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SHOULD EMERGING MARKETS HAVE AN INDEPENDENT DEBT MANAGEMENT AUTHORITY?

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Current standards call for a country's debt manager to serve as a passive agent of the finance ministry, a passive optimizer of existing conditions. This approach is widely practiced in developed and emerging markets. However, I argue, drawing heavily on fiscal dominance theory, emerging-market environments are more likely to reflect "non-Ricardian" conditions. Consequently, fiscal action in general, and debt management specifically takes on a heightened role, given the possibility of adverse interaction with the monetary policy regime. Similarly, the potential for adverse interaction between monetary policy and debt management suggests a need for increased strategic action within the treasury department and the inