 31, 2013, the US debt / GDP was 104.8%**
- From 2009-2012, the U.S. government has been **running deficits well in excess of $1 trillion each year**
  - The trajectory of US debt levels remains high as the Treasury reported a **1 month deficit of $204B** in February 2013 alone

US debt / GDP of 105% is near historical levels last seen during WWII when defense spending peaked at 42% of GDP in 1944

Source: zerohedge.com, USA Today

Growth in spending has increased gross debt by 42% in the last 5 years, driving US debt / GDP levels from 63% to 105%



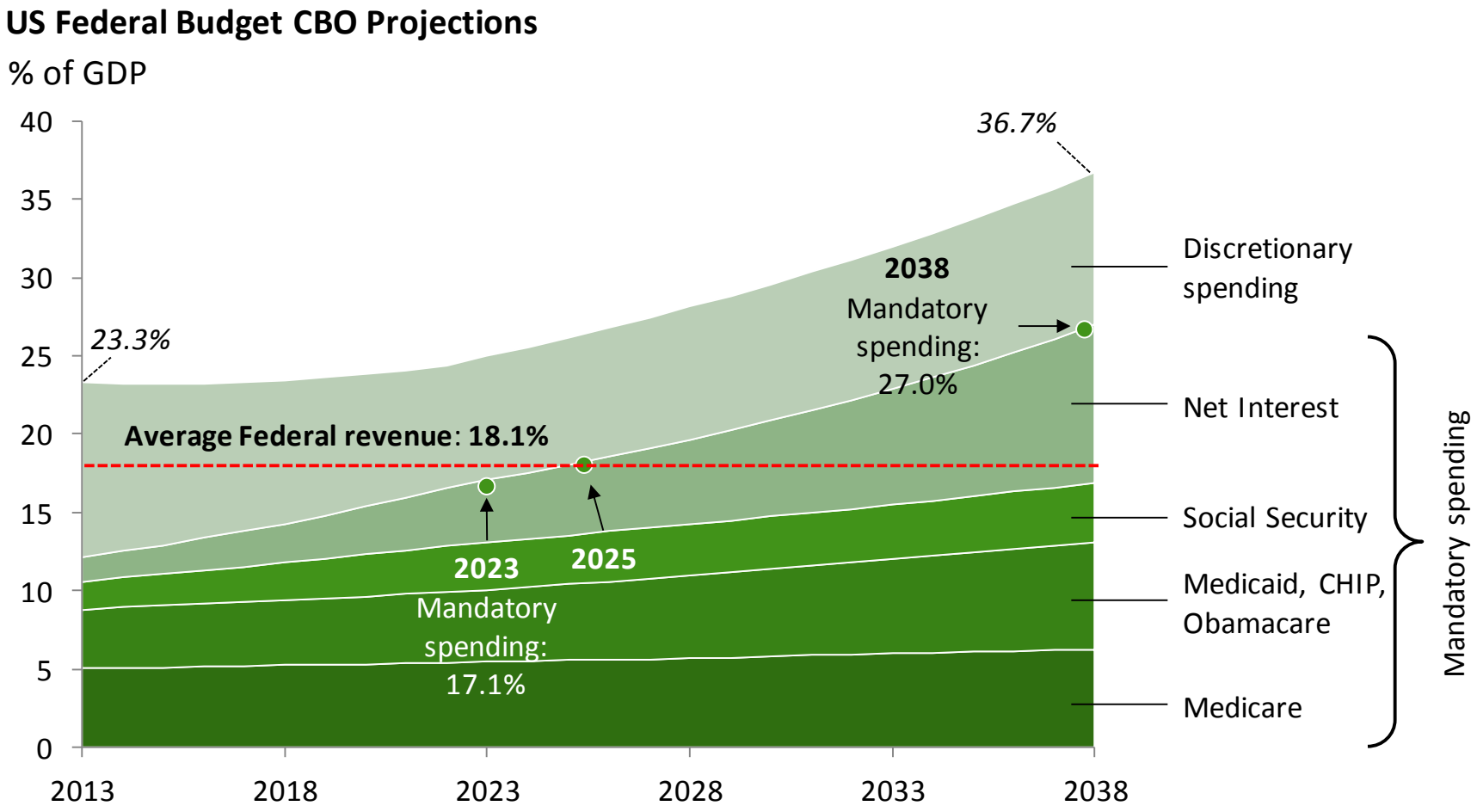
Debt definitions:

Gross Debt: Total US Treasury issued debt including debt issued to other US governmental agencies / trust funds ($4.8T total intra-governmental debt, $2.7T by Social Security, $1.1T by Federal Employee Retirement)

Public Debt: Total US Treasury issued debt held by non-US federal government entities including banks, private citizens, foreign governments and other institutions and individuals

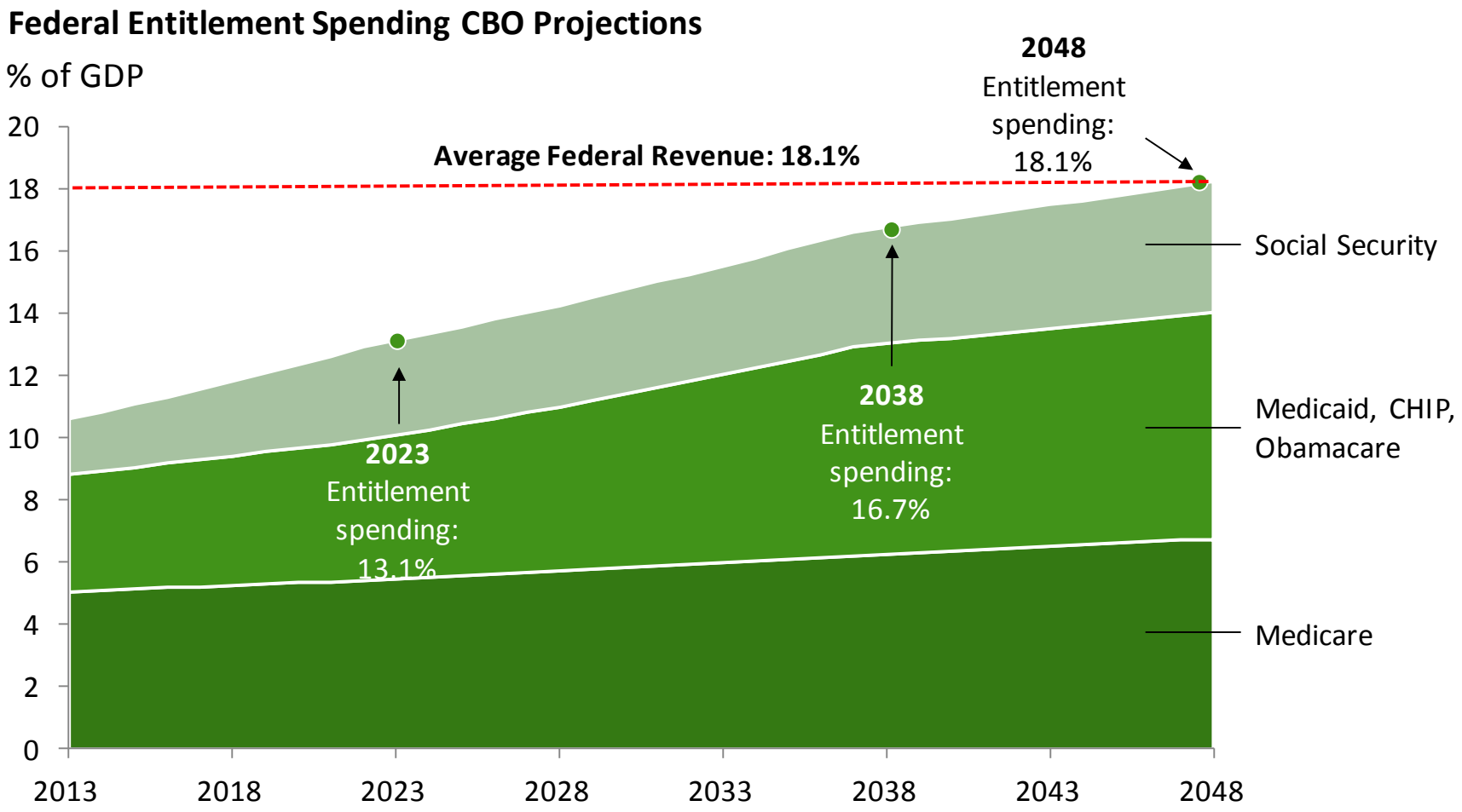
Source: FRED Economic Data & CBO. Current debt as of March 31, 2013

Future federal spending will be driven up by increasing entitlement spending and interest payments



Source: Congressional Budget Office (CBO) 2012, glendonTodd analysis to project interim year numbers using constant CAGR method

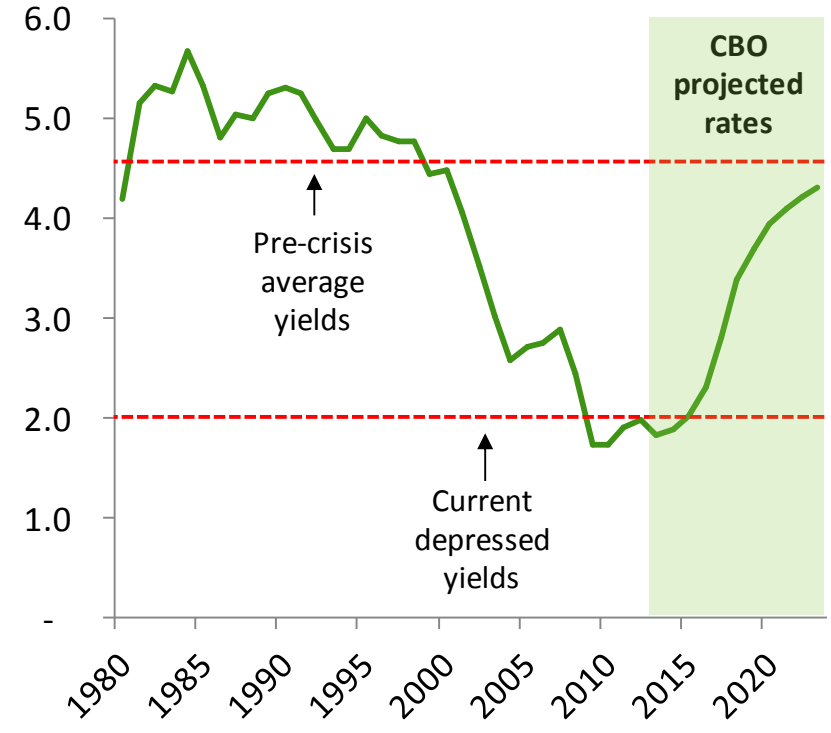
Entitlement spending alone will surpass projected federal revenue by 2048



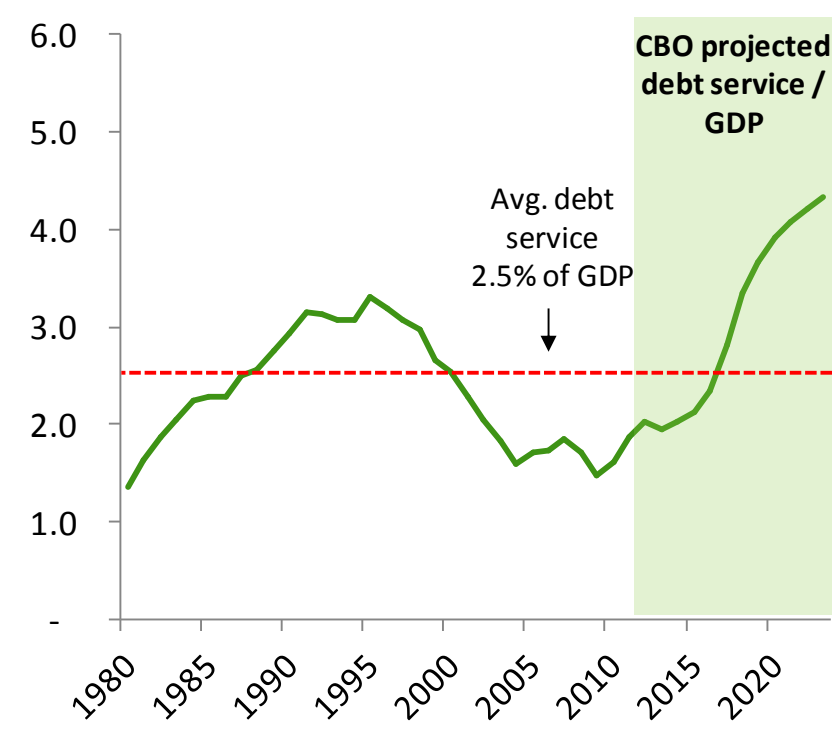
Source: Congressional Budget Office (CBO) 2012, glendonTodd analysis to project interim year numbers using constant CAGR method

US debt service will continue to rise as QE tapering drives treasury yields up to historic averages and continued fiscal deficits increase government debt levels

US Interest Rates



US Debt Service



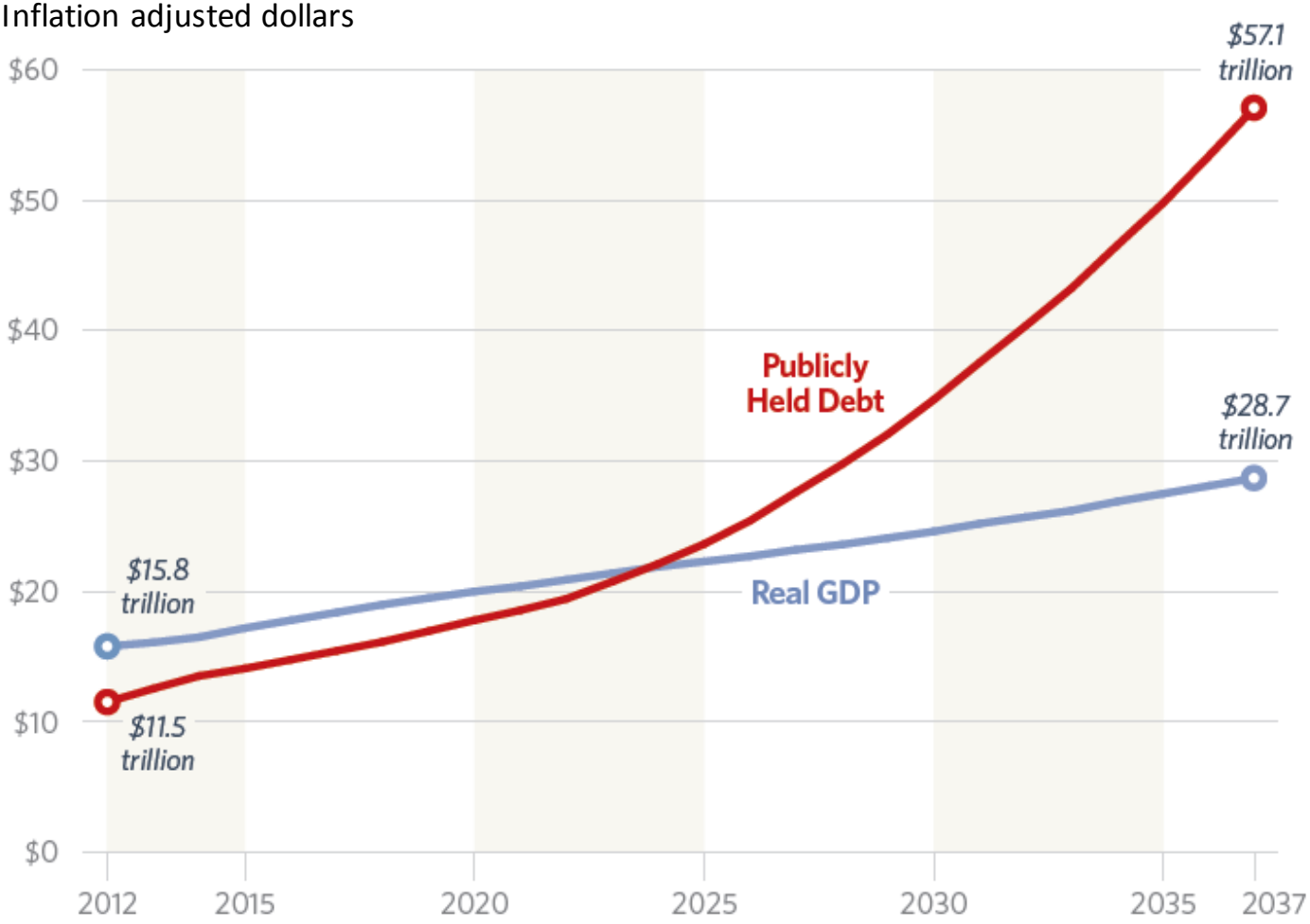
Unprecedented central bank intervention has enabled debt service / GDP to reach historic lows despite a spike in US debt levels

Source: CBO 2013

The US economy faces a potential vicious cycle of growing deficits and exploding debt levels if current spending isn't curtailed

US Publicly Held Debt CBO Alternative Case Projections

Inflation adjusted dollars



Recent CBO projections indicate US will reach 200% publicly held debt / GDP by 2037

Source: Congressional Budget Office Alternative Fiscal Scenario (CBO) 2012

Case Study: Examining decades of economic stagnation in Japan coupled with exploding debt

Economic Boom and Bust

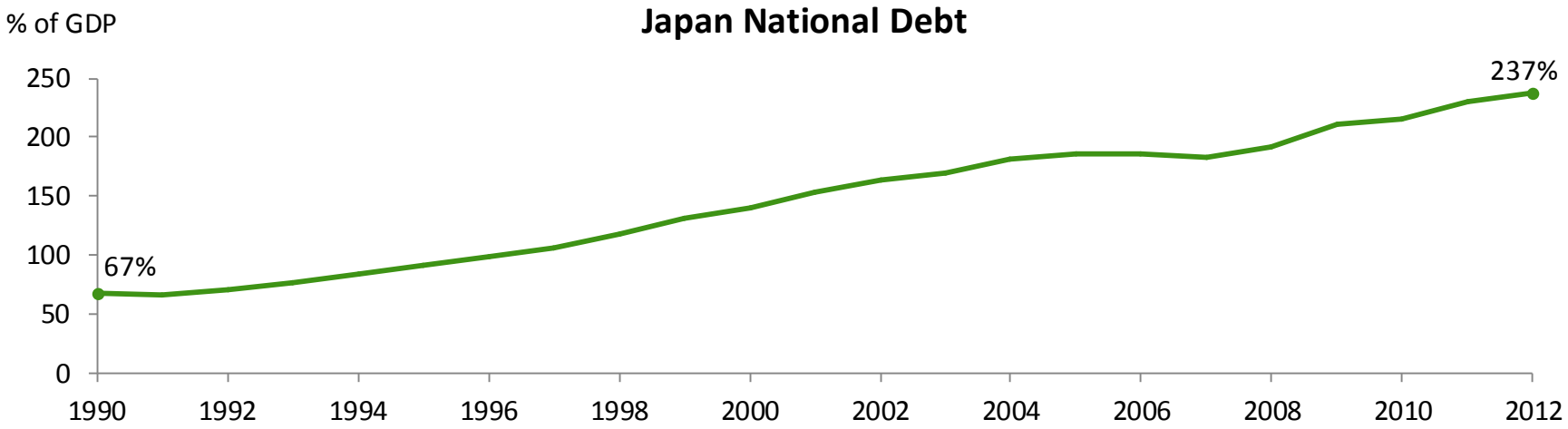
- Japan enjoyed decades of export fueled strong economic growth, average 9.5% per year between 1955 and 1970 accelerated by a depreciated currency
- In response to growing trade deficits with Japan by the west (US, France Germany), the Plaza Accord was passed in 1985 which caused the Yen to appreciate 46% against the Dollar
  - Japan's growth slowed from 4.4% in 1985 to 2.9% in 1986
- In an effort to stimulate the economy, the Bank of Japan ("BoJ") reduced interest rates from 5.0% to 2.5% in 1986
  - Drove up public equity markets and real estate values, causing them to triple from 1985 to 1989
- Seeking to reverse the unsustainable asset price inflation, the BOJ increased interest rates to 6.0% between 1989 and 1990 which led to a sharp reversal in 1991 with Japanese public equity prices losing a third of their value within a year

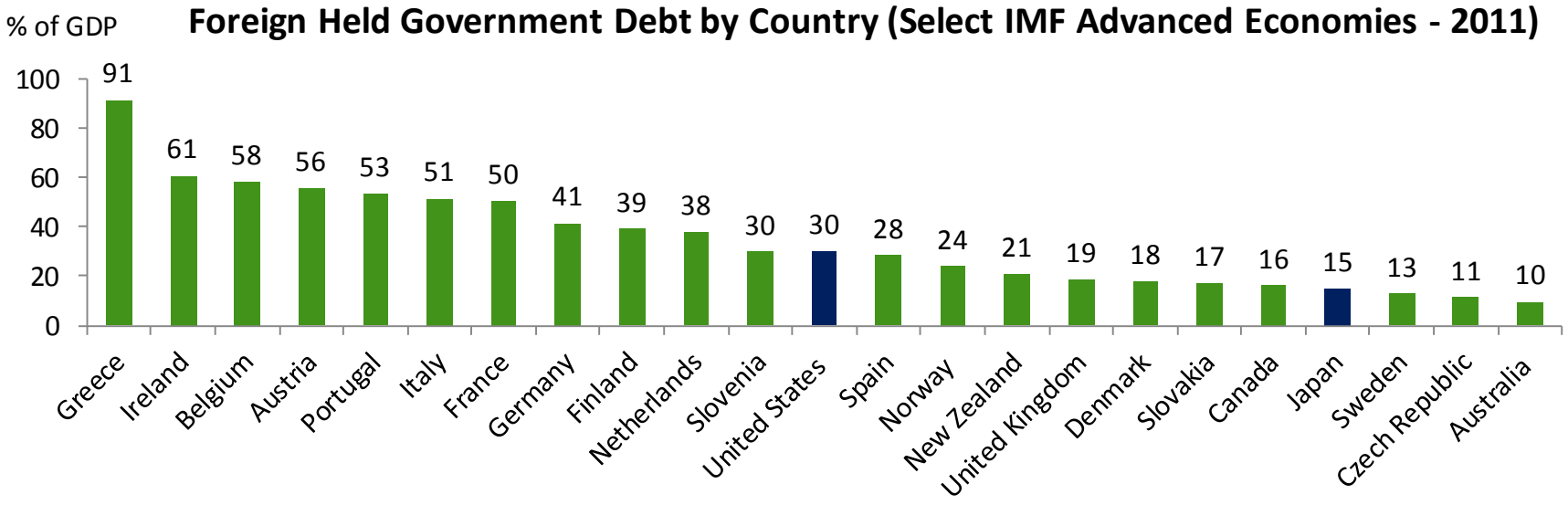
After the Collapse

- Since the collapse of Japanese equity markets and asset values in 1991, GDP growth has been sluggish, averaging around 0.8% per year while debt has exploded from 66% of GDP in 1991 to 237% of GDP in 2012
- **Japan's high levels of debt have been sustainable because of low interest rates**, driven by the BoJ's zero interest-rate policy and quantitative easing programs since 2001
- Japan's 2012 government **gross debt stands at 237% of GDP** but net debt is only 126% of GDP

Source: economonitor.com, IMF 2012, 2011

Case Study: The sustainability (so far) of Japanese National Debt levels is driven by the high percentage of domestically held debt



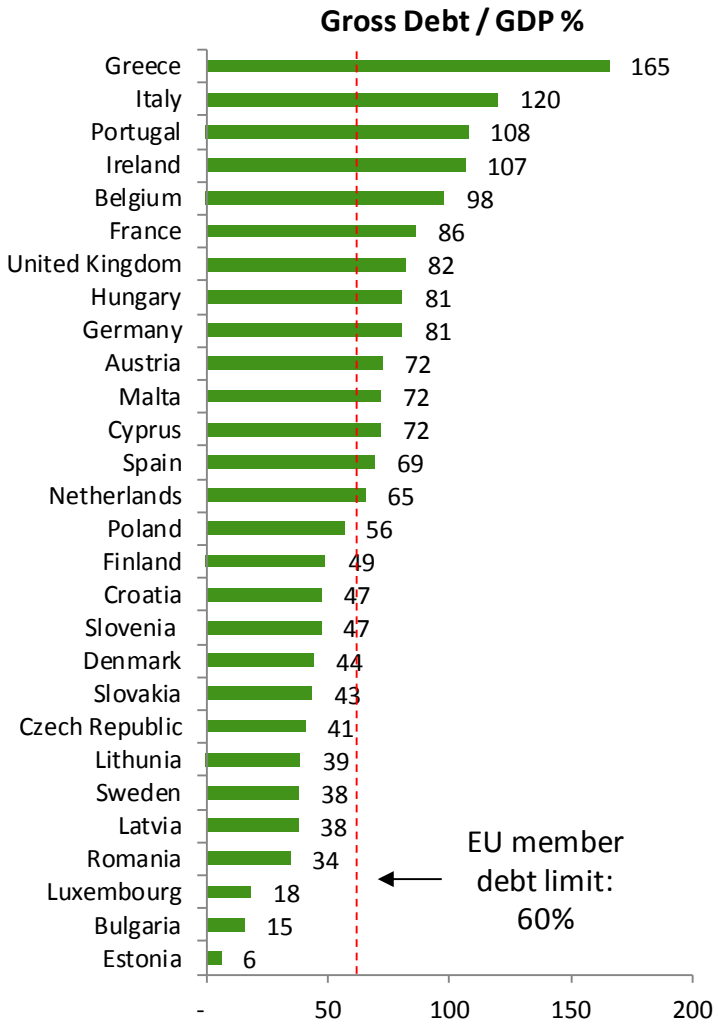


Even though Japan's gross debt / GDP levels appear alarmingly high, low levels of foreign held debt have prevented growth in government bond yields as traditional economic theory would suggest

Source: IMF Financial Stability Report, IMF 2012

Case Study: The EU public debt crisis and the challenges of a unified currency

Euro Debt Levels by Country in 2011



Source: IMF 2012

- The sovereign debt crisis of several European countries exposed the structural weaknesses of a single monetary policy that must work in coordination with 17 separate fiscal policies
  - EU monetary policy is set by the European Central Bank
- Under the Maastricht Treaty (1992), each member state in the EU must **ensure their debt does not exceed 60% of their GDP** or a **budget deficit of more than 3% of GDP**
  - Treaty has **not been enforced** as many countries have surpassed the 60% debt / GDP threshold
- The inclusion of less credit worthy countries like Greece into the Eurozone in 2001 signaled the beginning of a widespread crisis. Joining the Eurozone enabled Greece to:
  - Gain access to virtually unlimited capital at a similarly **low interest rate** of more credit worthy countries like Germany and France
  - Support exploding government budgets and pension programs by issuing debt
  - Grow debt / GDP to a point where GDP growth stalled and unemployment levels spiked
  - In May 2010, Greece received a **$152B bailout** from the "troika" of the ECB, EU and the IMF in exchange for public spending cuts

Although the implications of high debt / GDP levels are universal, unique factors of each economy dictate how and when debt levels become unsustainable

- Even though **Japan** has extremely high levels of debt, the speed at which their economy reaches unsustainable levels of government debt has been limited **by their low level of externally held debt**, and consequently low interest rates
  - Hoshi and Ito (2012) argue a key feature that makes Japan's debt levels a rarity is its very high domestic saving rate coupled with extreme home bias. According to the IMF (2011) **only 15% of Japan's total debt is held externally**

- **European Union** countries are at a disadvantage due to **limited central bank flexibility** and thus could see the speed to reaching unsustainable levels of debt accelerate significantly on small changes in the underlying situation

- The **US** benefits from its privileged position as the world's **reserve currency** and favored status during periods of **"flight to quality mentality"** by global market participants

While the inflection points may differ based on individual country circumstances without corrective action the debt spiral will swallow any high debt /GDP country

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High debt to GDP levels lead to increasingly slower economic growth rates, though the relationship is not as clear as previously thought

- In 2010, two Harvard economists, Reinhart and Rogoff, published a widely cited study illustrating when debt / GDP passed the 90% threshold, there was a sharp drop in GDP growth
  - The study focused on 20 developed economies
  - Countries were classified into four different debt / GDP categories of 0-30%, 30-60%, 60-90%, and greater than 90%
  - The result they showed was that **once debt / GDP surpassed 90%, GDP growth dropped** an average of 2.8% **to (0.1%)**

- Herndon, et al from University of Massachusetts tried to replicate Reinhart and Rogoff's findings but could not replicate the results. They discovered a coding error that excluded five countries

- Herndon, et al find that debt / GDP between 90% and 120% countries have on average real GDP growth of 2.4% not that much different from those in the 60-90% category of 3.2% GDP growth

- Herndon, et al study shows that there is a wide range of GDP growth performances at every level of public debt among the 20 advanced economies included in the study. This suggests that there maybe other variables that could be helpful in explaining the effect that debt / GDP has on economic growth

The main take-away from the Reinhart and Rogoff study that high debt / GDP is detrimental to economic growth still stands, but the severe drop-off at 90% does not seem to hold

Source: Rienhart, Rogoff (2010), Herndon, Ash, Pollin (2013)

A recent study by former Federal Reserve Governor Frederic Mishkin showed that high debt levels lead to increased borrowing cost…

- Several studies that have established a government's borrowing cost is likely to increase as debt / GDP increases
- In developed nations government debt is viewed as a relatively low risk and highly liquid investment, but it should not be assumed that these properties will hold as debt / GDP rises
- Countries with high debt loads are vulnerable to an adverse feedback loop in which uncertainty by lenders lead to higher sovereign interest rates, which in turn made the debt problems more severe
- Mishkin, Hooper, Hamilton, and Greenlaw show in their 2013 paper that there is a significant relationship between debt levels and borrowing costs
  - Interest rates rise more quickly at higher debt levels
  - Countries with large current-account deficits experience a higher correlation between debt levels and interest rates

Source: Greenlaw, Hamilton, Hooper, Mishkin (2013)

… And by factoring in other metrics, tipping points may become more pronounced

- Mishkin et al's regression suggests that if the country's primary deficit increases by 1.0% of GDP (causing both gross and net debt to increase by 1.0%), then the borrowing costs would increase by 4.5 bps

- The study also identified that the current-account deficit was highly significant
  - If 5-year-average current-account deficit increases by 1.0% of GDP, then interest rate increases by 18 bps

- Mishkin et al also looked to see if there was a nonlinear relationship or a "tipping point"
  - Added squared term for gross debt and current account while taking net debt out of the regression
  - Found that both terms were highly statistically significant

- For example, if a country with a current-account deficit of 5.0% were to increase its debt from 80% to 120% the borrowing costs would increase 3.0%

The Mishkin regression results imply that a country can quickly face an insurmountable debt problem if government debt levels rises significantly above 80% of GDP

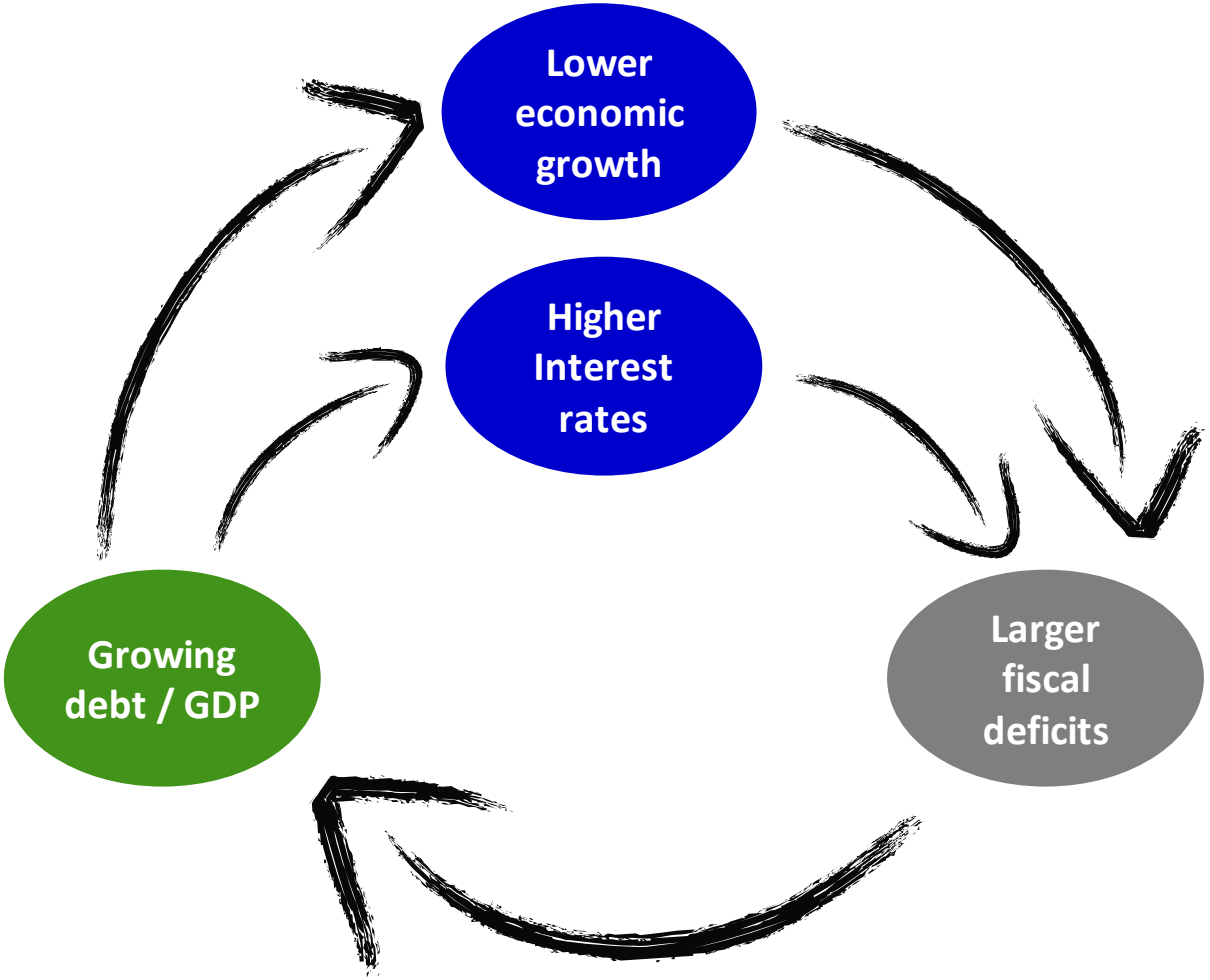
Source: Greenlaw, Hamilton, Hooper, Mishkin (2013)

Like Mishkin, we believe gross debt is the best estimate of government debt

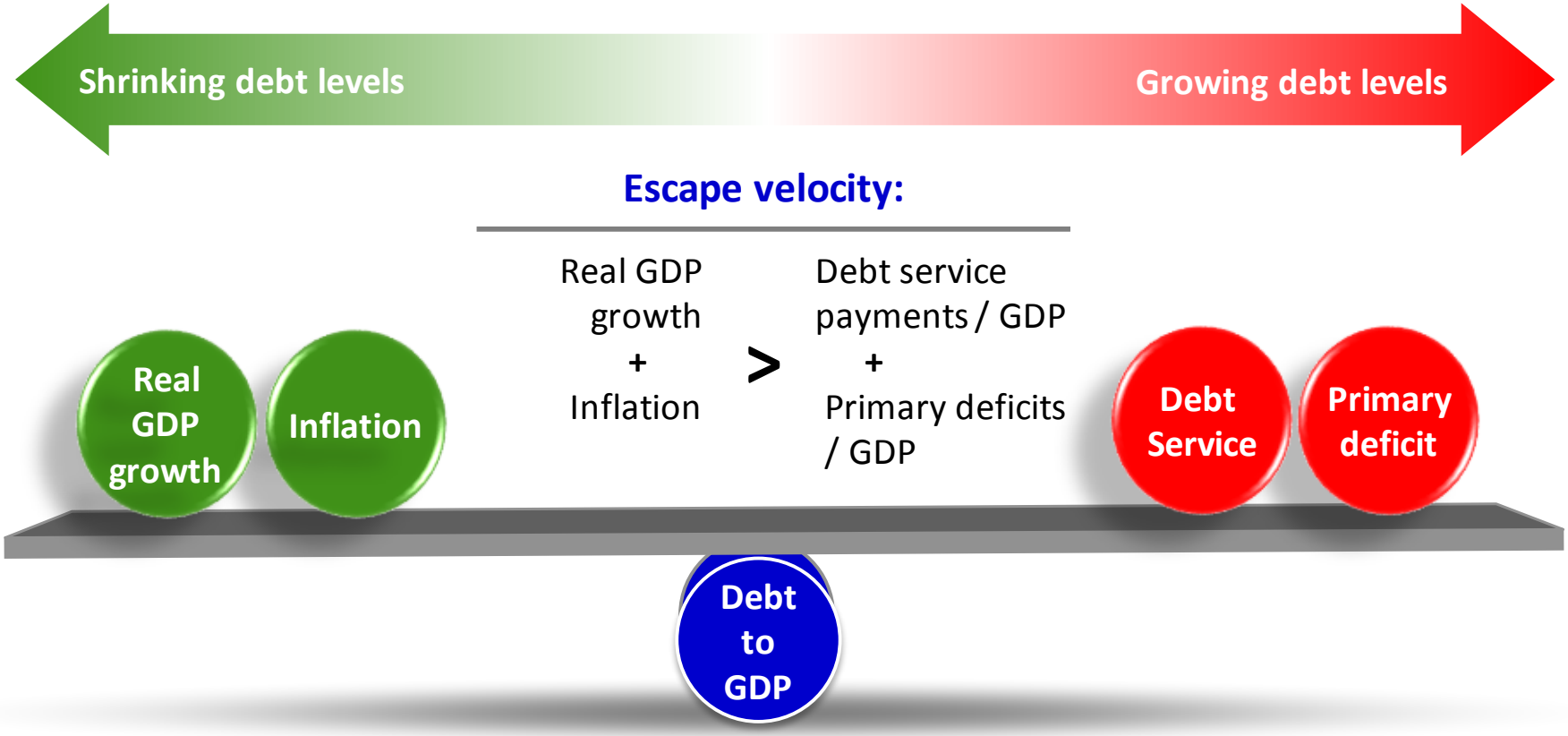
- Gross debt represents all Treasury debt that is on the Treasury's balance sheet and earns interest
- Some (including the CBO) argue that gross debt does not matter and that only net debt should evaluated
  - Argument that gross debt merely represents money that the government owes itself that it should be excluded
- However, the debt is still on the Treasury balance sheet **accruing interest**, and will at some point have to be paid through additional tax revenue or public debt raises
- **The argument for net debt** as the only measurement tool is that since a given security is a liability on **Treasury balance sheet** and is an asset on the **Social Security balance sheet** that it should **net to zero**
  - This is **faulty logic** because it selectively looks at the assets of the Social Security Administration
    - If you want to look at the asset side of the balance sheet you should then also look at the liability side which in the case of the Social Security Administration and most government agency balance sheets, is much higher
- A practical argument for looking at the US gross debt is that Social Security will soon begin to draw down its Treasury security assets **closing the gap between gross and net debt**

Despite some debate over the best debt metric for the US government, gross debt represents all interest bearing debt for the government and is more comparable across countries

As the US economy nears tipping points, a self-reinforcing feedback loop of higher rates and lower growth will lead to spiraling debt levels



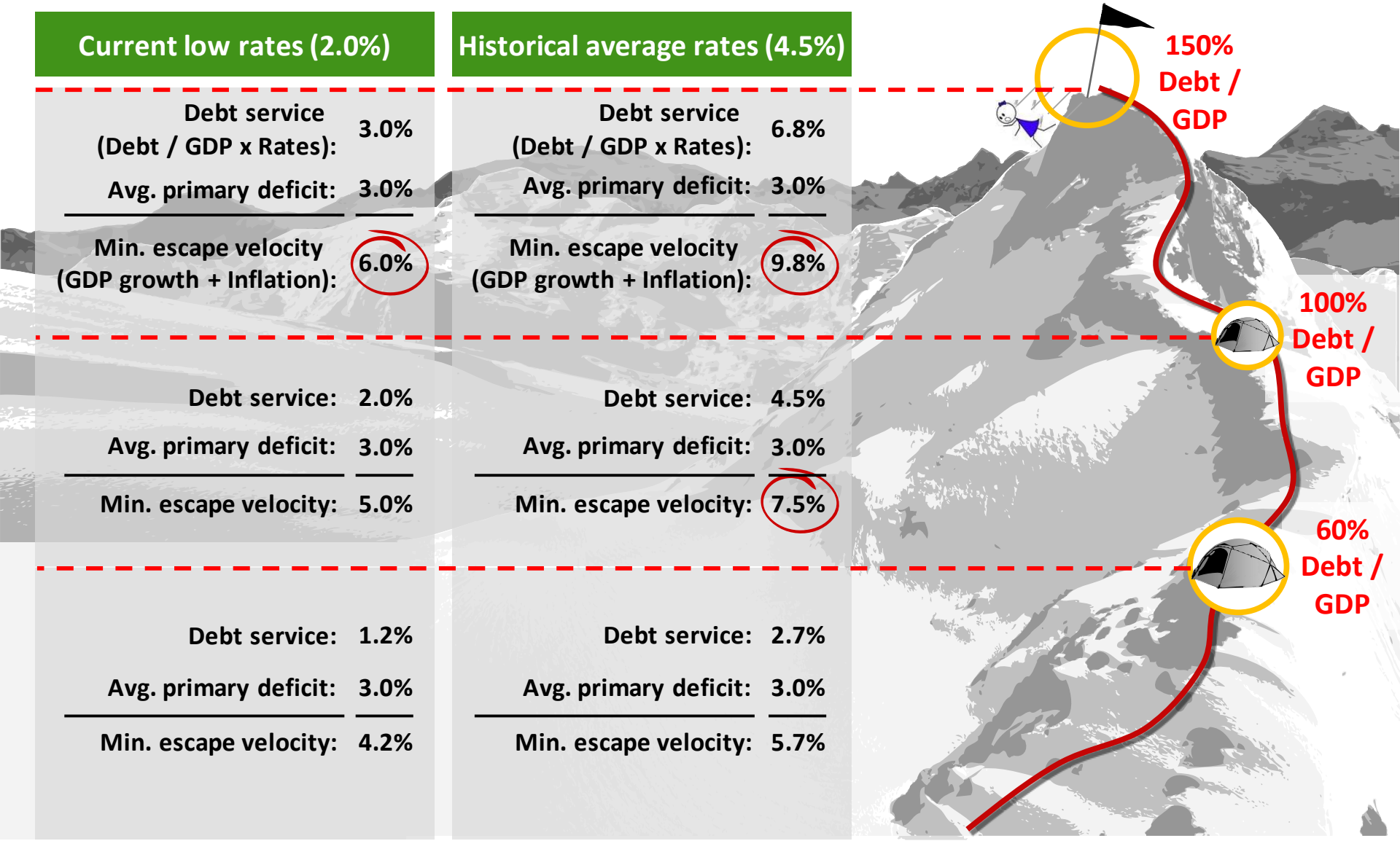
The economy must regularly reach 'escape velocity' to avoid falling victim to an unsustainable level of debt



- **Real GDP Growth** allows the economy to 'outgrow' debt levels as reduction in nominal debt levels is rare
  - Growing debt levels cause **crowding out** of private investment which drags down GDP growth
- **Inflation** is growth in nominal GDP (and prices) which can also cause a reduction in currency values
- **Debt service** is driven by debt levels and net interest rates on outstanding government debt
  - Interest rates rise as debt levels increase creating an exponential increase in debt service
- **Primary deficits** like those of '09 – '12 can cause rapid spikes in government debt levels

As debt / GDP levels rise the economy will have to work harder to reach an escape velocity until it finally passes a point of no return and plunges into spiraling levels of debt

Current low rates (2.0%)		Historical average rates (4.5%)	
Debt service (Debt / GDP x Rates):	3.0%	Debt service (Debt / GDP x Rates):	6.8%
Avg. primary deficit:	3.0%	Avg. primary deficit:	3.0%
Min. escape velocity (GDP growth + Inflation):	6.0%	Min. escape velocity (GDP growth + Inflation):	9.8%
Debt service:	2.0%	Debt service:	4.5%
Avg. primary deficit:	3.0%	Avg. primary deficit:	3.0%
Min. escape velocity:	5.0%	Min. escape velocity:	7.5%
Debt service:	1.2%	Debt service:	2.7%
Avg. primary deficit:	3.0%	Avg. primary deficit:	3.0%
Min. escape velocity:	4.2%	Min. escape velocity:	5.7%



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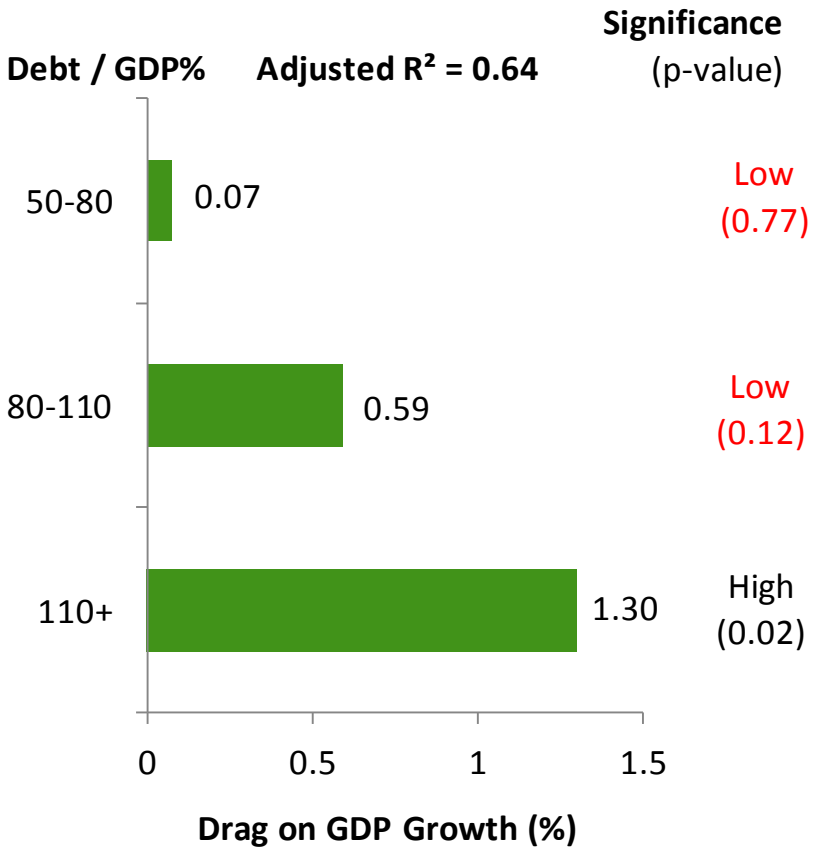
As debt / GDP exceeds 110%, there is a significant drag on GDP growth of 1.3%

Impact of Debt / GDP on GDP Growth



List of Factors

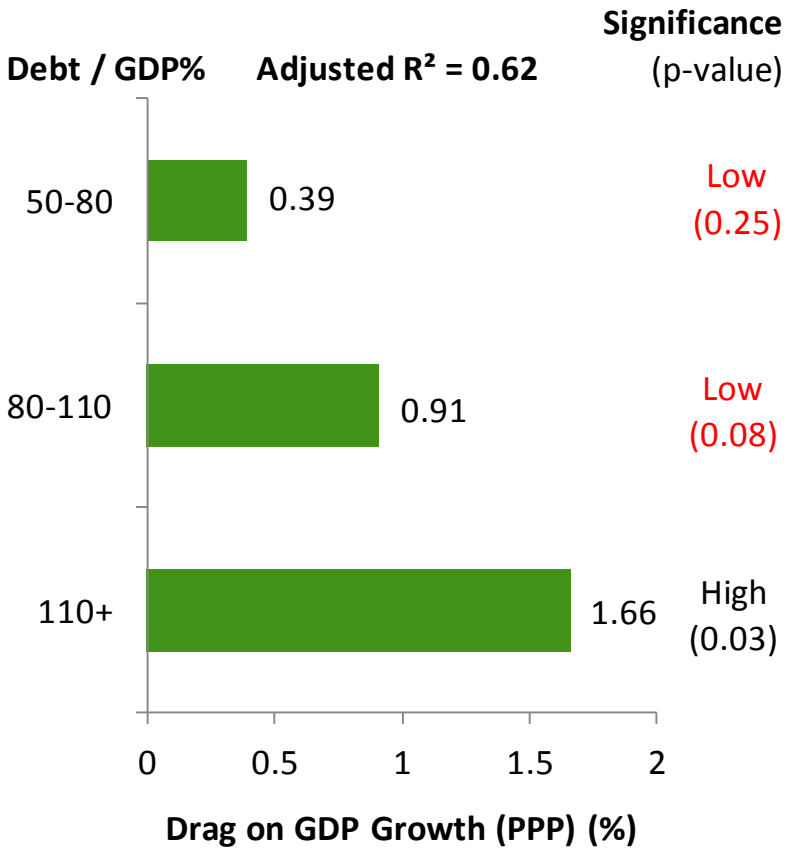
- GDP Growth (lagged)
- Total Investment
- Total Investment (lagged)
- 3-year government deficits (% of GDP)
- Gross Debt / GDP
  - 50% - 80%
  - 80% - 110%
  - > 110%

GTC GDP Growth Drag Equation

$$
\begin{aligned}
&GDP\ Growth = \\
&C + B_1 Total\ Investment \\
&+B_2\, 3yr\ Gov\ Deficit \\
&+B_3 LAG_1(Total\ Investment) \\
&+ B_4 LAG_1(GDP\ Growth) \\
&+ Country\ Specific\ Fixed\ Effect \\
&+ B_5 \frac{gross\ debt}{GDP}\ between\ 50\%\ and\ 80\% \\
&+ B_6 \frac{gross\ debt}{GDP}\ between\ 80\%\ and\ 110\% \\
&+ B_7 \frac{gross\ debt}{GDP}\ over\ 110\%
\end{aligned}
$$

As debt / GDP exceeds 110%, there is a significant drag on GDP growth (PPP) of 1.6%

Impact of Debt / GDP on GDP Growth (PPP)



List of Factors

- GDP Growth (PPP) (lagged)
- Total Investment
- Total Investment (lagged)
- 3-year government deficits (% of GDP)
- Gross Debt / GDP
  - 50% - 80%
  - 80% - 110%
  - > 110%

GTC GDP Growth (PPP) Drag Equation

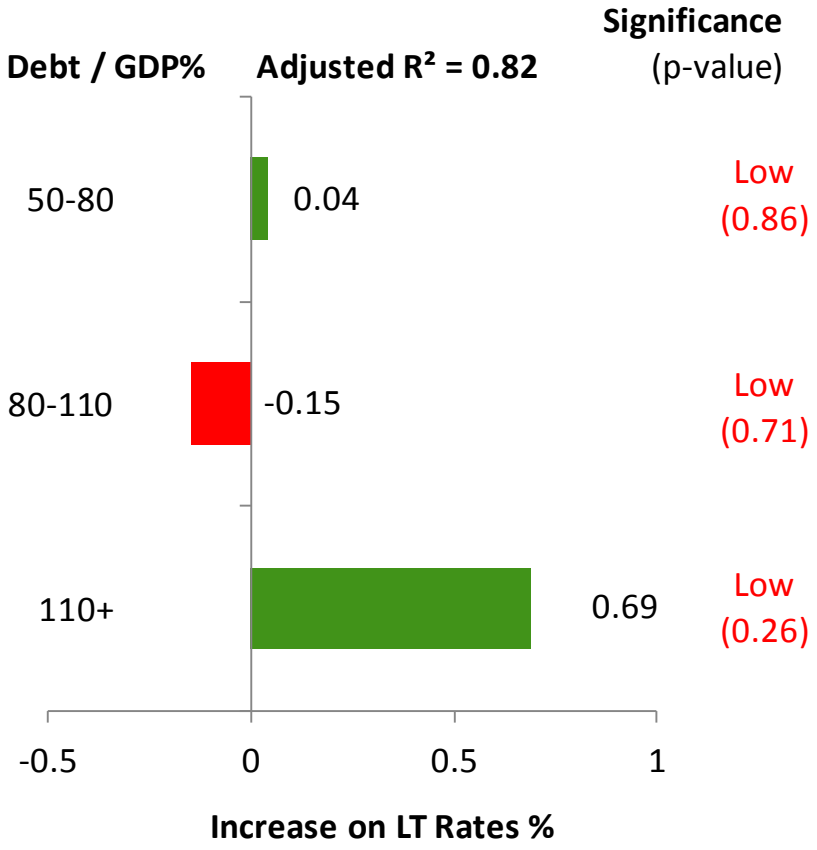
$$
\begin{aligned}
&GDP\ Growth\ (PPP)\\
&= C + B_1 Total\ Investment\\
&+ B_2 Government\ Deficit\\
&+ B_3 LAG_1(Total\ Investment)\\
&+ B_4 LAG_1(GDP\ Growth\ (PPP))\\
&+ Country\ Specific\ Fixed\ Effect\\
&+ B_5 \frac{gross\ debt}{GDP}\ between\ 50\%\ and\ 80\%\\
&+ B_6 \frac{gross\ debt}{GDP}\ between\ 80\%\ and\ 110\%\\
&+ B_7 \frac{gross\ debt}{GDP}\ over\ 110\%
\end{aligned}
$$

GDP growth drag when debt / GDP is over 110% could make 1.5 – 2% GDP growth the new normal

- Our regression shows that **GDP growth decreases** by **130bps** when debt / GDP is over **110%**
- We saw no significant affect on growth at lower levels of debt
- Start to see growth become affected in the 80-110% range but it is not as significant but the **doubling** of the amount of drag and **increased significance** shown **above 110%** is an important **tipping point** to note
- Both **GDP growth** and **GDP growth (PPP) show a drag that is significant** for debt levels above 110% but we choose to focus on GDP growth as it is a more useful tool for our analysis

Although the results are less statistically significant, our research suggest interest rates rise rapidly as debt / GDP levels pass 110%

Impact of Debt / GDP on LT Interest Rates



List of Factors

- GDP Growth
- Total Investment
- Inflation
- Government Deficits (% of GDP)
- Gross Debt / GDP
  - 50% - 80%
  - 80% - 110%
  - > 110%

GTC LT Interest Rate Equation

$$
\begin{aligned}
&Long\ term\ interest\ rates \\
&= C + B_1 Total\ Investment \\
&+ B_2 Inflation \\
&+ B_3 Government\ Deficit \\
&+ B_4 GDP\ Growth \\
&+ Country\ Specific\ Fixed\ Effect \\
&+ B_5 \frac{gross\ debt}{GDP}\ between\ 50\%\ and\ 80\% \\
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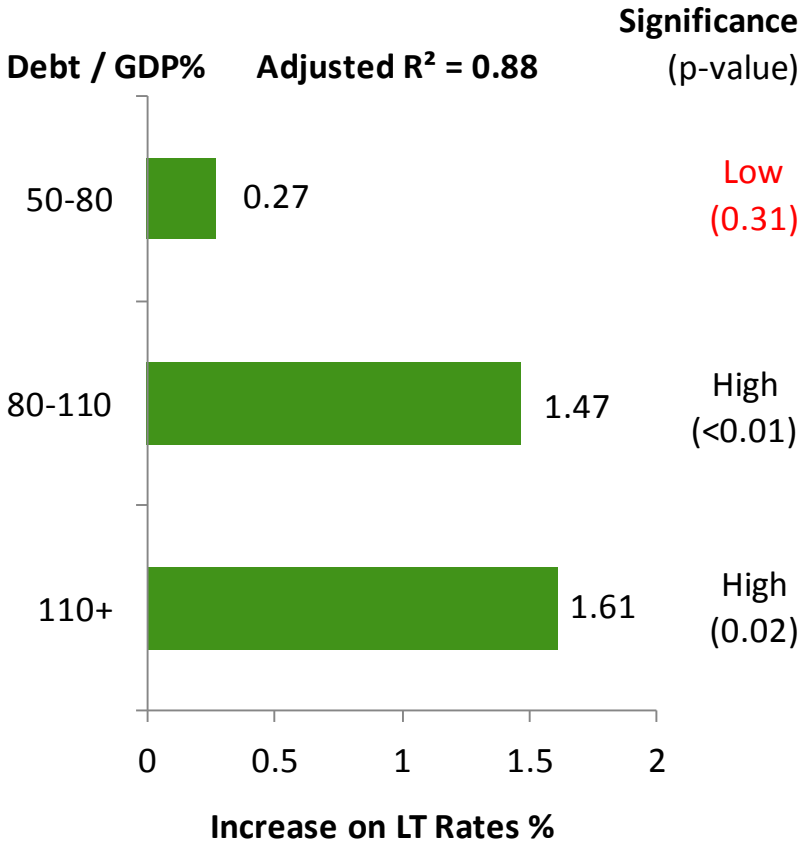
&+ B_7 \frac{gross\ debt}{GDP}\ over\ 110\%
\end{aligned}
$$

When looking at pre-financial crisis data (1980-2006), there was a significant spike in LT interest rates when debt / GDP exceeded 80%

Impact of Debt / GDP on LT Interest Rates



List of Factors

- GDP Growth
- Gross Debt / GDP
- Total Investment
  - 50% - 80%
- Inflation
  - 80% - 110%
- Government Deficits (% of GDP)
  - > 110%

GTC LT Interest Rate Equation

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\begin{aligned}
&Long\ term\ interest\ rates \\
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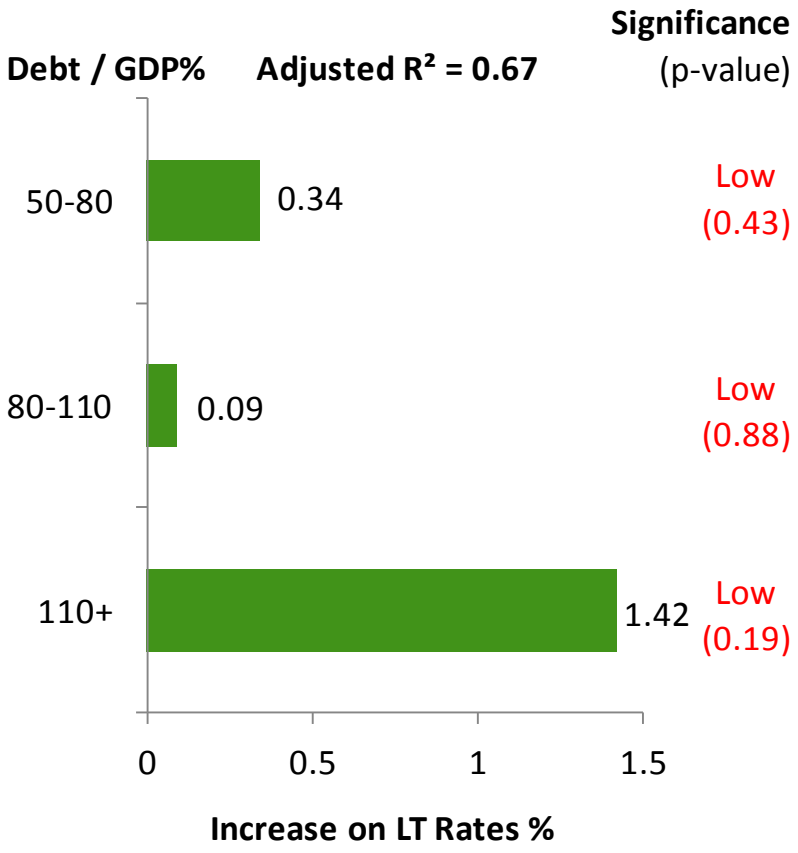
&+ B_7 \frac{gross\ debt}{GDP}\ over\ 110\%
\end{aligned}
$$

Our regression does not show a significant relationship between high debt levels and LT interest rates after the 2007 financial crisis

Impact of Debt / GDP on LT Interest Rates



List of Factors

- GDP Growth
- Total Investment
- Inflation
- Government Deficits (% of GDP)
- Gross Debt / GDP
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GTC LT Interest Rate Equation

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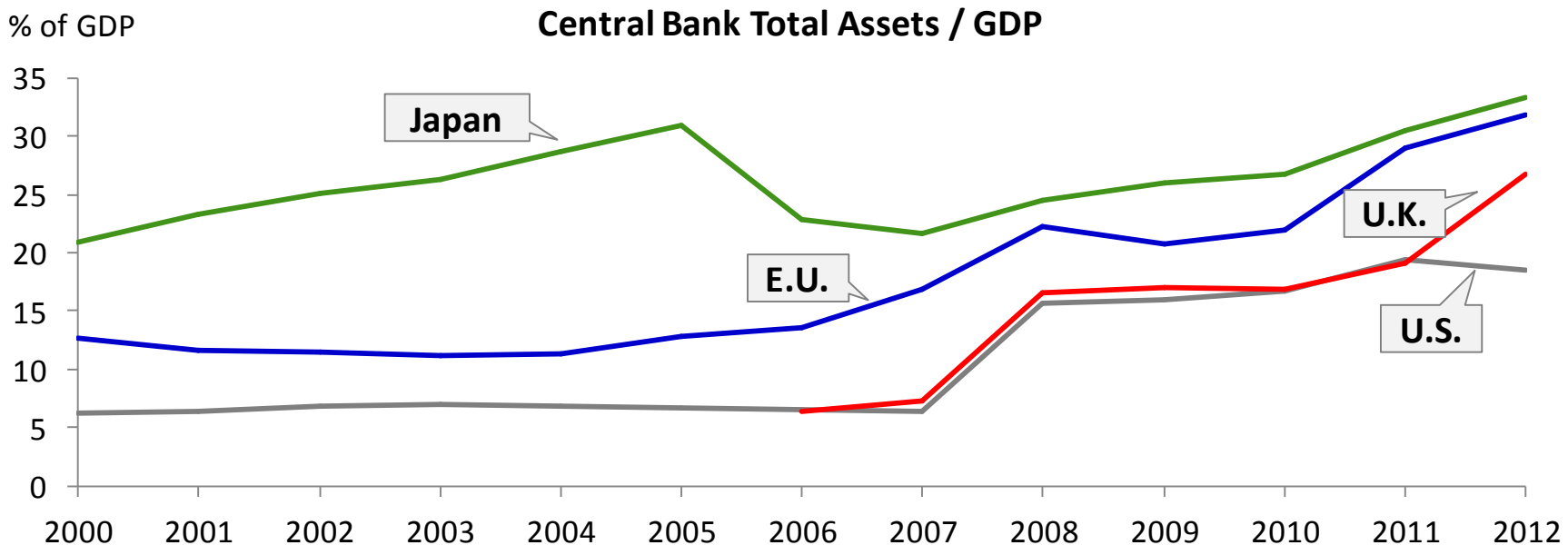
&+ B_2 Inflation \\
&+ B_3 Government\ Deficit \\
&+ B_4 GDP\ Growth \\
&+ Country\ Specific\ Fixed\ Effect \\
&+ B_5 \frac{gross\ debt}{GDP}\ between\ 50\%\ and\ 80\% \\
&+ B_6 \frac{gross\ debt}{GDP}\ between\ 80\%\ and\ 110\% \\
&+ B_7 \frac{gross\ debt}{GDP}\ over\ 110\%
\end{aligned}
$$

The relationship between long-term interest rates and debt / GDP levels was severely distorted by the unprecedented central bank actions taken since the financial crisis

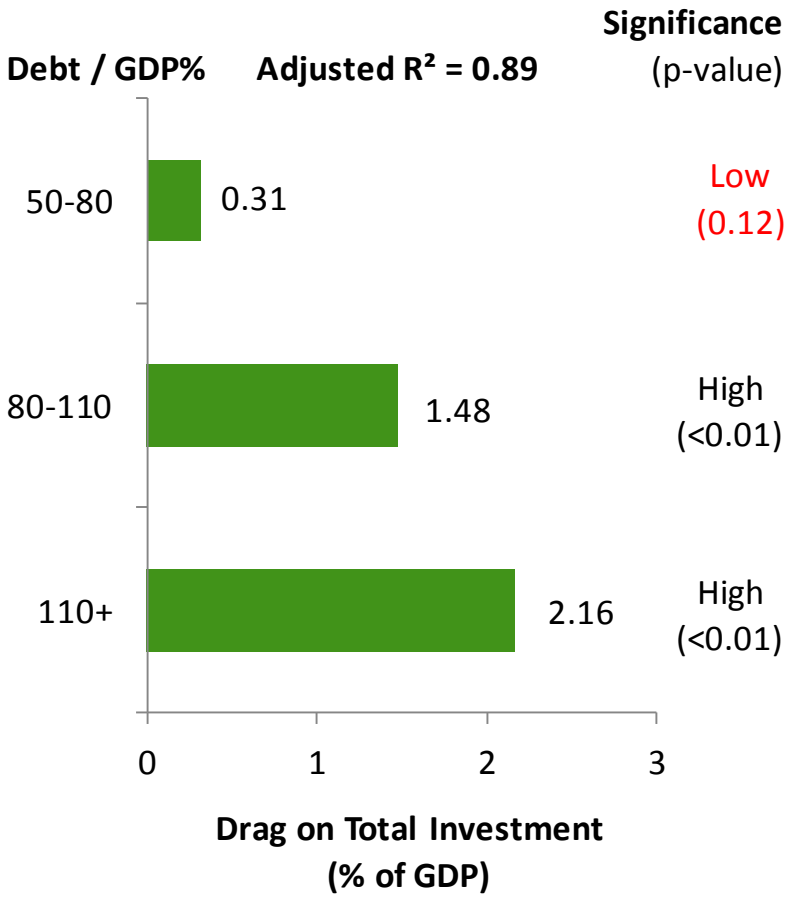
- For the **long term rate regression** we were only able to look at **OECD member countries** due to lack of data from non-OECD countries
- Taking **all of the years** of available data leads to **not very significant** results but a **clear change** is evident **when separating pre-2007** data **from post-2007** data
- Before massive central bank intervention in sovereign credit markets there is **significant implications from debt above 80% debt / GDP**



Source: IMF, HAVER

Our regression shows that when debt / GDP exceeds 80%, there is a significant drag on total investment

Impact of Debt / GDP on Total Investment



List of Factors

- GDP Growth (lagged)
- Total Investment (lagged)
- Current Account Balance
- Government Deficits (% of GDP)
- Gross Debt / GDP
  - 50% - 80%
  - 80% - 110%
  - > 110%

GTC Investment Drag Equation

$$
\begin{aligned}
&Total\ Investment \\
&= C + B_1 Current\ Account\ Balance \\
&+ B_2 Government\ Deficit \\
&+ B_3 LAG_1(Total\ Investment) \\
&+ B_4 LAG_1(GDP\ Growth) \\
&+ Country\ Specific\ Fixed\ Effect \\
&+ B_5 \frac{gross\ debt}{GDP}\ between\ 50\%\ and\ 80\% \\
&+ B_6 \frac{gross\ debt}{GDP}\ between\ 80\%\ and\ 110\% \\
&+ B_7 \frac{gross\ debt}{GDP}\ over\ 110\%
\end{aligned}
$$

Our findings suggest that there are severe economic consequences associated with high debt levels

GDP Growth

- Debt / GDP causes a significant **drag on GDP growth of 1.3%** when debt / GDP is above 110%
  - Also see a significant **drag on GDP growth (PPP) of 1.66%** when debt / GDP is above 110%

Long Term Interest Rates

- Prior to central bank intervention in the wake of the financial crisis, debt / GDP caused long-term interest rates to increase
  - **1.47% increase** when debt / GDP is between 80% - 110%
  - **1.61% increase** when debt / GDP is over 110%

- Central bank intervention post financial crisis distorts the data rendering complete time series results insignificant

Total Investment

- Debt / GDP causes a significant reduction in total investment
  - **1.48% reduction** when debt / GDP is between 80%-110%
  - **2.16% reduction** when debt / GDP is over 110%

Agenda

- Thesis
- Macroeconomic Backdrop
- Approach
- Review of Findings
- **Implications**
- Appendix

The unique situation of the US as the world's biggest economy could dampen or delay the adverse effects of high debt levels

- The US enjoys many benefits from being the world's largest economy, **reserve currency**, and **safe haven** during times of uncertainty or volatility that could **limit the effects** that **high levels of debt** have on the country
- Due to the perceived safety and liquidity of US debt over other securities the US sovereign debt yields **may not react in the same** way as history dictates from other countries
- We have tried to allow for this by putting in **country-specific variables**
- The US may be able to **push off the consequences** of high debt in the short-term which allows for more time to "right the ship" but it will **not be able to outrun the adverse effects of high debt forever**

While the dire economic consequences of high debt levels may take longer to materialize then we have predicted, the economic consequences of high debt will be felt in the long-run

Based on the implications from the research, the current CBO economic projections appear overly optimistic

- Current CBO projections have the US economy moving past the financial crisis and sluggish recovery and **returning to a pre-crisis trajectory of growth.**
  - Current CBO estimates for **real growth are 3.0% - 4.0%** for next 5 years, and **2.25% thereafter**
  - Optimistic considering gross debt / GDP levels have nearly doubled from '07 – '12 (64% to 102%)
  - Research suggest future growth will dragged down from **historical average of 2.5% to 1.5%** as economy passes 110% debt / GDP
- While the US has been buoyed by **record low interest rates** recently, **Treasury yields will rise** as QE is tapered off and **debt levels continue to increase**
  - CBO projections are for **Treasury rates** to slowly grow to **sub historical average levels** (~4.5%) to 4.3% by 2023
  - Optimistic considering current and projected debt levels far above the pre-crisis period where Treasury yields were at 4.5%
  - Research suggests rates will **shift up** ~150 bps **to 6%** as debt surpasses 110% of GDP
- At a certain point the US economy overburdened with debt will no longer be able to escape from its 'debt spiral'
  - Based on this premise we investigate:
    - The **maximum 'escape velocity' for the US** economy in the current state
    - The future state of the economy based on **3 cases of fiscal restraint**
      - **Current trajectory** with no fiscal restraint
      - **Maintain debt levels** with limited fiscal restraint
      - Run **balanced budgets** with significant fiscal restraint to return to pre-crisis debt levels

As treasury yields return to historic rates, the US economy will near a tipping point of unsustainable debt levels

Escape Velocity Components

- **Real GDP Growth: 2.5%**
  - If the US remains below 110% debt / GDP, the economy should return to historical average growth rates of 2.5%
- **Inflation: 2.0%**
  - The Fed has pegged targeted long-term inflation at 2.0%
- **Primary Deficit (Surplus) spending: 0.0%**
  - Pre-crisis historical primary deficits average 0.1% of GDP
  - Although deficits are coming down from '09 – '12 levels, entitlement increases will likely prevent sustainable primary surpluses going forward
  - An optimistic case is for neutral primary budget deficit/surplus spending

Projected Nominal Escape Velocity = 4.5% of GDP (pre-debt service)

Required Nominal Escape Velocity

***At a balanced primary budget (pre-debt service)**

Gross Debt / GDP \ Weighted Avg. Maturity US Treasury Rate	2.0%	3.0%	4.0%	5.0%	6.0%
60%	1.2%	1.8%	2.4%	3.0%	3.6%
80%	1.6%	2.4%	3.2%	4.0%	4.8%
100%	2.0%	3.0%	4.0%	5.0%	6.0%
120%	2.4%	3.6%	4.8%	6.0%	7.2%
140%	2.8%	4.2%	5.6%	7.0%	8.4%
160%	3.2%	4.8%	6.4%	8.0%	9.6%
180%	3.6%	5.4%	7.2%	9.0%	10.8%
200%	4.0%	6.0%	8.0%	10.0%	12.0%

Very attainable (<4.0%)

Likely attainable (4.0% - 5.0%)

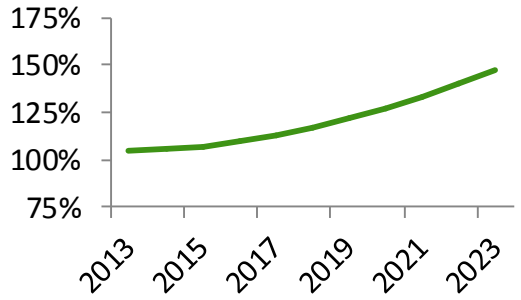
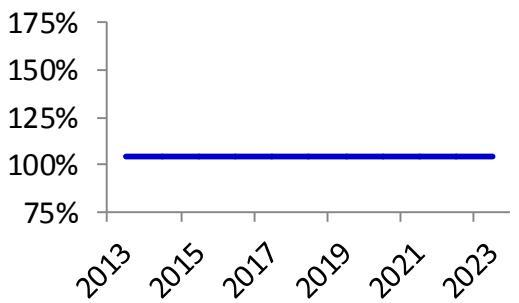
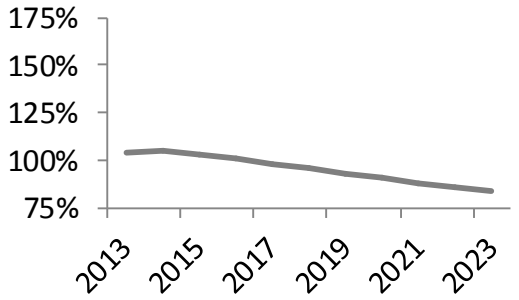
Unlikely attainable (>5.0%)

As rates rise to historical averages (4.5%) and beyond, US debt / GDP growth will begin to accelerate as the economy fails to keep up with increasing debt service levels

Potential scenarios include: continuing current fiscal trajectory, maintaining debt / GDP levels, and balancing federal budgets

	Current Fiscal Trajectory	Maintain Debt Levels	Balanced Federal Budget

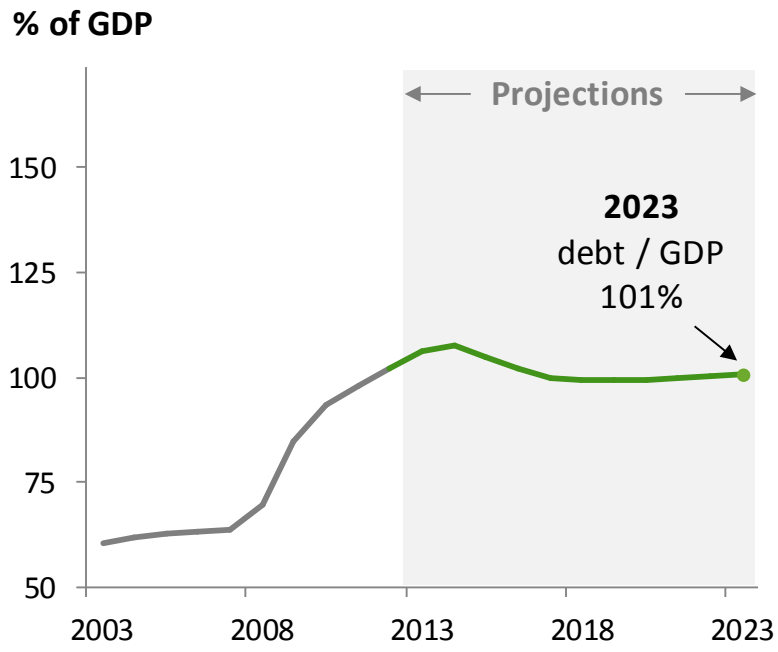
Overview	• Continued unsustainable fiscal policy with rising debt / GDP levels
	• **Assumptions:**
	  ▸ 2.0% inflation
	  ▸ 1.5% real GDP growth
	  ▸ 3.0% primary budget deficit
		• Achieve neutral escape velocity where nominal growth equals total deficits
		• **Assumptions:**
		  ▸ 2.0% inflation
		  ▸ 2.5% real GDP growth
			• Balanced federal budget (after debt service)
			• **Assumptions:**
			  ▸ 2.0% inflation
			  ▸ 2.5% real GDP growth

Gross Debt / GDP Projection			

Implications	• Significant inflation required to prevent insolvency
	• Further continued rounds of QE likely to maintain treasury demand and depressed treasury yields
		• Painful deficit cuts required
		  ▸ 6.8% of GDP in deficit cuts over ~**11 year period**
		• Avoid significant drop in GDP growth that hits > 110% debt / GDP
			• Aggressive deficit cuts required immediately
			  ▸ 7.0% of GDP in deficit cuts over ~**6 year period**
			• Enables declining debt / GDP
			• Below 80% debt / GDP in 12 years

The current trajectory of the US updated for our research findings paints a much dimmer picture than the latest CBO projections

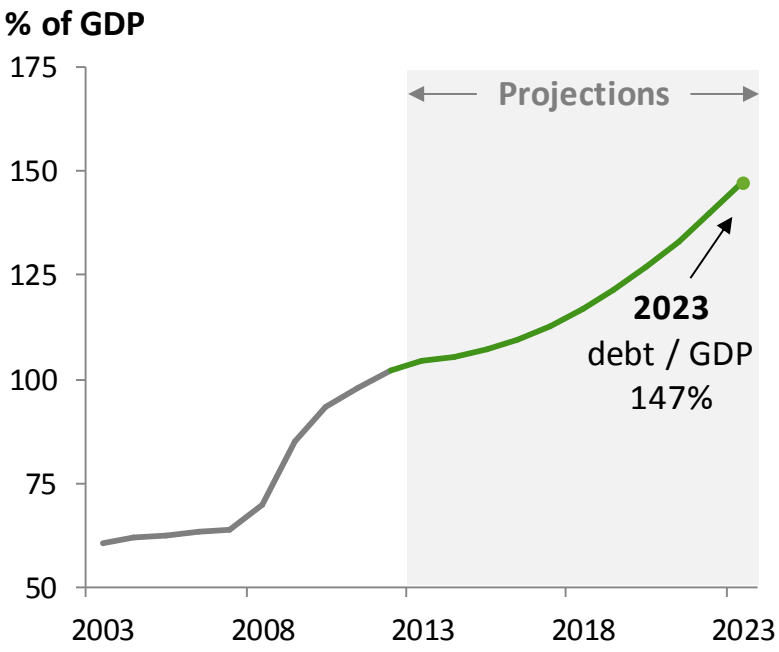
CBO Federal Debt Projections



Key Highlights

- **Real GDP growth** averages **3.5%** from 2014 – 2018
  - US averages 2.5% since 1980
- **Primary deficits** fall to **<1.0% of GDP** by 2015
- **Interest rates** edge up to **4.3%** by 2023
  - US Treasury rates average 4.5% from 1980 – 2007
- **Federal revenue** / GDP grows from 15.8% to **~19.0%**

Current Trajectory Federal Debt Projections



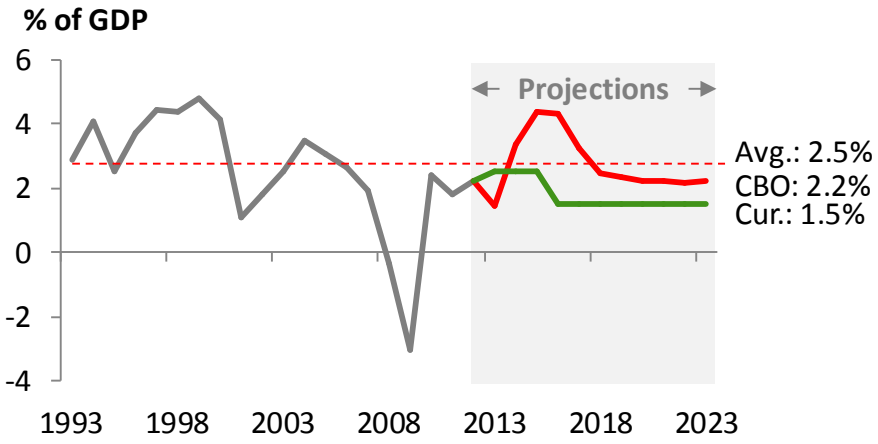
Key Highlights

- **Real GDP grows at 2.5%** until US passes 110% debt / GDP, then **falls to 1.5%** growth
- **Primary deficits** fall to **3.0%** of GDP by 2016 and remain through 2038 (at historical average)
- **Interest rates** steadily grow to **6.0% by 2024**
  - Represents 150bps premium to avg.

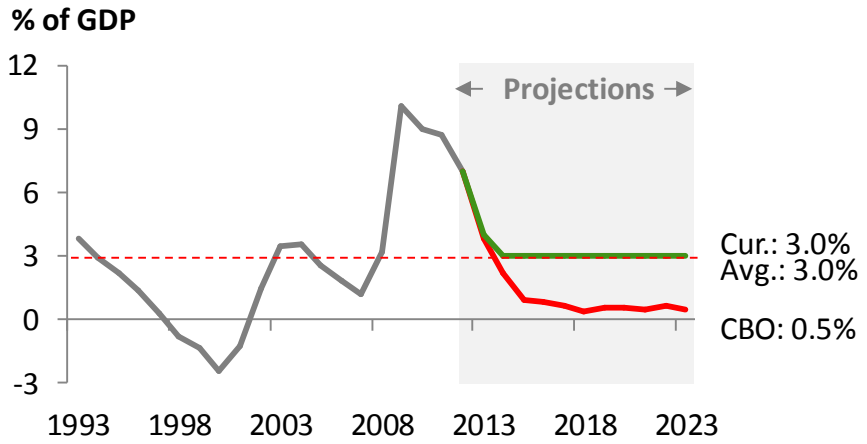
CBO projections revised to 'Current Trajectory' case based on research findings

CBO Projections
Current Trajectory Scenario Projections

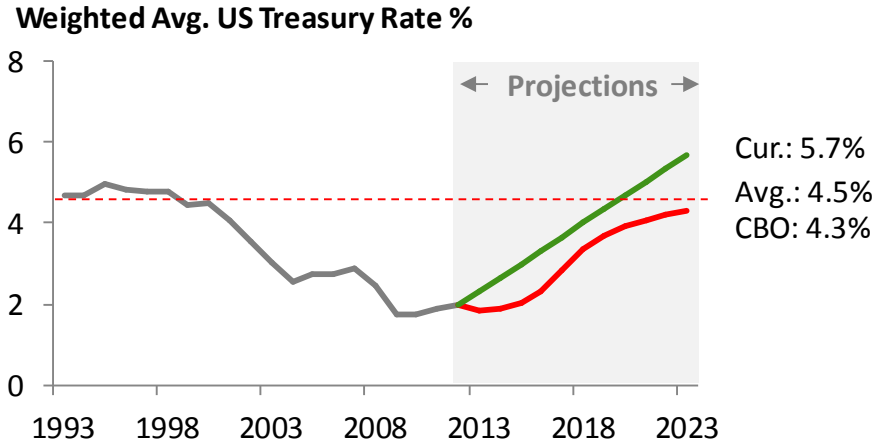
GDP Growth



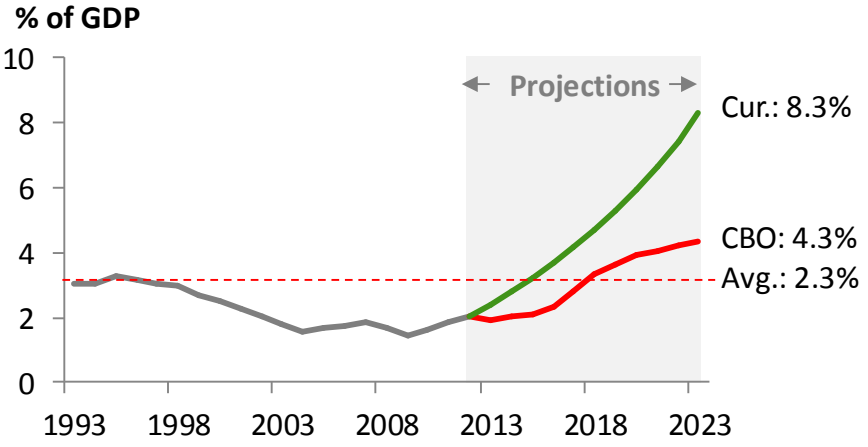
Primary Budget Deficit (Surplus)



Interest Rates



Gross Debt Service



Source: IMF 2012, CBO 2013

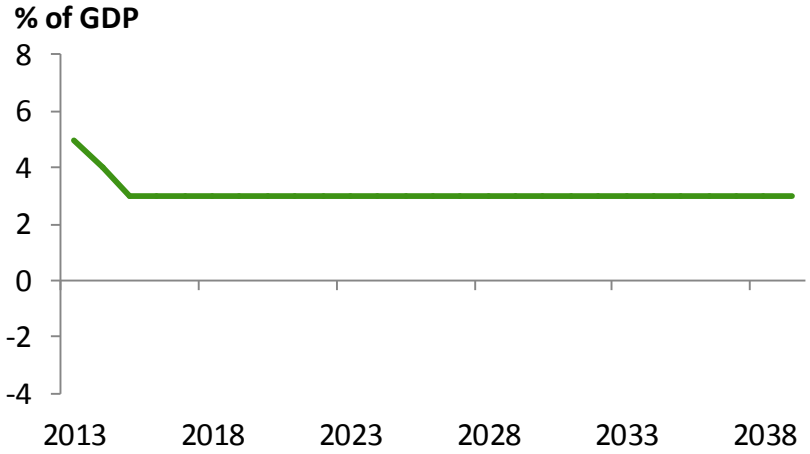
Under the current fiscal trajectory the US debt levels will spiral out of control in as little as 5 years

Peak Escape Velocity Components

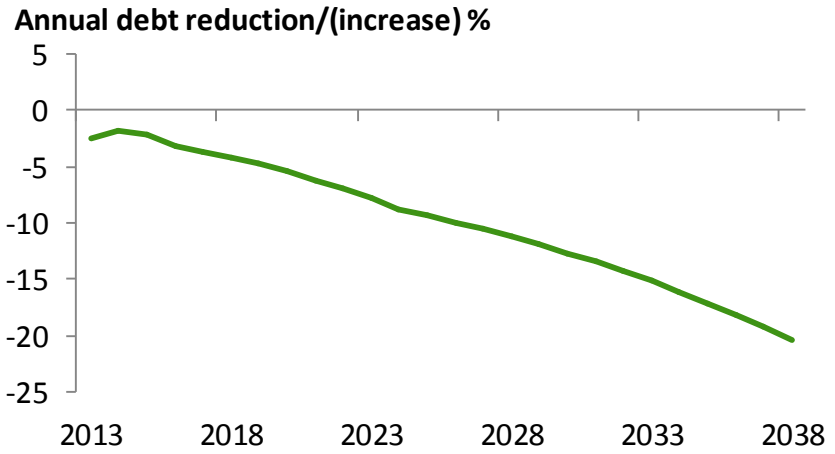
- **Real GDP Growth: 1.5%**
  - As gross debt levels surpass 110% of GDP, our research suggests the economy experiences a drag as growth slows to 1.5% of GDP
- **Inflation: 2.0%**
  - The Fed has pegged targeted long-term inflation at 2.0%
- **Gross Debt Service: 6.0% (rising to 20.9%)**
  - Current debt service payments are ~2.0% of GDP
  - Current depressed Treasury rates of 2.0% return to averages of 4.5%, and begin to rise our estimated ~160bps to 6.0% over 11 years
- **Primary Deficit (Surplus) spending: 3.0%**
  - Entitlement spending increases will keep primary deficits at minimum 3% of GDP, potentially higher in out years

Projected escape velocity = -5.5% of GDP

Projected Primary Budget Deficit (Surplus)

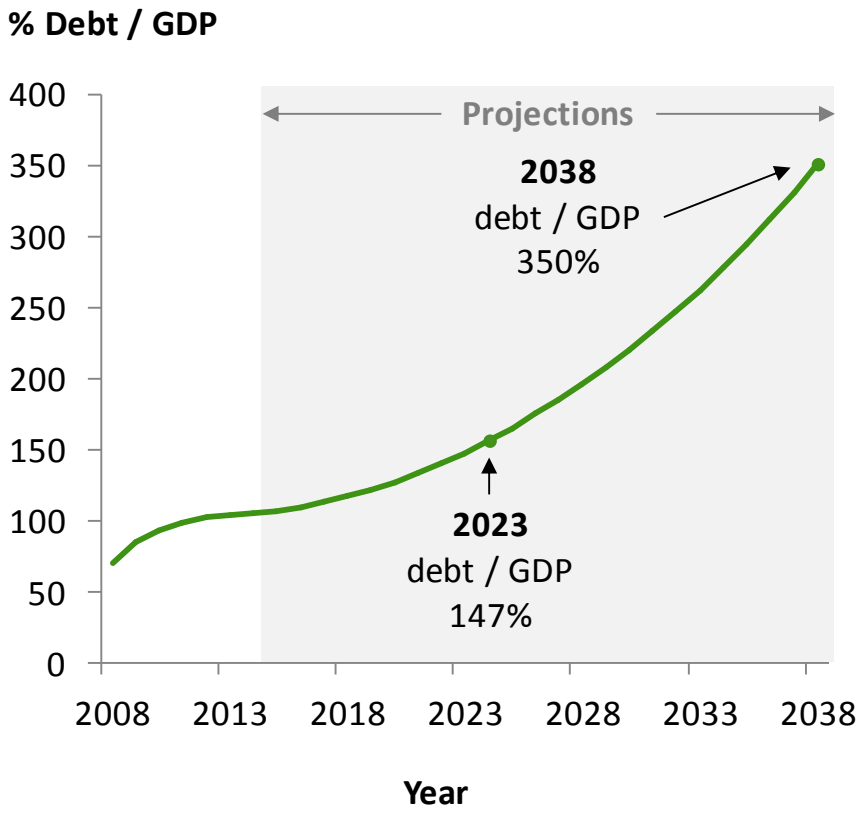


Escape Velocity Projections – 25 Years



US government debt levels pass 300% of GDP by 2035 in the current trajectory case

Debt / GDP Levels



Implications

- Government debt levels accelerate into **'debt spiral'**
  - Time for debt / GDP to grow by 10%:
    - 110% to 120% - **2.6 years**
    - 210% to 220% - **0.8 years**
- **Debt service** grows larger than total government revenue (based on avg. US revenue / GDP of 18.1%)
  - **2012** debt service / US revenue: **11%**
  - **2038** debt service / US revenue: **116%**
- **GDP growth** severely **slowed** by debt levels due to:
  - **Crowding out** of private investment as capital is directed to government debt
  - **Rising interest rates** (6.0% treasury yield) drives up cost of private debt, slowing economic activity

The current trajectory of US fiscal policy will lead to unsustainable levels of debt in as soon as 2018 with US debt service surpassing a max nominal escape velocity of 4.5%

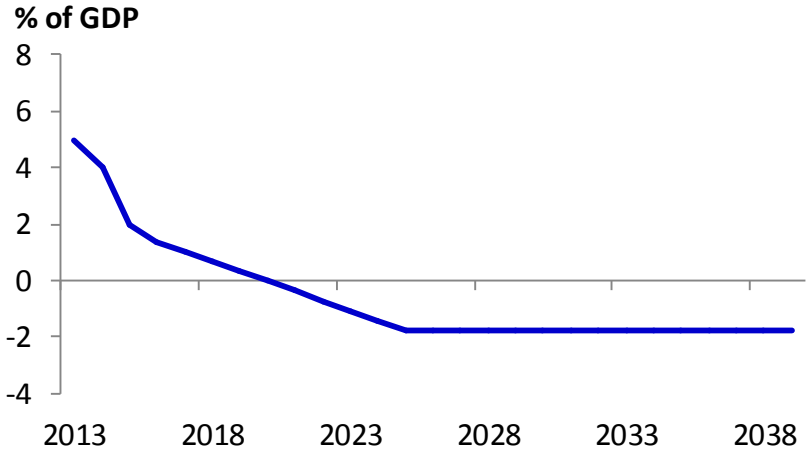
US government debt stalls at 105% of GDP in the maintain case and the economy is able to maintain 2.5% growth

Peak Escape Velocity Components

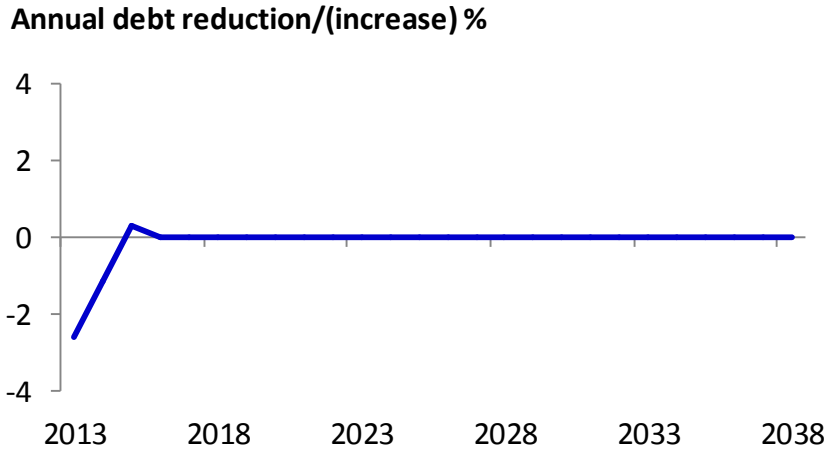
- **Real GDP Growth: 2.5%**
  - As gross debt levels remain below 110% of GDP and confidence in US fiscal policy returns, real GDP will return to historic averages
- **Inflation: 2.0%**
  - The Fed has pegged targeted long-term inflation at 2.0%
- **Gross Debt Service: 6.3%**
  - Current debt service payments are ~2.0% of GDP
  - Current depressed Treasury rates of 2.0% return to averages of 4.5%, and begin to rise our estimated ~160bps to 6.0% over 10 years
- **Primary Deficit (Surplus) spending: (1.8%)**
  - Primary deficits/(surplus) adjust to maintain debt levels going forward, 1.8% surplus not reached for 11 years

Projected escape velocity = +0% of GDP

Projected Primary Budget Deficit (Surplus)

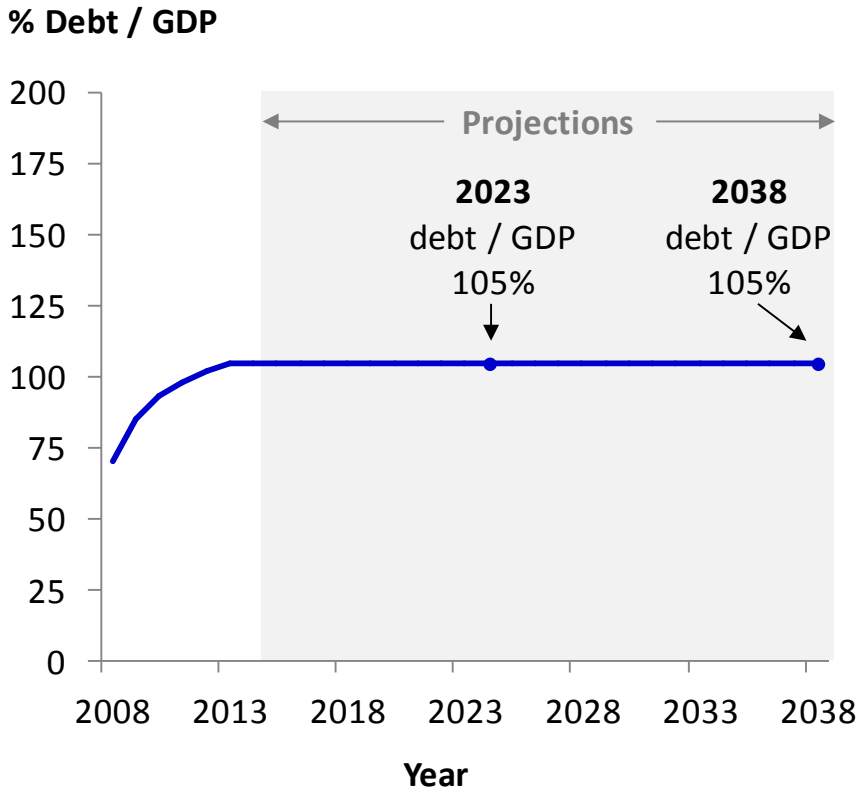


Escape Velocity Projections – 25 Years



To maintain current debt levels, significant action is required over the next 10 years

Debt / GDP Levels



Implications

- US primary deficits must come down to offset growth in debt service as Treasury rates adjust to 6.0%
  - Debt service at normalized rates (6.0%): **6.3% of GDP**
  - 2012 debt service: **2.0% of GDP**
- To gain control of rising debt levels, the US must reduce deficits from '09 – '12 levels
  - **6.8% of GDP reduction in deficit** required over next 11 years to maintain debt levels
    - **Increase revenues**
      - **43%** of 2012 federal revenue
    - **Reduced government spending**
      - **82%** of 2012 discretionary spending
      - **52%** of 2012 entitlement spending

Although significant deficit reduction is required to achieve the maintain scenario, cuts can be phased in over an 11 year period as average Treasury coupon rates adjust to normalized yields

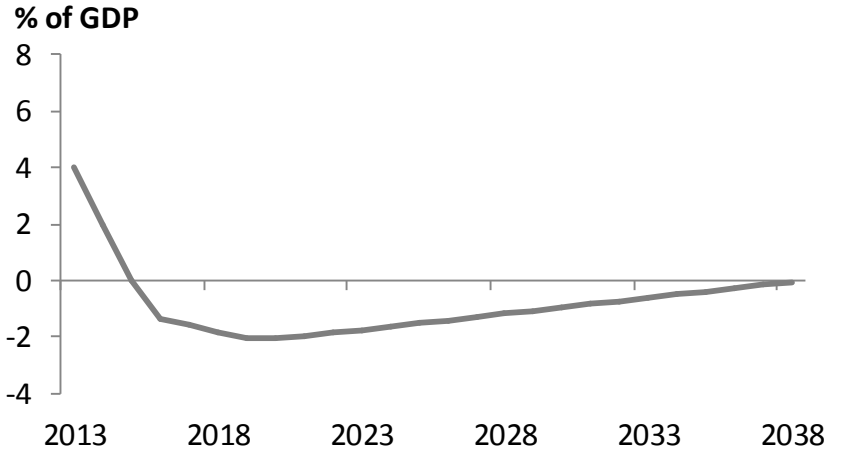
Although requiring painful near term deficit reduction measures, debt levels fall to pre-crisis levels under balanced budget scenario

Peak Escape Velocity Components

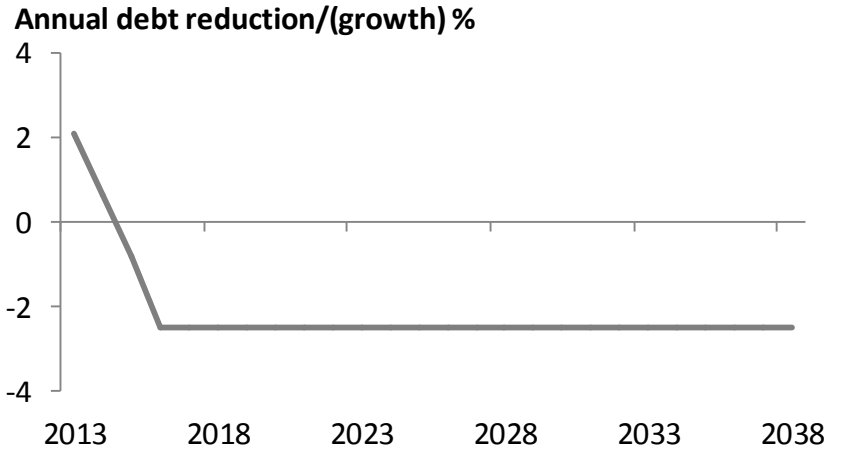
- **Real GDP Growth: 2.5%**
  - As gross debt levels remain below 110% of GDP and confidence in US fiscal policy returns, real GDP will return to historic averages
- **Inflation: 2.0%**
  - The Fed has pegged targeted long-term inflation at 2.0%
- **Gross Debt Service: 4.1% - max**
  - Current debt service payments are ~2.0% of GDP
  - Current depressed Treasury rates of 2.0% return to averages of 4.5% over time
  - Debt service declines as debt / GDP decreases
- **Primary Deficit (Surplus) spending: (2.1%) - max**
  - Requires significant discretionary and entitlement cuts over a 6 year period
  - Primary surpluses plus inflation offset debt service to reach 'balanced budget'

Projected escape velocity = +2.5% of GDP

Projected Primary Budget Deficit (Surplus)

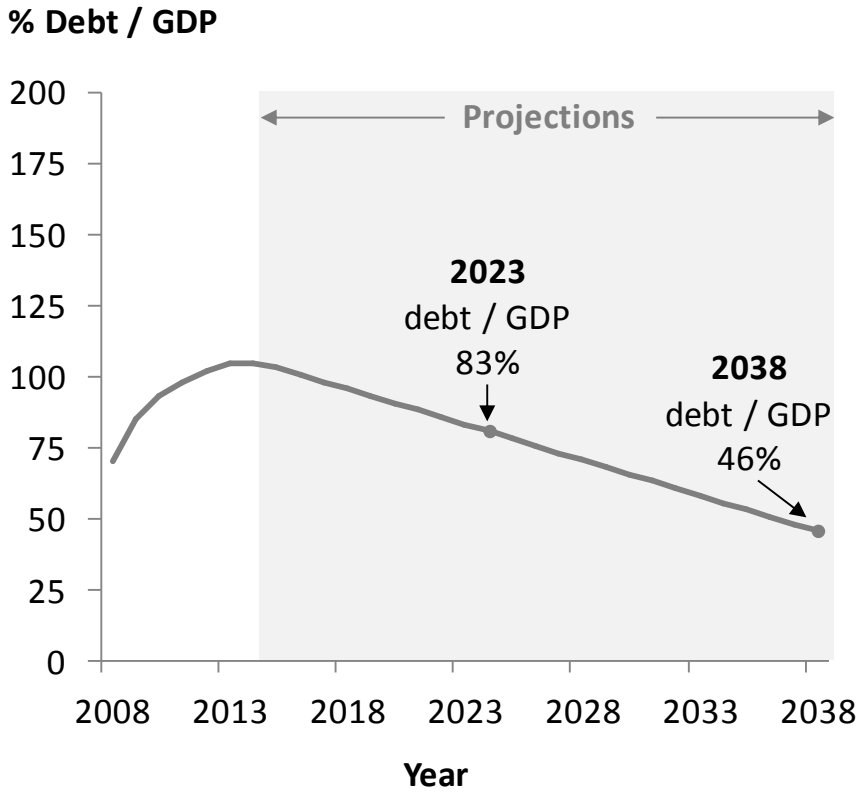


Escape Velocity Projections – 25 Years



Government debt steadily declines to 1986 levels within 25 years under the balanced budget scenario

Debt / GDP Levels



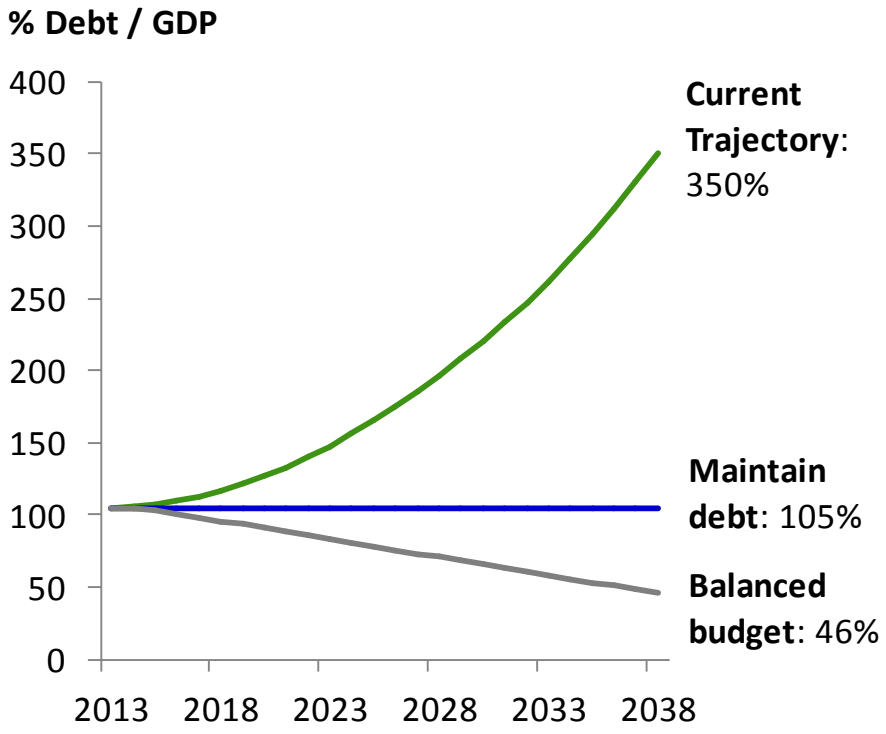
Fiscal Policy Implications

- **Short-term pain** in deficit reduction as rates normalize
  - Must reach **2.1%** of GDP **primary surpluses** within **6 years** required to 'right the ship'
  - Long-term primary surpluses decline to 0.1% of GDP
- **7.1% of GDP reduction in deficit** required over next 6 years to achieve sustainable debt / GDP reductions
  - **Increase revenues**
    - **45%** of 2012 federal revenue
  - **Reduced government spending**
    - **86%** of 2012 discretionary spending
    - **54%** of 2012 entitlement spending

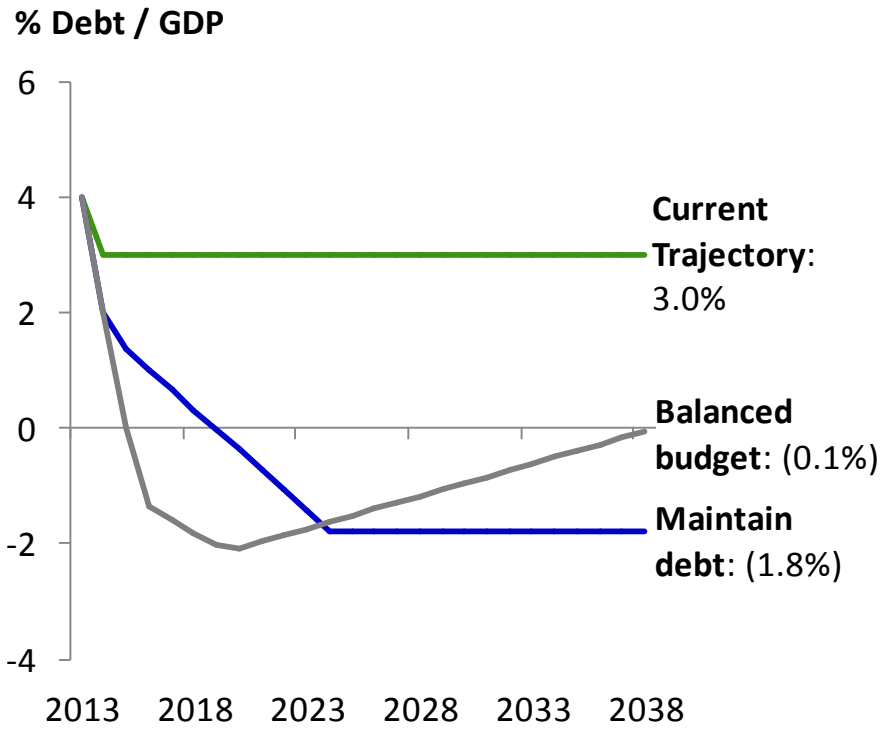
By accelerating cuts similar to those in the maintain debt / GDP scenario, the economy is able to get ahead of interest rate increases and maintain a long-term debt / GDP reduction trajectory

The short-term pain caused by adjusting federal deficits to sustainable levels pales in comparison to the pain of falling into a debt spiral

Debt / GDP Levels by Scenario



Annual Primary Budget Deficits (Surplus)

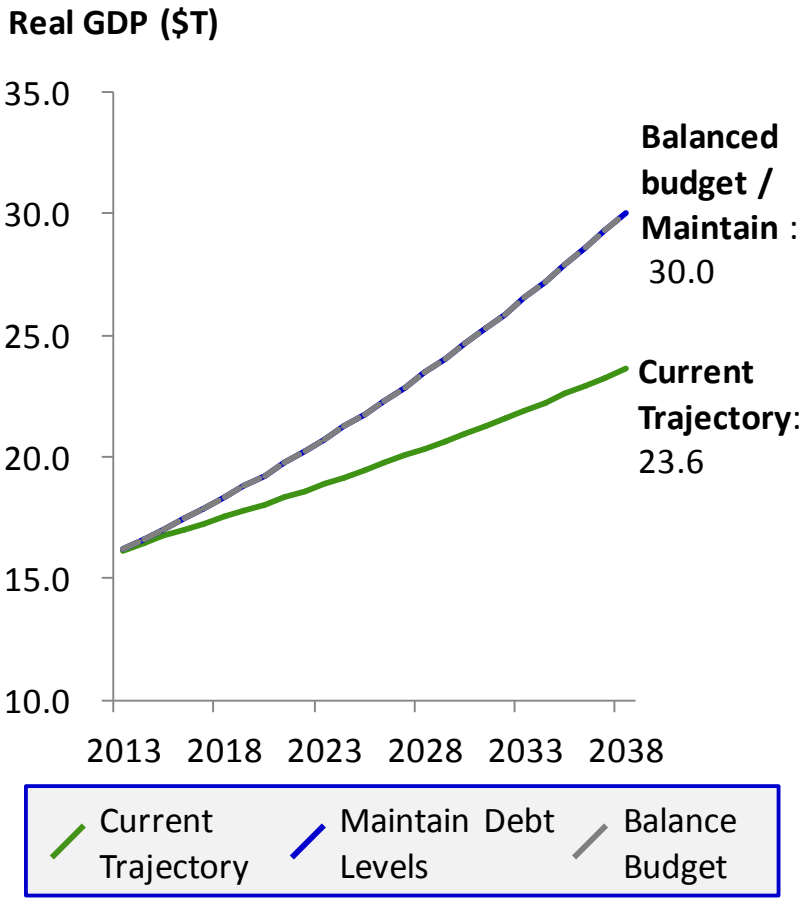


Current Trajectory | Maintain Debt Levels | Balance Budget

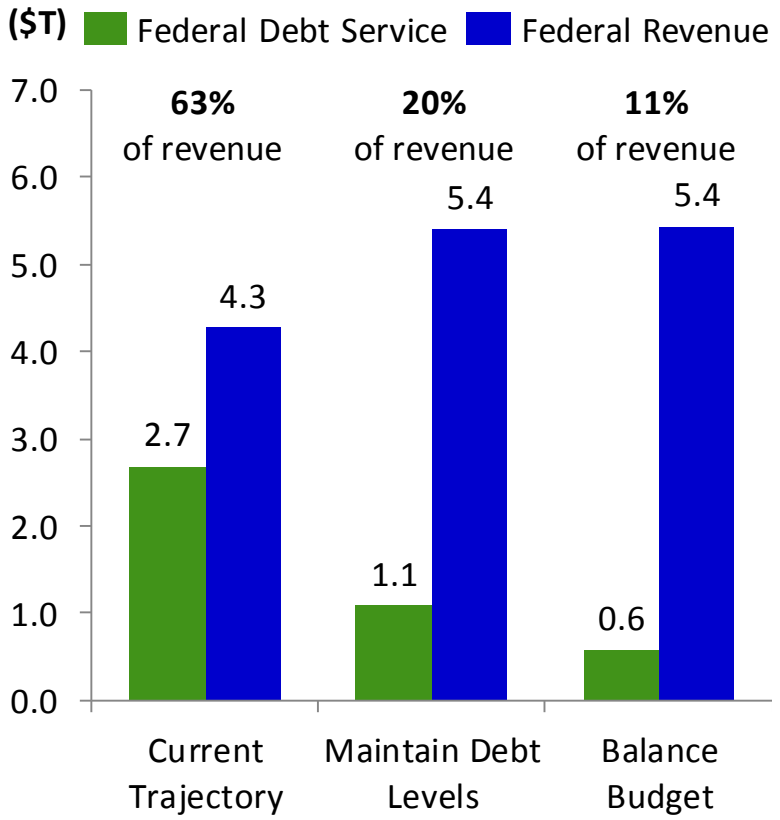
As the US nears a tipping point of unsustainable debt levels, fiscal policy decisions made over the next few years will have tremendous impact on the future state of the US economy

Rising debt levels and short-term fiscal irresponsibility will lead to long-term reductions to wealth and government revenue

Projected US Real GDP by Debt Scenario



2038 Projected Federal Revenues* & Debt Service by Scenario



Taking the painful, yet necessary near term steps to remain solvent and keep debt below 110% of GDP will allow the US to create 25%+ higher real wealth than the current trajectory would allow

*Based on US federal revenue / GDP historical avg. of 18.1%

Agenda

- Thesis
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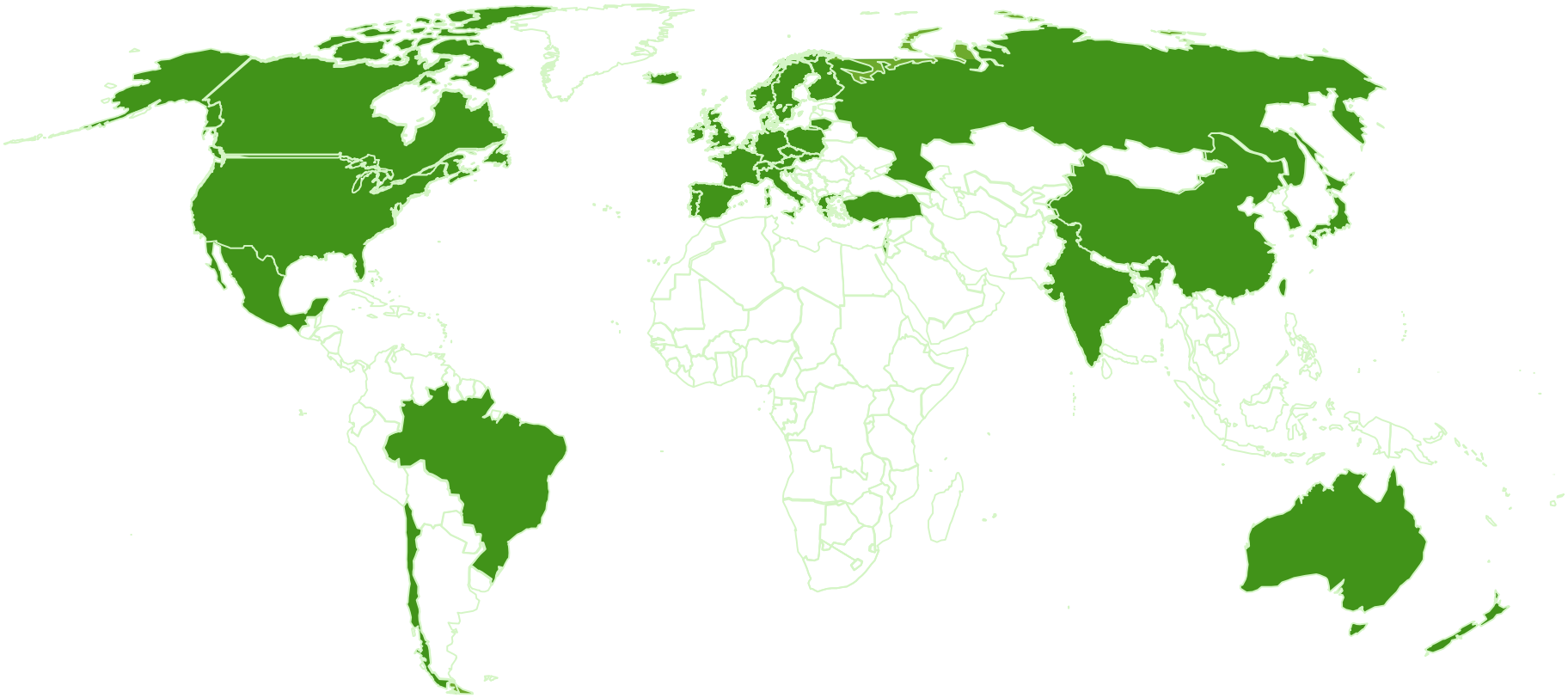
- Implications
- **Appendix**

Appendix

To identify economic tipping points, we used a variety of economic metrics

- GDP
- GDP / capita
- GDP growth (PPP)
- GDP current prices
- GDP constant prices
- GDP growth
- Gross sovereign debt
- Net sovereign debt
- Government interest payments
- Short term sovereign interest rates
- Long term sovereign interest rates
- Total investment
- Inflation
- Employment
- Unemployment
- Current account balance

The countries in the data set include IMF advanced economies, OECD countries, and the BRIC countries



- **OECD Countries in our dataset include:**
  - Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Russia, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States
- **Additional IMF/BRIC countries in the dataset include:**
  - Brazil, China, Cyprus, Estonia, Hong Kong SAR, India, Malta, Singapore, Taiwan Province of China, Turkey

Economic metrics – GDP and derivative measures

GDP - Gross Domestic Product

- **Nominal GDP**
  - Evaluated at current market prices which will include all changes in market prices
  - Estimates of GDP begin with a "benchmark" estimate, sometimes called a "best-level" estimate, which is usually produced once every five years with the reference year usually several years in the past
  - The estimate is based on the economic census, which is a mandatory survey that is carried out once every five years and covers virtually all of the more than seven million businesses with paid employees in the United States and over 95 percent of the expenditures included in GDP
  - The Bureau of Economic Analysis sums up C + I + G + (X –M) to arrive at nominal GDP
  - The nominal estimates are deflated using price indexes to arrive at an estimate of real, or inflation-adjusted, GDP

GDP Derivative Measures

- **Real GDP**
  - Evaluated at the market prices of a country-specific base year
  - Real GDP is the output of goods and services produced by labor and property within a country
- **Real GDP Growth**
  - Annual percentage growth rate of GDP at market prices based on constant local currency
- **Purchasing power parity (PPP)**
  - A technique used to determine the relative value of currencies
  - Represents the amount of money needed to make the same purchase in different countries
  - Avoids volatility of currency market exchange rates

Source: OECD Glossary of Statistical Terms, Bureau of Economic Analysis

Economic metrics – Sovereign debt measures

Gross Government Debt

- Comprises both debt held by the public and intragovernmental debt
  - Debt held by the public includes funds borrowed from entities other than the federal government, and includes borrowing from foreign governments, the Federal Reserve, foreign central banks, and private investors
  - Intragovernmental debt consists of liabilities owed by the treasury to other parts of the federal government, such as the money owed to the Social Security Trust

Net Government Debt

- Net debt can be recorded in the following ways:
  - 1) Gross debt minus financial assets held by the government
  - 2) Government debt held by the public (U.S. method)
- There is little consistency across countries in quantifying net debt
  - Many countries record negative levels of net debt

Source: OECD Glossary of Statistical Terms, IMF Glossary

Economic metrics – Other macroeconomic measures

Total Investment (% of GDP)

- Expressed as a ratio of nominal total investment and nominal GDP
- Investment or gross capital formation is measured by the total value of
  - Changes in inventories
  - Acquisitions less disposals of assets for a unit or sector
  - Gross fixed capital formation
    - measured by the total value of a producer's acquisitions, less disposals, of fixed assets during the accounting period
    - plus certain additions to the value of non-produced assets
      - such as subsoil assets or major improvements in the quantity, quality or productivity of land realised by the productive activity of institutional units

Sovereign Long Term Interest Rates

- 10-year government bonds are the instrument whose yield is used as the representative 'interest rate'
- The yield is calculated at the pre-tax level and before deductions for brokerage costs and commissions
- Derived from the relationship between the present market value of the bond and that at maturity, taking into account also interest payments paid through to maturity

Current Account Balance

- Includes all transactions (other than those in financial items) that involve economic value and occur between resident and non-residents entities
- Major classifications:
  - Goods and services
  - Income
  - Current transfers

Source: OECD Glossary of Statistical Terms, IMF Glossary

Agenda

- Thesis
- Macroeconomic Backdrop
- Approach
- Data Overview
- **Statistical Methodology**
- Review of Findings
- Implications
- Appendix

Overview of modeling

- Used Microsoft Excel with Stat Tools add-in to run many iterations of a **multi-variable linear regression**
- Looked at **three main regression outputs**
  - GDP Growth
  - Long-term Interest Rates
  - Total Investments
- Created **lagged variables** to increase the explanatory power of our model
- Used **dummy variables** for grouping purposes
- **Fixed effects** allow for heterogeneity between countries
  - Enabled model to adjust intercept for each country (level set countries to a consistent base)
  - Removed a degree of trend from the data, minimizing the likelihood of a spurious regression
- Used **moving averages** of deficits over 3 and 5 year periods to net out the effects of short run fluctuations
  - Maintained the ability to utilize the time series dimension of the data

We modeled 3 output factors to prove our hypothesis that high levels of debt have severe economic consequences

- **GDP Growth** (either Real or in PPP)
  - Slower growth will grow future deficits and lead to geometric growth in sovereign debt levels

- **Total investment**
  - Growing sovereign debt leads to private investment crowding out which will slow economic development in future years creating the same geometric growth in debt levels

- **Sovereign interest rates**
  - High debt levels will lead to default/credit risk/inflation fears driving up interest rates, increasing interest payments as % of GDP, leading to higher deficits and spiraling geometric debt growth

Our model uses lagged variables to further the explanatory power by allowing for a delay in the economic consequences of a variable

- Lagging variables in a time series regression allows for the relationship between past data and future or current data to be captured
- In an economic time series an independent variable may have a **delayed effect** on the dependent variable
- We lagged several variables in order to capture the economic effect that previous years had on the current year
  - The **reactions** from economic participants is never instantaneous and will **happen gradually over time**
    - For example, current year GDP growth is influenced by the behavior changes and decisions that economic actors made due to last years GDP growth
- Found that a **one year lag** on both GDP growth and Total Investment **were significant in our models**

Our model uses dummy variables to allow for country heterogeneity

- Used **dummy variables** to allow to account for country specific variance

- This gives us cleaner results by **removing country specific fluctuations** out of our other explanatory variables
  - Helped **flatten the data** to remove trending and enable comparison between countries with different traits
    - High growth (China) vs. low growth (Italy) countries

- We use a dummy variable for each country
  - US dummy variable not included in the regression (base country)
  - This is necessary to avoid falling into the "dummy variable trap" that results in perfect multicollinearity

Our model uses grouping of data to increase the explanatory power of the data pool

- In order to find "tipping points" we replicated a technique from the Reinhart and Rogoff study to **group countries by their debt / GDP**
- Our fixed effect model shows the difference in intercept among groups assuming the same slope
- We used **4 distinct groups for gross debt / GDP** and include them through the use of dummy variables
  - Debt / GDP < 50
  - 50 < Debt / GDP < 80
  - 80 < Debt / GDP < 110
  - 110 < Debt / GDP
- We tried many different groupings of debt / GDP but found that the **most significant results were given by this grouping**

Our model includes time series factors to account for unique circumstances like the 2007 – 2009 financial crisis

- To account for the **unprecedented actions** taken by **central banks** around the world during and after the most recent financial crisis we broke our data up into two groups
  - Pre 2007 data
  - Post 2007 data
- **The affect of central bank bond buying is clear** when comparing between the Pre and Post 2007 data
- Looked at other **snapshots of time** but did not find any significant results or significant changes from the total data set

We included other variables and looked at other outputs but did not find any significant results

- We started with a wide range of explanatory variables, and **whittled down** our model to the most significant variables
- We looked at **inflation** as an output but could not find any significance
- We tried to use **unemployment or employment** as either an output or an explanatory variable but could not find any significance
- We tried **labor productivity** growth as a potential output or explanatory variable instead of total investment but got more significant results with total investment

Modeling summary

Data

- Collected data on OECD member countries and IMF advanced economies that reflected a wide range of economic data points

Modeling

- Ran many multivariable regressions to build models that show the effect of high debt levels on GDP growth, long-term interest rates, and total investment while allowing for heterogeneity between counties

Methodology / Data treatment

- Used statistical techniques of lagging variables, dummy variables, and groupings to find more significant results

Potential accelerants to our debt spiral

State and local government debt

- As highlighted by the recent Detroit bankruptcy, many state and local governments are in bad financial shape due to their own exploding debt levels
  - The Federal Reserve Bank of St. Louis puts total state and local debt excluding pensions at $3.0T
  - A 2009 paper by Robert Novy-Marx, a Finance Professor at the Booth School of Business, estimate the total unfunded pension liability of states and local governments at $3.2T
    - California: $475B
    - Illinois: $219B
    - Ohio: $216B

Student Loan Debt

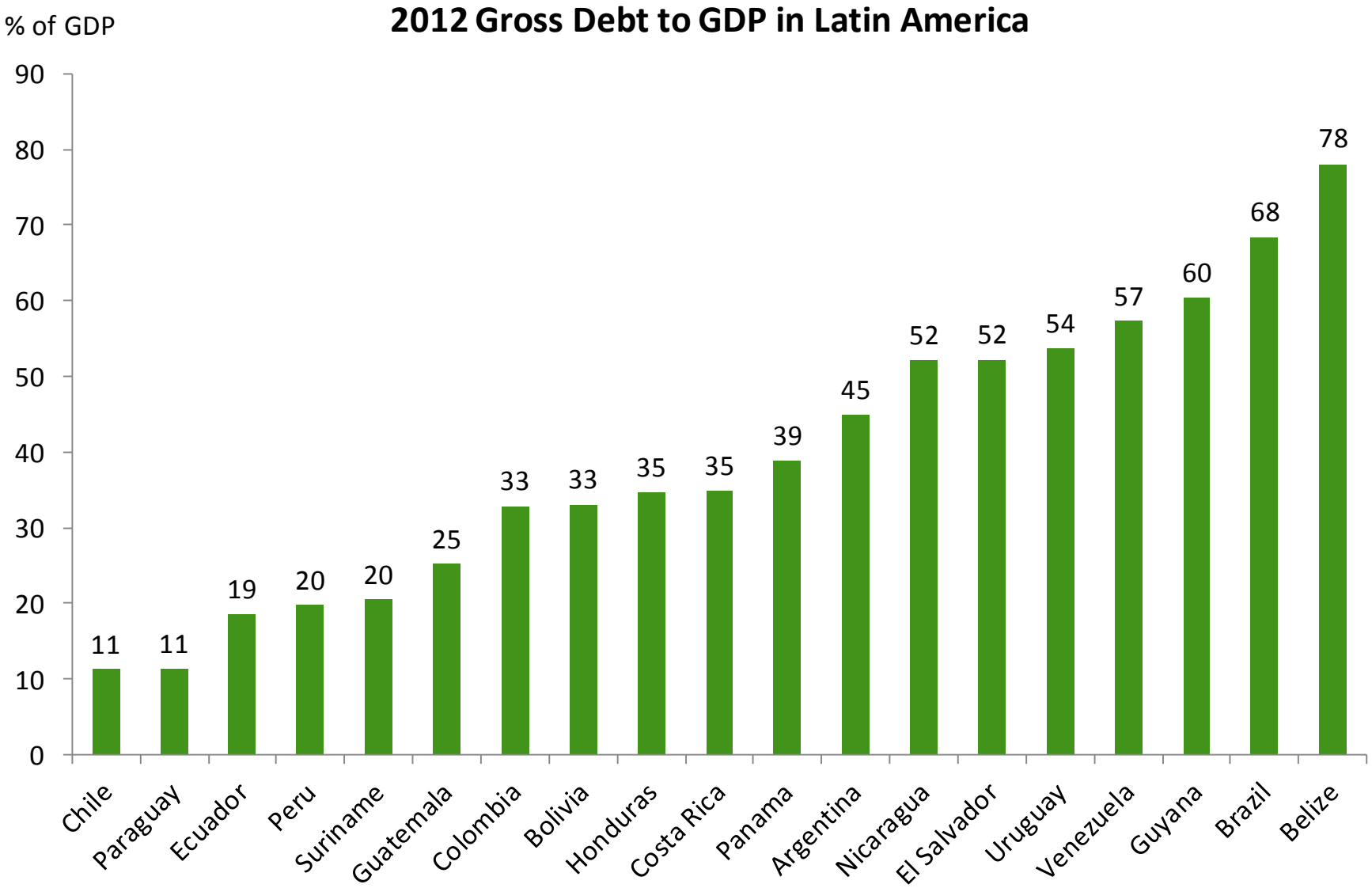
- Student loans are approaching $1.0T mostly backed by the government
  - 11% are over 90 days delinquent
  - Only 38% of borrowers are currently making payments on their loans
  - Student loan debt is now greater than auto loans, credit card debt, and revolving home-equity loans

To big to fail banks

  - Systematic financial risk could create the political will and desire to incur the high cost of a new round of bail outs

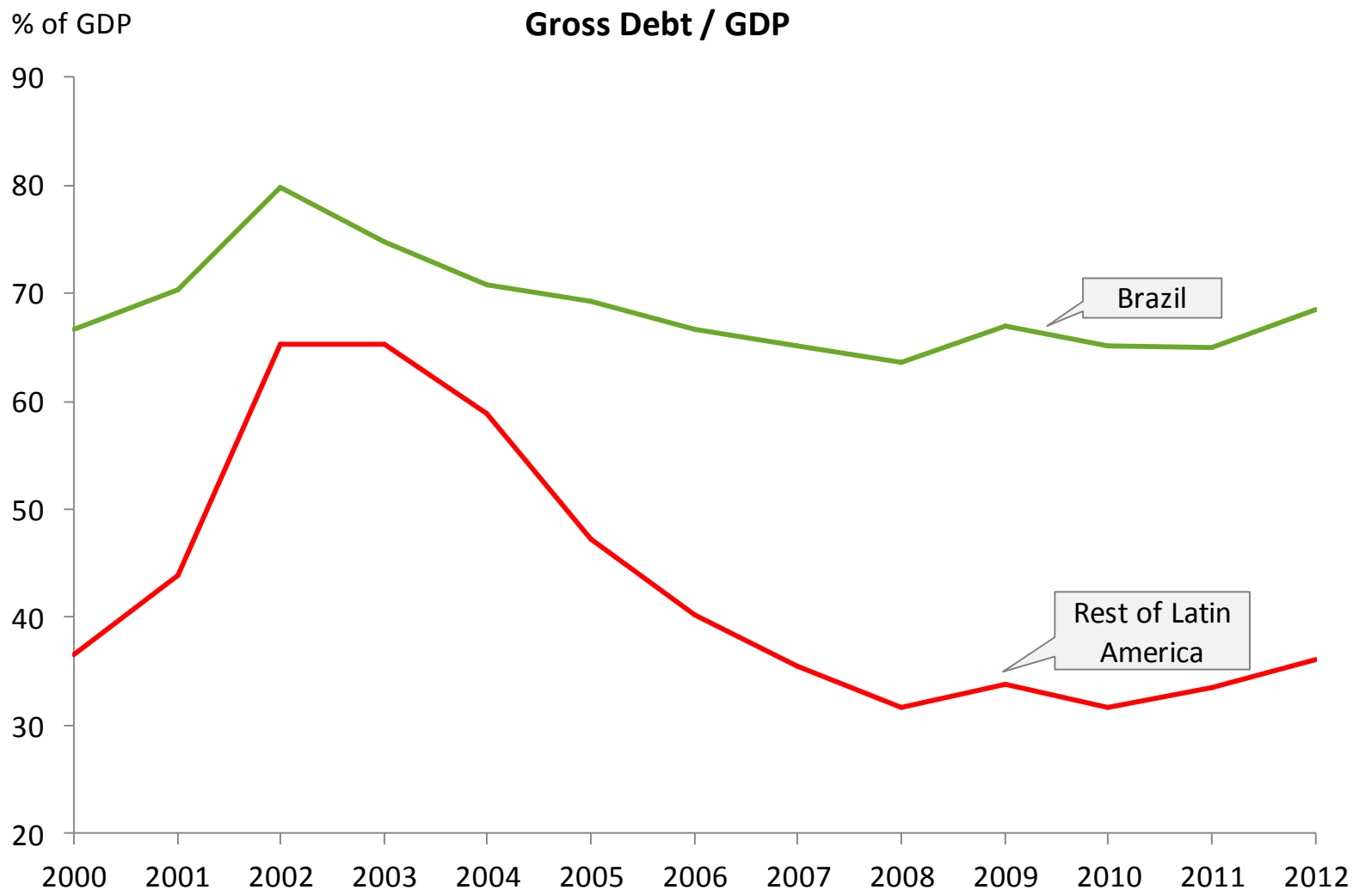
Source: Federal Reserve St. Louis, Federal Reserve New York, Paper by Robert Novy-Marx, WSJ Editorial July 24,2013

Gross Debt to GDP in Latin America



Note: All Latin American countries included except for French Guiana
Source: IMF

Brazil's gross debt / GDP has been consistently higher than the rest of Latin America



Note: Rest of Latin America calculated as a weighted average (current prices in US Dollar)
Source: IMF 2012

Collection of Data

Collected from IMF:

- GDP
- GDP / capita
- GDP (PPP)
- GDP current prices
- GDP constant prices
- GDP growth
- Gross sovereign debt
- Net sovereign debt
- Government interest payments
- Total investment
- Inflation
- Unemployment
- Current Account Balance

Collected from OECD:

- Short-term interest rates
- Long-term interest rates

Collected from HAVER:

- Central Balance sheets total assets for:
  - United States
  - European Union
  - United Kingdom
  - Japan

CBO Baseline Budget Projections (in billions)

	Actual, 2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total 2014-2018	Total 2014-2023
	In Billions of Dollars													
Revenues														
Individual income taxes	1,132	1,264	1,355	1,540	1,674	1,810	1,929	2,040	2,158	2,282	2,412	2,548	8,308	19,747
Social insurance taxes	845	953	1,021	1,068	1,129	1,195	1,256	1,314	1,372	1,433	1,498	1,565	5,670	12,852
Corporate income taxes	242	251	356	448	489	511	512	498	492	493	499	506	2,317	4,805
Other	229	241	270	317	299	249	239	249	258	288	326	342	1,374	2,837
Total	2,449	2,708	3,003	3,373	3,591	3,765	3,937	4,101	4,279	4,496	4,734	4,961	17,669	40,241
On-budget	1,880	2,038	2,271	2,607	2,779	2,904	3,029	3,149	3,285	3,457	3,651	3,832	13,589	30,963
Off-budget[a]	570	670	732	766	812	862	908	952	995	1,039	1,084	1,129	4,080	9,278
Outlays														
Mandatory	2,031	2,116	2,205	2,342	2,535	2,655	2,768	2,924	3,087	3,263	3,501	3,658	12,504	28,938
Discretionary	1,285	1,213	1,170	1,189	1,209	1,233	1,257	1,293	1,324	1,356	1,396	1,424	6,059	12,852
Net interest	223	224	243	272	323	412	517	593	667	730	795	857	1,767	5,410
Total	3,538	3,553	3,618	3,803	4,067	4,300	4,542	4,811	5,078	5,350	5,691	5,939	20,330	47,199
On-budget	3,031	2,910	2,901	3,039	3,255	3,437	3,627	3,842	4,048	4,256	4,529	4,704	16,259	37,637
Off-budget[a]	508	643	717	763	812	864	915	969	1,030	1,094	1,162	1,235	4,071	9,562
Deficit (-) or Surplus	-1,089	-845	-616	-430	-476	-535	-605	-710	-798	-854	-957	-978	-2,661	-6,958
On-budget	-1,151	-872	-630	-433	-476	-533	-598	-693	-763	-799	-878	-872	-2,670	-6,675
Off-budget[a]	62	27	14	3	0	-2	-6	-17	-35	-55	-79	-106	9	-283
Debt Held by the Public	11,280	12,229	12,937	13,462	14,025	14,642	15,316	16,092	16,957	17,876	18,902	19,944	n.a.	n.a.
	2.0%	1.8%	1.9%	2.0%	2.3%	2.8%	3.4%	3.7%	3.9%	4.1%	4.2%	4.3%		
Memorandum:														
Gross Domestic Product	15,549	16,034	16,646	17,632	18,792	19,959	20,943	21,890	22,854	23,842	24,858	25,910	93,972	213,326

CBO Baseline Budget Projections (as % of GDP)

	Actual, 2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total 2014-2018	Total 2014-2023
Revenues														
Individual income taxes	7.3	7.9	8.1	8.7	8.9	9.1	9.2	9.3	9.4	9.6	9.7	9.8	8.8	9.3
Social insurance taxes	5.4	5.9	6.1	6.1	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Corporate income taxes	1.6	1.6	2.1	2.5	2.6	2.6	2.4	2.3	2.2	2.1	2.0	2.0	2.5	2.3
Other	1.5	1.5	1.6	1.8	1.6	1.2	1.1	1.1	1.1	1.2	1.3	1.3	1.5	1.3
Total	15.8	16.9	18.0	19.1	19.1	18.9	18.8	18.7	18.7	18.9	19.0	19.1	18.8	18.9
On-budget	12.1	12.7	13.6	14.8	14.8	14.5	14.5	14.4	14.4	14.5	14.7	14.8	14.5	14.5
Off-budget[a]	3.7	4.2	4.4	4.3	4.3	4.3	4.3	4.3	4.4	4.4	4.4	4.4	4.3	4.3
Outlays														
Mandatory	13.1	13.2	13.2	13.3	13.5	13.3	13.2	13.4	13.5	13.7	14.1	14.1	13.3	13.6
Discretionary	8.3	7.6	7.0	6.7	6.4	6.2	6.0	5.9	5.8	5.7	5.6	5.5	6.4	6.0
Net interest	1.4	1.4	1.5	1.5	1.7	2.1	2.5	2.7	2.9	3.1	3.2	3.3	1.9	2.5
Total	22.8	22.2	21.7	21.6	21.6	21.5	21.7	22.0	22.2	22.4	22.9	22.9	21.6	22.1
On-budget	19.5	18.2	17.4	17.2	17.3	17.2	17.3	17.6	17.7	17.8	18.2	18.2	17.3	17.6
Off-budget[a]	3.3	4.0	4.3	4.3	4.3	4.3	4.4	4.4	4.5	4.6	4.7	4.8	4.3	4.5
Deficit (-) or Surplus	-7.0	-5.3	-3.7	-2.4	-2.5	-2.7	-2.9	-3.2	-3.5	-3.6	-3.8	-3.8	-2.8	-3.3
On-budget	-7.4	-5.4	-3.8	-2.5	-2.5	-2.7	-2.9	-3.2	-3.3	-3.3	-3.5	-3.4	-2.8	-3.1
Off-budget[a]	0.4	0.2	0.1	0	0	0	0	-0.1	-0.2	-0.2	-0.3	-0.4	**	-0.1
Debt Held by the Public	72.5	76.3	77.7	76.3	74.6	73.4	73.1	73.5	74.2	75.0	76.0	77.0	n.a.	n.a.

CBO Projections

	CBO Projections								
	Real GDP	Real GDP Growth	Inflation	Primary Deficit	Gross Debt	Public Debt	Interest Rates	Gross Debt Service	Public Debt Service
2012	15.8	2.2%	2.0%	-5.0%	102%	72%	2.0%	2.0%	1.4%
2013	16.0	1.4%	1.3%	-3.9%	106.4%	76.3%	1.8%	2.0%	1.4%
2014	16.6	3.4%	1.8%	-2.2%	107.4%	77.7%	1.9%	2.0%	1.5%
2015	17.3	4.4%	1.9%	-0.9%	104.9%	76.3%	2.0%	2.1%	1.5%
2016	18.0	4.3%	1.9%	-0.8%	102.0%	74.6%	2.3%	2.4%	1.7%
2017	18.6	3.2%	2.0%	-0.6%	99.9%	73.4%	2.8%	2.8%	2.1%
2018	19.1	2.5%	2.0%	-0.4%	99.3%	73.1%	3.4%	3.4%	2.5%
2019	19.5	2.4%	2.0%	-0.5%	99.3%	73.5%	3.7%	3.7%	2.7%
2020	20.0	2.2%	2.0%	-0.6%	99.6%	74.2%	3.9%	3.9%	2.9%
2021	20.4	2.2%	2.0%	-0.5%	99.9%	75.0%	4.1%	4.1%	3.1%
2022	20.8	2.2%	2.0%	-0.7%	100.3%	76.0%	4.2%	4.2%	3.2%
2023	21.3	2.2%	2.0%	-0.5%	100.7%	77.0%	4.3%	4.3%	3.3%
2024	21.8	2.2%	2.0%	7.4%	107.7%	82.4%	4.3%	4.6%	3.5%
2025	22.3	2.2%	2.0%	8.2%	115.2%	88.1%	4.3%	5.0%	3.8%
2026	22.7	2.2%	2.0%	9.1%	123.3%	94.3%	4.3%	5.3%	4.1%
2027	23.2	2.2%	2.0%	10.1%	131.9%	100.9%	4.3%	5.7%	4.3%
2028	23.8	2.2%	2.0%	11.1%	141.2%	108.0%	4.3%	6.1%	4.6%
2029	24.3	2.2%	2.0%	12.1%	151.1%	115.5%	4.3%	6.5%	5.0%
2030	24.8	2.2%	2.0%	13.3%	161.6%	123.6%	4.3%	6.9%	5.3%
2031	25.4	2.2%	2.0%	14.5%	172.9%	132.3%	4.3%	7.4%	5.7%
2032	25.9	2.2%	2.0%	15.8%	185.0%	141.5%	4.3%	8.0%	6.1%
2033	26.5	2.2%	2.0%	17.2%	198.0%	151.4%	4.3%	8.5%	6.5%
2034	27.1	2.2%	2.0%	18.7%	211.9%	162.0%	4.3%	9.1%	7.0%
2035	27.7	2.2%	2.0%	20.3%	226.7%	173.4%	4.3%	9.7%	7.5%
2036	28.3	2.2%	2.0%	22.0%	242.6%	185.5%	4.3%	10.4%	8.0%
2037	28.9	2.2%	2.0%	23.9%	259.5%	198.5%	4.3%	11.2%	8.5%
2038	29.5	2.2%	2.0%	25.9%	277.7%	212.4%	4.3%	11.9%	9.1%

Current Trajectory

	Current Trajectory Projections								
	Real GDP	Real GDP Growth	Inflation	Primary Deficit	Gross Debt	Public Debt	Interest Rates	Gross Debt Service	Public Debt Service
2012	15.8	2.2%	2.0%	-5.0%	102.3%	71.9%	2.0%	2.0%	1.4%
2013	16.2	2.5%	2.0%	-4.0%	104.2%	73.1%	2.3%	2.4%	1.7%
2014	16.6	2.5%	2.0%	-3.0%	105.5%	73.6%	2.7%	2.8%	2.0%
2015	17.0	2.5%	2.0%	-3.0%	107.2%	74.3%	3.0%	3.2%	2.2%
2016	17.4	2.5%	2.0%	-3.0%	109.3%	75.3%	3.3%	3.6%	2.5%
2017	17.7	1.5%	2.0%	-3.0%	112.9%	77.6%	3.7%	4.1%	2.8%
2018	18.0	1.5%	2.0%	-3.0%	117.0%	80.2%	4.0%	4.6%	3.2%
2019	18.2	1.5%	2.0%	-3.0%	121.7%	83.3%	4.3%	5.2%	3.5%
2020	18.5	1.5%	2.0%	-3.0%	127.0%	86.7%	4.7%	5.8%	4.0%
2021	18.8	1.5%	2.0%	-3.0%	132.9%	90.7%	5.0%	6.5%	4.4%
2022	19.1	1.5%	2.0%	-3.0%	139.7%	95.1%	5.3%	7.3%	5.0%
2023	19.4	1.5%	2.0%	-3.0%	147.3%	100.1%	5.7%	8.1%	5.5%
2024	19.6	1.5%	2.0%	-3.0%	155.9%	105.8%	6.0%	9.1%	6.2%
2025	19.9	1.5%	2.0%	-3.0%	165.1%	111.8%	6.0%	9.6%	6.5%
2026	20.2	1.5%	2.0%	-3.0%	174.8%	118.2%	6.0%	10.2%	6.9%
2027	20.5	1.5%	2.0%	-3.0%	185.1%	125.0%	6.0%	10.8%	7.3%
2028	20.9	1.5%	2.0%	-3.0%	196.0%	132.3%	6.0%	11.4%	7.7%
2029	21.2	1.5%	2.0%	-3.0%	207.6%	139.9%	6.0%	12.1%	8.2%
2030	21.5	1.5%	2.0%	-3.0%	219.9%	148.1%	6.0%	12.8%	8.6%
2031	21.8	1.5%	2.0%	-3.0%	233.0%	156.7%	6.0%	13.6%	9.1%
2032	22.1	1.5%	2.0%	-3.0%	246.9%	165.9%	6.0%	14.4%	9.7%
2033	22.5	1.5%	2.0%	-3.0%	261.7%	175.6%	6.0%	15.3%	10.2%
2034	22.8	1.5%	2.0%	-3.0%	277.3%	186.0%	6.0%	16.2%	10.8%
2035	23.1	1.5%	2.0%	-3.0%	294.0%	197.0%	6.0%	17.1%	11.5%
2036	23.5	1.5%	2.0%	-3.0%	311.6%	208.6%	6.0%	18.2%	12.2%
2037	23.8	1.5%	2.0%	-3.0%	330.4%	221.0%	6.0%	19.3%	12.9%
2038	24.2	1.5%	2.0%	-3.0%	350.3%	234.2%	6.0%	20.4%	13.7%

Maintain Debt Projections

Maintain Debt Projections									
	Real GDP	Real GDP Growth	Inflation	Primary Deficit	Gross Debt	Public Debt	Interest Rates	Gross Debt Service	Public Debt Service
2012	15.8	2.2%	2.0%	-5.0%	102.3%	71.9%	2.0%	2.0%	1.4%
2013	16.2	2.5%	2.0%	-4.0%	104.3%	73.1%	2.3%	2.4%	1.7%
2014	16.6	2.5%	2.0%	-2.0%	104.5%	72.6%	2.7%	2.8%	1.9%
2015	17.0	2.5%	2.0%	-1.4%	104.5%	71.6%	3.0%	3.1%	2.1%
2016	17.4	2.5%	2.0%	-1.0%	104.5%	70.4%	3.3%	3.5%	2.3%
2017	17.9	2.5%	2.0%	-0.7%	104.5%	69.1%	3.7%	3.8%	2.5%
2018	18.3	2.5%	2.0%	-0.3%	104.5%	67.7%	4.0%	4.2%	2.7%
2019	18.8	2.5%	2.0%	0.0%	104.5%	66.0%	4.3%	4.5%	2.9%
2020	19.3	2.5%	2.0%	0.4%	104.5%	64.1%	4.7%	4.9%	3.0%
2021	19.7	2.5%	2.0%	0.7%	104.5%	62.0%	5.0%	5.2%	3.1%
2022	20.2	2.5%	2.0%	1.1%	104.5%	59.6%	5.3%	5.6%	3.2%
2023	20.7	2.5%	2.0%	1.4%	104.5%	56.9%	5.7%	5.9%	3.2%
2024	21.2	2.5%	2.0%	1.8%	104.5%	53.8%	6.0%	6.3%	3.2%
2025	21.8	2.5%	2.0%	1.8%	104.5%	50.6%	6.0%	6.3%	3.0%
2026	22.3	2.5%	2.0%	1.8%	104.5%	47.2%	6.0%	6.3%	2.8%
2027	22.9	2.5%	2.0%	1.8%	104.5%	43.5%	6.0%	6.3%	2.6%
2028	23.5	2.5%	2.0%	1.8%	104.5%	39.6%	6.0%	6.3%	2.4%
2029	24.0	2.5%	2.0%	1.8%	104.5%	35.5%	6.0%	6.3%	2.1%
2030	24.6	2.5%	2.0%	1.8%	104.5%	31.1%	6.0%	6.3%	1.9%
2031	25.3	2.5%	2.0%	1.8%	104.5%	26.4%	6.0%	6.3%	1.6%
2032	25.9	2.5%	2.0%	1.8%	104.5%	21.4%	6.0%	6.3%	1.3%
2033	26.5	2.5%	2.0%	1.8%	104.5%	16.1%	6.0%	6.3%	1.0%
2034	27.2	2.5%	2.0%	1.8%	104.5%	10.4%	6.0%	6.3%	0.6%
2035	27.9	2.5%	2.0%	1.8%	104.5%	4.4%	6.0%	6.3%	0.3%
2036	28.6	2.5%	2.0%	1.8%	104.5%	-2.0%	6.0%	6.3%	-0.1%
2037	29.3	2.5%	2.0%	1.8%	104.5%	-8.8%	6.0%	6.3%	-0.5%
2038	30.0	2.5%	2.0%	1.8%	104.5%	-16.0%	6.0%	6.3%	-1.0%

Balance Budget Projections

Balance Budget Projections									
	Real GDP	Real GDP Growth	Inflation	Primary Deficit	Gross Debt	Public Debt	Interest Rates	Gross Debt Service	Public Debt Service
2012	15.8	2.2%	2.0%	-5.0%	102.3%	71.9%	2.0%	2.0%	1.4%
2013	16.2	2.50%	2.0%	-4.0%	104.3%	73.1%	2.3%	2.4%	1.7%
2014	16.6	2.50%	2.0%	-2.0%	104.5%	72.6%	2.7%	2.8%	1.9%
2015	17.0	2.50%	2.0%	0.0%	103.1%	70.2%	3.0%	3.1%	2.1%
2016	17.4	2.50%	2.0%	1.4%	100.6%	66.5%	3%	3.4%	2.2%
2017	17.9	2.50%	2.0%	1.6%	98.1%	62.7%	3.7%	3.6%	2.3%
2018	18.3	2.50%	2.0%	1.8%	95.6%	58.8%	4.0%	3.8%	2.4%
2019	18.8	2.50%	2.0%	2.0%	93.1%	54.6%	4.3%	4.0%	2.4%
2020	19.3	2.50%	2.0%	2.1%	90.6%	50.3%	4.5%	4.1%	2.3%
2021	19.7	2.50%	2.0%	2.0%	88.1%	45.9%	4.5%	4.0%	2.1%
2022	20.2	2.50%	2.0%	1.9%	85.6%	41.4%	4.5%	3.9%	1.9%
2023	20.7	2.50%	2.0%	1.7%	83.1%	36.8%	4.5%	3.7%	1.7%
2024	21.2	2.50%	2.0%	1.6%	80.6%	32.1%	4.5%	3.6%	1.4%
2025	21.8	2.50%	2.0%	1.5%	78.1%	27.3%	4.5%	3.5%	1.2%
2026	22.3	2.50%	2.0%	1.4%	75.6%	22.4%	4.5%	3.4%	1.0%
2027	22.9	2.50%	2.0%	1.3%	73.1%	17.4%	4.5%	3.3%	0.8%
2028	23.5	2.50%	2.0%	1.2%	70.6%	12.3%	4.5%	3.2%	0.6%
2029	24.0	2.50%	2.0%	1.1%	68.1%	7.0%	4.5%	3.1%	0.3%
2030	24.6	2.50%	2.0%	1.0%	65.6%	1.7%	4.5%	3.0%	0.1%
2031	25.3	2.50%	2.0%	0.8%	63.1%	-3.9%	4.5%	2.8%	-0.2%
2032	25.9	2.50%	2.0%	0.7%	60.6%	-9.5%	4.5%	2.7%	-0.4%
2033	26.5	2.50%	2.0%	0.6%	58.1%	-15.3%	4.5%	2.6%	-0.7%
2034	27.2	2.50%	2.0%	0.5%	55.6%	-21.3%	4.5%	2.5%	-1.0%
2035	27.9	2.50%	2.0%	0.4%	53.1%	-27.4%	4.5%	2.4%	-1.2%
2036	28.6	2.50%	2.0%	0.3%	50.6%	-33.7%	4.5%	2.3%	-1.5%
2037	29.3	2.50%	2.0%	0.2%	48.1%	-40.2%	4.5%	2.2%	-1.8%
2038	30.0	2.50%	2.0%	0.1%	45.6%	-46.8%	4.5%	2.1%	-2.1%

As debt/GDP exceeds 110%, there is a significant drag on GDP growth of 1.3% (1 of 2)

Summary	Multiple R	R-Square	Adjusted R-Square	StErr of Estimate
	0.8131	0.6611	0.6398	1.982346184

ANOVA Table	Degrees of Freedom	Sum of Squares	Mean of Squares	F-Ratio	p-Value
Explained	49	5993.466574	122.3156444	31.1260	< 0.0001
Unexplained	782	3073.022581	3.929696395		

Regression Table	Coefficient	Standard Error	t-Value	p-Value	Confidence Interval 95% Lower	Upper
Constant	0.387658397	0.956508688	0.4053	0.6854	-1.489970263	2.265287056
Total Investment	0.877946166	0.037013081	23.7199	< 0.0001	0.805289406	0.950602926
Gov Deficit % of GDP 3yr	0.04401321	0.029004838	1.5174	0.1296	-0.012923351	0.100949772
Lag1(Total Investment)	-0.813843954	0.035706006	-22.7929	< 0.0001	-0.883934923	-0.743752986
Lag1(GDP Growth)	0.21482983	0.02824922	7.6048	< 0.0001	0.159376548	0.270283111
Australia	0.455721377	0.830986877	0.5484	0.5836	-1.175507691	2.086950444
Austria	-0.135526126	0.802615157	-0.1689	0.8660	-1.711061445	1.440009193
Belgium	0.583780535	0.8324866	0.7012	0.4834	-1.050392493	2.217953562
Brazil	1.045737947	0.883303231	1.1839	0.2368	-0.688188238	2.779664132
Canada	0.475884304	0.771014813	0.6172	0.5373	-1.037619472	1.989388079
Chile	1.536197543	0.886587885	1.7327	0.0835	-0.204176426	3.276571511
China	4.606479178	0.95391034	4.8290	< 0.0001	2.733951083	6.479007274
Cyprus	0.943002046	0.842780974	1.1189	0.2635	-0.71137886	2.597382953
Czech Republic	0.25312692	0.895747669	0.2826	0.7776	-1.505227724	2.011481565
Denmark	-0.615770219	0.871250375	-0.7068	0.4799	-2.326036622	1.094496185
Estonia	1.911041113	0.901671301	2.1194	0.0344	0.141058364	3.681023861
Finland	0.293466239	0.793706659	0.3697	0.7117	-1.264581679	1.851514156
France	-0.285868726	0.768013838	-0.3722	0.7098	-1.793481581	1.221744129
Germany	-0.35787978	0.808282569	-0.4428	0.6581	-1.944540242	1.228780681
Greece	0.059490934	0.795363147	0.0748	0.9404	-1.501808675	1.620790542
Hong Kong SAR	1.67606741	0.926433404	1.8092	0.0708	-0.142523401	3.494658221
Hungary	0.177688544	0.851034502	0.2088	0.8347	-1.492894055	1.848271143

As debt/GDP exceeds 110%, there is a significant drag on GDP growth of 1.3% (2 of 2)

Regression Table	Coefficient	Standard Error	t-Value	p-Value	Confidence Interval 95% Lower	Upper
Iceland	0.658830706	0.779512659	0.8452	0.3983	-0.871354358	2.18901577
India	2.384260952	0.848445286	2.8102	0.0051	0.718760989	4.049760916
Ireland	2.142193321	0.770586832	2.7800	0.0056	0.629529674	3.654856968
Israel	1.807221263	0.91431675	1.9766	0.0484	0.01241547	3.602027056
Italy	-0.157889642	0.839113692	-0.1882	0.8508	-1.805071666	1.489292382
Japan	0.248704136	0.840266219	0.2960	0.7673	-1.4007403	1.898148572
Korea	1.603565571	0.904418963	1.7730	0.0766	-0.171810843	3.378941984
Luxembourg	1.333969078	0.878983946	1.5176	0.1295	-0.391478341	3.059416498
Malta	0.459648352	0.916566521	0.5015	0.6162	-1.339573746	2.258870449
Mexico	0.431183615	0.87047516	0.4953	0.6205	-1.27756104	2.13992827
Netherlands	0.132445642	0.846380938	0.1565	0.8757	-1.529002002	1.793893287
New Zealand	0.226322161	0.795726241	0.2844	0.7762	-1.335690201	1.788334523
Norway	0.542856069	0.839821071	0.6464	0.5182	-1.10571454	2.191426679
Poland	1.304209583	0.861146965	1.5145	0.1303	-0.386223804	2.994642969
Portugal	-0.162158197	0.806870419	-0.2010	0.8408	-1.746046604	1.421730211
Russia	1.833731403	0.915248911	2.0035	0.0455	0.037095778	3.630367029
Singapore	4.082304752	0.918190383	4.4460	< 0.0001	2.27989501	5.884714494
Slovak Republic	1.491763851	0.908246144	1.6425	0.1009	-0.291125328	3.274653031
Slovenia	0.4381081	0.88032447	0.4977	0.6189	-1.289970771	2.166186971
Spain	0.084812262	0.783008587	0.1083	0.9138	-1.452235316	1.62185984
Sweden	0.552758557	0.820185618	0.6739	0.5005	-1.057267617	2.16278473
Switzerland	-0.292645084	0.787063304	-0.3718	0.7101	-1.837652081	1.252361913
Taiwan Province of China	1.479142139	0.872692893	1.6949	0.0905	-0.23395593	3.192240209
Turkey	1.835241108	0.983882131	1.8653	0.0625	-0.096121681	3.766603896
United Kingdom	0.480465794	0.793210254	0.6057	0.5449	-1.07660768	2.037539268
50<gross debt/gdp<80	-0.07179018	0.247910115	-0.2896	0.7722	-0.558438281	0.414857921
80<gross debt/gdp<110	-0.589545783	0.38114165	-1.5468	0.1223	-1.337727681	0.158636115
110<gross debt/gdp	-1.299011211	0.56945327	-2.2812	0.0228	-2.416849234	-0.181173189

As debt/GDP exceeds 110%, there is a significant drag on GDP PPP growth of 1.6% (1 of 2)

Summary	Multiple R	R-Square	Adjusted R-Square	StErr of Estimate
	0.8090	0.6545	0.6228	2.343562046

ANOVA Table	Degrees of Freedom	Sum of Squares	Mean of Squares	F-Ratio	p-Value
Explained	49	5546.226944	113.188305	20.6086	< 0.0001
Unexplained	533	2927.386874	5.492283066		

Regression Table	Coefficient	Standard Error	t-Value	p-Value	Confidence Interval 95% Lower	Upper
Constant	-0.345627495	1.443924136	-0.2394	0.8109	-3.182107771	2.490852781
Total Investment	1.09910811	0.051788215	21.2231	< 0.0001	0.99737406	1.200842161
Gov Deficit % of GDP 3yr	0.113683482	0.039579634	2.8723	0.0042	0.03593227	0.191434694
Lag1(Total Investment)	-0.960840428	0.047471974	-20.2402	< 0.0001	-1.054095548	-0.867585307
Australia	-0.145041567	1.271240574	-0.1141	0.9092	-2.642297984	2.352214849
Austria	0.033014309	1.243564273	0.0265	0.9788	-2.4098741	2.475902717
Belgium	1.228382247	1.268511669	0.9684	0.3333	-1.263513442	3.720277936
Brazil	0.910516785	1.446443046	0.6295	0.5293	-1.930911702	3.751945272
Canada	0.586512113	1.174946139	0.4992	0.6179	-1.721581135	2.89460536
Chile	0.659716677	1.401349362	0.4708	0.6380	-2.093128661	3.412562015
China	3.073123911	1.423878768	2.1583	0.0314	0.276021251	5.87022657
Cyprus	0.351481267	1.334631319	0.2634	0.7924	-2.270301498	2.973264032
Czech Republic	-1.065278236	1.391342502	-0.7656	0.4442	-3.79846585	1.667909379
Denmark	-0.190230876	1.384505986	-0.1374	0.8908	-2.909988669	2.529526917
Estonia	2.037025993	1.387217764	1.4684	0.1426	-0.688058884	4.762110871
Finland	0.868687853	1.213295267	0.7160	0.4743	-1.514739369	3.252115076
France	0.361912196	1.186699783	0.3050	0.7605	-1.9692702	2.693094593
Germany	0.13733399	1.253443966	0.1096	0.9128	-2.32496233	2.59963031
Greece	-0.351911394	1.188557469	-0.2961	0.7673	-2.686743075	1.982920287
Hong Kong SAR	0.865312595	1.549769587	0.5583	0.5768	-2.179093103	3.909718294
Hungary	-0.144233965	1.332215046	-0.1083	0.9138	-2.761270142	2.472802213

As debt/GDP exceeds 110%, there is a significant drag on GDP PPP growth of 1.6% (2 of 2)

Regression Table	Coefficient	Standard Error	t-Value	p-Value	Confidence Interval 95% Lower	Upper
Iceland	1.261613424	1.192829912	1.0577	0.2907	-1.08161115	3.604837997
India	0.970910933	1.298533056	0.7477	0.4550	-1.579959512	3.521781378
Ireland	2.90273339	1.168313111	2.4846	0.0133	0.607670227	5.197796553
Israel	0.870359002	1.509783497	0.5765	0.5645	-2.095497031	3.836215035
Italy	0.50117691	1.279898686	0.3916	0.6955	-2.013087717	3.015441538
Japan	0.601995355	1.25360378	0.4802	0.6313	-1.860614908	3.064605618
Korea	1.186727179	1.40688746	0.8435	0.3993	-1.576997336	3.950451694
Luxembourg	0.45428797	1.37662818	0.3300	0.7415	-2.249994466	3.158570406
Malta	1.890627071	1.50663104	1.2549	0.2101	-1.069036198	4.850290341
Mexico	-0.328569552	1.357901413	-0.2420	0.8089	-2.996064665	2.33892556
Netherlands	0.501439812	1.337984639	0.3748	0.7080	-2.126930297	3.129809921
New Zealand	0.20677534	1.220861972	0.1694	0.8656	-2.191516107	2.605066787
Norway	1.307517444	1.269379195	1.0300	0.3035	-1.186082435	3.801117323
Poland	1.01914929	1.345120768	0.7577	0.4490	-1.623239208	3.661537789
Portugal	0.251649063	1.237611781	0.2033	0.8390	-2.179546121	2.682844247
Russia	1.041370413	1.472985312	0.7070	0.4799	-1.852198356	3.934939182
Singapore	2.154174968	1.403008253	1.5354	0.1253	-0.601929136	4.910279072
Slovak Republic	1.149858624	1.428560008	0.8049	0.4212	-1.656439981	3.956157228
Slovenia	0.12201659	1.371788143	0.0889	0.9292	-2.572757958	2.816791137
Spain	0.428744425	1.199215969	0.3575	0.7208	-1.927025078	2.784513928
Sweden	0.85413683	1.269436548	0.6728	0.5013	-1.639575714	3.347849373
Switzerland	-0.162744287	1.217872307	-0.1336	0.8937	-2.555162761	2.229674186
Taiwan Province of China	0.957419026	1.359520222	0.7042	0.4816	-1.713256115	3.628094168
Turkey	-0.060378516	1.528215071	-0.0395	0.9685	-3.06244199	2.941684959
United Kingdom	1.13018407	1.21007444	0.9340	0.3507	-1.246916082	3.507284221
50<gross debt/gdp<80	-0.386990916	0.334486274	-1.1570	0.2478	-1.044064023	0.270082191
80<gross debt/gdp<110	-0.912638403	0.516984838	-1.7653	0.0781	-1.928216202	0.102939397
110<gross debt/gdp	-1.660453481	0.762530575	-2.1776	0.0299	-3.158387399	-0.162519564
Lag1(GDP PPP Growth %)	0.250480854	0.032162937	7.7879	< 0.0001	0.187299185	0.313662522

Although the results are less statistically significant, our research suggest interest rates rise rapidly as debt/GDP levels pass 110% (1 of 2)

Summary	Multiple R	R-Square	Adjusted R-Square	StErr of Estimate
	0.9109	0.8297	0.8185	2.005600923

ANOVA Table	Degrees of Freedom	Sum of Squares	Mean of Squares	F-Ratio	p-Value
Explained	39	11640.58899	298.4766409	74.2030	< 0.0001
Unexplained	594	2389.326428	4.022435063		

Regression Table	Coefficient	Standard Error	t-Value	p-Value	Confidence Interval 95% Lower	Upper
Constant	2.814752273	1.031083652	2.7299	0.0065	0.789739327	4.839765218
Total Investment	-0.131142284	0.038009703	-3.4502	0.0006	-0.205792038	-0.05649253
Inflation	0.932294071	0.021606559	43.1487	< 0.0001	0.889859529	0.974728614
Government Deficit %G	0.180923016	0.026848733	6.7386	< 0.0001	0.128193025	0.233653006
GDP Growth	0.197368484	0.037404696	5.2766	< 0.0001	0.123906943	0.270830025
Australia	4.184856089	0.790811676	5.2918	< 0.0001	2.631729067	5.737983112
Austria	2.76805802	0.764450542	3.6210	0.0003	1.266703361	4.269412679
Belgium	2.723262549	0.795377016	3.4239	0.0007	1.161169355	4.285355743
Canada	3.235459455	0.717469129	4.5095	< 0.0001	1.826374681	4.644544229
Chile	2.513432941	1.009451181	2.4899	0.0131	0.530905426	4.495960455
Czech Republic	1.484727119	0.916945033	1.6192	0.1059	-0.316121492	3.28557573
Denmark	2.046431038	0.832779815	2.4573	0.0143	0.41088003	3.681982045
Finland	4.001490222	0.762656382	5.2468	< 0.0001	2.503659232	5.499321211
France	3.01649549	0.712257945	4.2351	< 0.0001	1.617645303	4.415345678
Germany	2.153558924	0.752555217	2.8617	0.0044	0.675566277	3.631551571
Greece	1.460204382	0.885560113	1.6489	0.0997	-0.279005322	3.199414086
Hungary	1.032003847	0.854643132	1.2075	0.2277	-0.646485967	2.710493661

Although the results are less statistically significant, our research suggest interest rates rise rapidly as debt/GDP levels pass 110% (2 of 2)

Regression Table	Coefficient	Standard Error	t-Value	p-Value	Confidence Interval 95% Lower	Upper
Iceland	3.357373011	0.784626755	4.2789	< 0.0001	1.816392962	4.898353061
Ireland	2.487407168	0.717730932	3.4657	0.0006	1.077808223	3.897006114
Israel	2.293821773	0.848017301	2.7049	0.0070	0.628344866	3.95929868
Italy	2.350915968	0.841281688	2.7944	0.0054	0.698667572	4.003164363
Japan	1.243023611	0.881826835	1.4096	0.1592	-0.488854063	2.974901285
Korea	2.786257767	0.932705801	2.9873	0.0029	0.954455548	4.618059985
Luxembourg	1.589844398	0.879117788	1.8085	0.0710	-0.1367128	3.316401596
Mexico	4.544211126	1.052640958	4.3170	< 0.0001	2.476860369	6.611561882
Netherlands	1.623397653	0.784724998	2.0687	0.0390	0.082224658	3.164570649
New Zealand	4.140975749	0.741450697	5.5850	< 0.0001	2.684791998	5.5971595
Norway	5.514656886	0.796843771	6.9206	< 0.0001	3.949683037	7.079630735
Poland	1.948038649	0.877935283	2.2189	0.0269	0.22380385	3.672273448
Portugal	2.520194413	0.794864649	3.1706	0.0016	0.959107491	4.081281336
Russia	-0.296601961	0.937717345	-0.3163	0.7519	-2.13824668	1.545042759
Slovak Republic	0.05126438	0.91094801	0.0563	0.9551	-1.737806283	1.840335044
Slovenia	1.403707314	0.951071912	1.4759	0.1405	-0.464165317	3.271579945
Spain	3.067251437	0.732103701	4.1896	< 0.0001	1.629424865	4.505078009
Sweden	2.677364749	0.781012387	3.4281	0.0006	1.143483194	4.211246304
Switzerland	2.020523065	0.740027955	2.7303	0.0065	0.56713353	3.4739126
United Kingdom	2.405240406	0.744464082	3.2308	0.0013	0.943138471	3.867342342
50<gross debt/gdp<80	0.043466712	0.251670796	0.1727	0.8629	-0.450806104	0.537739529
80<gross debt/gdp<110	-0.154083606	0.418402499	-0.3683	0.7128	-0.975811771	0.667644559
110<gross debt/gdp	0.693522014	0.615950185	1.1259	0.2606	-0.516183034	1.903227062

When looking at pre-financial crisis data, there was a significant spike in LT interest rates when debt/GDP exceeded 80% (1 of 2)

Summary	Multiple R	R-Square	Adjusted R-Square	StErr of Estimate
	0.9429	0.8890	0.8791	1.790709277

ANOVA Table	Degrees of Freedom	Sum of Squares	Mean of Squares	F-Ratio	p-Value
Explained	39	11223.73801	287.788154	89.7476	< 0.0001
Unexplained	437	1401.301555	3.206639713		

Regression Table	Coefficient	Standard Error	t-Value	p-Value	Confidence Interval 95% Lower	Upper
Constant	1.290673406	1.195720634	1.0794	0.2810	-1.059404697	3.640751508
Total Investment	-0.047396362	0.043004663	-1.1021	0.2710	-0.131918041	0.037125317
Inflation	0.924606087	0.021856973	42.3026	< 0.0001	0.881648232	0.967563942
Government Deficit %G	0.26494302	0.030502388	8.6860	< 0.0001	0.204993404	0.324892637
GDP Growth	0.236670373	0.050662178	4.6715	< 0.0001	0.137098556	0.336242189
Australia	3.922710375	0.89322545	4.3916	< 0.0001	2.167158526	5.678262225
Austria	2.207318529	0.87325406	2.5277	0.0118	0.491018594	3.923618463
Belgium	1.056483906	0.961699913	1.0986	0.2726	-0.833648156	2.946615969
Canada	2.126517663	0.842037884	2.5254	0.0119	0.471570232	3.781465094
Chile	3.000520803	1.501809879	1.9979	0.0463	0.048852654	5.952188952
Czech Republic	0.180440004	1.107848399	0.1629	0.8707	-1.996933364	2.357813372
Denmark	2.140743186	0.95477622	2.2421	0.0255	0.264219	4.017267371
Finland	4.394134579	0.861024472	5.1034	< 0.0001	2.701870768	6.08639839
France	2.858106707	0.822822356	3.4735	0.0006	1.240925614	4.4752878
Germany	1.89882374	0.862032998	2.2027	0.0281	0.204577764	3.593069716
Greece	-1.83913522	1.084655506	-1.6956	0.0907	-3.970925106	0.292654665
Hungary	-1.370399996	1.0346964	-1.3244	0.1860	-3.403999888	0.663199897

When looking at pre-financial crisis data, there was a significant spike in LT interest rates when debt/GDP exceeded 80% (2 of 2)

Regression Table	Coefficient	Standard Error	t-Value	p-Value	Confidence Interval 95% Lower	Upper
Iceland	4.048622205	0.90394119	4.4789	< 0.0001	2.272009561	5.825234848
Ireland	0.984570408	0.857390994	1.1483	0.2515	-0.700552139	2.669692955
Israel	1.41960571	1.096881702	1.2942	0.1963	-0.736213631	3.575425051
Italy	0.688850737	0.998756905	0.6897	0.4907	-1.274113407	2.651814882
Japan	-0.279246533	1.028370055	-0.2715	0.7861	-2.300412581	1.741919514
Korea	2.10876823	1.109675049	1.9003	0.0580	-0.072195249	4.289731708
Luxembourg	1.509921379	0.94936865	1.5904	0.1125	-0.355974729	3.375817486
Mexico	3.932523019	1.118909336	3.5146	0.0005	1.733410405	6.131635633
Netherlands	1.202887028	0.897407625	1.3404	0.1808	-0.560884499	2.966658555
New Zealand	4.114777571	0.839560603	4.9011	< 0.0001	2.464699005	5.764856138
Norway	5.682510045	0.878982443	6.4649	< 0.0001	3.954951506	7.410068585
Poland	2.059333791	1.076022956	1.9138	0.0563	-0.055489617	4.1741572
Portugal	1.102126634	0.920677481	1.1971	0.2319	-0.707379638	2.911632906
Russia	0.394902987	1.150315811	0.3433	0.7315	-1.865936143	2.655742118
Slovak Republic	-2.106554152	1.107954259	-1.9013	0.0579	-4.284135579	0.071027274
Slovenia	0.108918188	1.205249539	0.0904	0.9280	-2.259888094	2.477724471
Spain	2.443852792	0.835624774	2.9246	0.0036	0.801509732	4.086195851
Sweden	2.853125713	0.884905398	3.2242	0.0014	1.113926155	4.592325271
Switzerland	1.400149836	0.847452506	1.6522	0.0992	-0.265439535	3.065739207
United Kingdom	2.798953541	0.865169718	3.2351	0.0013	1.098542633	4.499364449
50<gross debt/gdp<80	0.274563523	0.271732153	1.0104	0.3129	-0.259500843	0.80862789
80<gross debt/gdp<110	1.471442933	0.520223844	2.8285	0.0049	0.448991175	2.49389469
110<gross debt/gdp	1.612633593	0.68730558	2.3463	0.0194	0.261798165	2.96346902

Our regression does not show a significant relationship between high debt levels and LT interest rates after the 2007 U.S. crisis (1 of 2)

Summary	Multiple R	R-Square	Adjusted R-Square	StErr of Estimate
	0.8654	0.7489	0.6653	1.150399279

ANOVA Table	Degrees of Freedom	Sum of Squares	Mean of Squares	F-Ratio	p-Value
Explained	39	461.9171565	11.84402965	8.9496	< 0.0001
Unexplained	117	154.8399646	1.323418501		

Regression Table	Coefficient	Standard Error	t-Value	p-Value	Confidence Interval 95% Lower	Upper
Constant	6.795440051	1.50414618	4.5178	< 0.0001	3.816557362	9.77432274
Total Investment	-0.150680242	0.060952914	-2.4721	0.0149	-0.271394295	-0.029966189
Inflation	0.163606403	0.0676779	2.4174	0.0172	0.029573869	0.297638938
Government Deficit %G	-0.147061705	0.040972466	-3.5893	0.0005	-0.228205528	-0.065917882
GDP Growth	-0.064799197	0.039040454	-1.6598	0.0996	-0.14211677	0.012518377
Australia	2.887052522	0.90634889	3.1854	0.0019	1.092076038	4.682029005
Austria	0.164134332	0.783049937	0.2096	0.8343	-1.386655035	1.714923699
Belgium	0.516668517	0.82438092	0.6267	0.5321	-1.115974696	2.149311729
Canada	0.123899449	0.811707194	0.1526	0.8789	-1.483644113	1.731443012
Chile	2.18602557	0.859121495	2.5445	0.0122	0.484580467	3.887470672
Czech Republic	1.609611459	0.888533304	1.8115	0.0726	-0.15008219	3.369305108
Denmark	-0.736097913	0.879681636	-0.8368	0.4044	-2.478261297	1.006065471
Finland	-0.472037283	0.868215509	-0.5437	0.5877	-2.191492603	1.247418037
France	0.313074657	0.756900073	0.4136	0.6799	-1.185926275	1.812075589
Germany	-0.927096467	0.772368325	-1.2003	0.2324	-2.456731461	0.602538527
Greece	3.865001972	1.102881172	3.5045	0.0006	1.680803603	6.049200342
Hungary	3.318026053	0.775024103	4.2812	< 0.0001	1.78313143	4.852920676

Our regression does not show a significant relationship between high debt levels and LT interest rates after the 2007 U.S. crisis (2 of 2)

Regression Table	Coefficient	Standard Error	t-Value	p-Value	Confidence Interval 95% Lower	Upper
Iceland	3.241781455	0.824148221	3.9335	0.0001	1.609599091	4.873963819
Ireland	3.353899516	0.778292801	4.3093	< 0.0001	1.812531407	4.895267626
Israel	1.000158078	0.804952019	1.2425	0.2165	-0.594007216	2.594323372
Italy	0.117655219	0.983048783	0.1197	0.9049	-1.829221383	2.064531822
Japan	-2.626793207	1.23478408	-2.1273	0.0355	-5.072218372	-0.181368042
Korea	2.069074628	0.90812178	2.2784	0.0245	0.27058703	3.867562226
Luxembourg	-1.117990157	1.338139881	-0.8355	0.4051	-3.768106071	1.532125758
Mexico	4.689386143	1.345869274	3.4843	0.0007	2.023962571	7.354809715
Netherlands	-0.337466351	0.774313069	-0.4358	0.6638	-1.870952809	1.196020107
New Zealand	1.893268994	0.849519144	2.2286	0.0277	0.210840846	3.575697142
Norway	-1.74422434	1.059907002	-1.6456	0.1025	-3.843314616	0.354865937
Poland	2.731250515	0.781383954	3.4954	0.0007	1.18376054	4.278740491
Portugal	2.515954742	0.769806249	3.2683	0.0014	0.991393804	4.04051568
Russia	3.050916085	0.972312568	3.1378	0.0022	1.125301994	4.976530176
Slovak Republic	1.894195237	0.862385505	2.1965	0.0300	0.186285935	3.602104539
Slovenia	1.588164596	0.876236786	1.8125	0.0725	-0.147176444	3.323505636
Spain	1.890689417	0.860339129	2.1976	0.0299	0.186832854	3.59454598
Sweden	-0.907817963	0.890790681	-1.0191	0.3103	-2.671982227	0.856346302
Switzerland	-1.750800009	0.814913023	-2.1485	0.0337	-3.364692547	-0.13690747
United Kingdom	-0.062625135	0.763882373	-0.0820	0.9348	-1.575454146	1.450203877
50<gross debt/gdp<80	0.344045518	0.436108394	0.7889	0.4318	-0.519644303	1.207735339
80<gross debt/gdp<110	0.092748855	0.605511132	0.1532	0.8785	-1.106434212	1.291931922
110<gross debt/gdp	1.422223307	1.085930759	1.3097	0.1929	-0.728405657	3.572852272

Our regression shows that when debt/GDP exceeds 80%, there is a significant drag on total investment (1 of 2)

Summary	Multiple R	R-Square	Adjusted R-Square	StErr of Estimate
	0.9478	0.8984	0.8926	1.735452895

ANOVA Table	Degrees of Freedom	Sum of Squares	Mean of Squares	F-Ratio	p-Value
Explained	49	22982.66735	469.0340276	155.7323	< 0.0001
Unexplained	863	2599.180595	3.011796749		

Regression Table	Coefficient	Standard Error	t-Value	p-Value	Confidence Interval 95% Lower	Upper
Constant	9.617670674	0.716113855	13.4304	< 0.0001	8.212142092	11.02319926
Current Account Balanc	-0.263328409	0.019795295	-13.3026	< 0.0001	-0.302180963	-0.224475854
Government Deficit %G	-0.235687709	0.02018218	-11.6780	< 0.0001	-0.275299611	-0.196075808
Lag1(Total Investment)	0.495506865	0.023743698	20.8690	< 0.0001	0.448904714	0.542109016
Lag1(GDP Growth)	0.084216644	0.024104493	3.4938	0.0005	0.036906355	0.131526933
Australia	2.213382348	0.676544017	3.2716	0.0011	0.885518144	3.541246551
Austria	3.259007921	0.659186156	4.9440	< 0.0001	1.965212281	4.552803562
Belgium	4.483507378	0.674334238	6.6488	< 0.0001	3.159980345	5.807034411
Brazil	0.068646043	0.731318639	0.0939	0.9252	-1.366725222	1.504017309
Canada	2.496144203	0.620335089	4.0239	< 0.0001	1.2786022	3.713686207
Chile	1.113969748	0.719757257	1.5477	0.1221	-0.2987098	2.526649296
China	11.06143076	0.820586205	13.4799	< 0.0001	9.450852558	12.67200896
Cyprus	-0.90979085	0.676104316	-1.3456	0.1788	-2.236792044	0.417210343
Czech Republic	3.741541318	0.738562129	5.0660	< 0.0001	2.291953135	5.1911295
Denmark	1.089534005	0.730322259	1.4919	0.1361	-0.343881649	2.522949659
Estonia	2.929265626	0.723083479	4.0511	< 0.0001	1.510057648	4.348473605
Finland	1.541416614	0.648472394	2.3770	0.0177	0.268649054	2.814184174
France	1.151463133	0.620815649	1.8548	0.0640	-0.067022074	2.36994834
Germany	1.730224938	0.663719531	2.6069	0.0093	0.427531568	3.032918308
Greece	2.698166697	0.626056254	4.3098	< 0.0001	1.469395667	3.926937726
Hong Kong SAR	3.486584261	0.823510427	4.2338	< 0.0001	1.870266638	5.102901884
Hungary	2.117119579	0.698013105	3.0331	0.0025	0.74711764	3.487121517

Our regression shows that when debt/GDP exceeds 80%, there is a significant drag on total investment (2 of 2)

Regression Table	Coefficient	Standard Error	t-Value	p-Value	Confidence Interval 95% Lower	Upper
Iceland	-0.336952756	0.624288314	-0.5397	0.5895	-1.56225382	0.888348307
India	6.610452269	0.698128965	9.4688	< 0.0001	5.24022293	7.980681607
Ireland	1.555826281	0.621854295	2.5019	0.0125	0.335302507	2.776350055
Israel	1.428736726	0.739227548	1.9327	0.0536	-0.022157486	2.879630937
Italy	3.677107053	0.681401706	5.3964	< 0.0001	2.339708583	5.014505524
Japan	6.546534137	0.693285352	9.4428	< 0.0001	5.185811436	7.907256837
Korea	5.263803107	0.768402047	6.8503	< 0.0001	3.75564762	6.771958595
Luxembourg	3.029772095	0.765264593	3.9591	< 0.0001	1.52777454	4.531769649
Malta	-0.79443016	0.761795727	-1.0428	0.2973	-2.289619313	0.700758994
Mexico	3.32581823	0.722976572	4.6002	< 0.0001	1.906820078	4.744816382
Netherlands	2.550343199	0.706091174	3.6119	0.0003	1.164486299	3.9362001
New Zealand	-0.229530799	0.638131312	-0.3597	0.7192	-1.482001746	1.022940149
Norway	2.174617672	0.702667344	3.0948	0.0020	0.795480781	3.553754563
Poland	1.142300646	0.692627794	1.6492	0.0995	-0.217131454	2.501732747
Portugal	2.367447224	0.654296143	3.6183	0.0003	1.083249294	3.651645154
Russia	2.630508211	0.779364501	3.3752	0.0008	1.100836533	4.160179888
Singapore	7.272411707	0.873370277	8.3268	< 0.0001	5.558233329	8.986590086
Slovak Republic	2.96983649	0.737190773	4.0286	< 0.0001	1.522939891	4.41673309
Slovenia	3.003260582	0.714587409	4.2028	< 0.0001	1.600727979	4.405793184
Spain	2.589163561	0.62810318	4.1222	< 0.0001	1.356374995	3.821952128
Sweden	0.944686163	0.688459242	1.3722	0.1704	-0.406564251	2.295936577
Switzerland	4.591856382	0.693967522	6.6168	< 0.0001	3.229794777	5.953917988
Taiwan Province of Chin	3.925641371	0.760924093	5.1590	< 0.0001	2.432162989	5.419119754
Turkey	0.294681195	0.769530344	0.3829	0.7019	-1.215688818	1.805051209
United Kingdom	-0.711910663	0.633633562	-1.1235	0.2615	-1.955553801	0.531732475
50<gross debt/gdp<80	-0.307921988	0.198779439	-1.5491	0.1217	-0.6980697	0.082225725
80<gross debt/gdp<110	-1.481096374	0.295512973	-5.0120	< 0.0001	-2.061104605	-0.901088144
110<gross debt/gdp	-2.16776372	0.439443258	-4.9330	< 0.0001	-3.030266318	-1.305261123

Meeting with Professor Fomby

- The **following slides** show our regressions before meeting with Professor Fomby
- After the meeting, we enhanced our regression by improving our model in the following ways:
  - Inserted dummy variables to capture the fixed effects. We did not want country-specific factors to construe our results
  - Flattened out data to remove fluctuations in the data

GDP growth regression (1st attempt)

Summary	Multiple R	R-Square	Adjusted R-Square	StErr of Estimate
	0.7778	0.6050	0.6012	2.0859

ANOVA Table	Degrees of Freedom	Sum of Squares	Mean of Squares	F-Ratio	p-Value
Explained	9	5,485.5795	609.5088	140.0833	< 0.0001
Unexplained	823	3,580.9097	4.3510		

Regression Table	Coefficient	Standard Error	t-Value	p-Value	Confidence Interval 95% Lower	Confidence Interval 95% Upper
Constant	0	NA	NA	NA	NA	NA
Total Investment	0.9032	0.0348	25.9629	< 0.0001	0.8349	0.9715
Current Account Balance	0.0831	0.0133	6.2602	< 0.0001	0.0570	0.1091
Gov Deficit % of GDP 3yr avg	0.0896	0.0205	4.3759	< 0.0001	0.0494	0.1298
Lag1(Total Investment)	(0.7995)	0.0343	(23.3230)	< 0.0001	(0.8668)	(0.7322)
Lag1(GDP Growth)	0.3450	0.0255	13.5444	< 0.0001	0.2950	0.3949
100< gross debt/gdp <110	(0.8576)	0.3792	(2.2616)	0.0240	(1.6018)	(0.1133)
gross debt/gdp >110	(2.0512)	0.3609	(5.6843)	< 0.0001	(2.7595)	(1.3429)
50< gross debt/gdp <75	(0.6171)	0.1674	(3.6869)	0.0002	(0.9456)	(0.2886)
75< gross debt/gdp <100	(0.3628)	0.2444	(1.4842)	0.1382	(0.8426)	0.1170

Long-term interest rates regression (1st attempt)

Summary	Multiple R	R-Square	Adjusted R-Square	StErr of Estimate
	0.8854	0.7840	0.7812	2.2019

ANOVA Table	Degrees of Freedom	Sum of Squares	Mean of Squares	F-Ratio	p-Value
Explained	8	10,999.5750	1,374.9469	283.5793	< 0.0001
Unexplained	625	3,030.3404	4.8485		

Regression Table	Coefficient	Standard Error	t-Value	p-Value	Confidence Interval 95% Lower	Upper
Constant	7.0412	0.6032	11.6734	< 0.0001	5.8567	8.2257
Debt/GDP Sq	(0.0001)	0.0000	-3.1042	0.0020	(0.0001)	(0.0000)
Total Investment	(0.1433)	0.0258	-5.5511	< 0.0001	(0.1939)	(0.0926)
Inflation	0.9018	0.0196	45.9098	< 0.0001	0.8632	0.9404
Government Deficit %GDP	0.1291	0.0229	5.6467	< 0.0001	0.0842	0.1740
GDP Growth	0.1317	0.0369	3.5742	0.0004	0.0594	0.2041
G? = G-20	(0.8562)	0.2500	-3.4251	0.0007	(1.3471)	(0.3653)
G? = G7	(0.8432)	0.2834	-2.9758	0.0030	(1.3997)	(0.2868)
Gross Debt/GDP% > 115	1.8056	0.5522	3.2697	0.0011	0.7212	2.8900

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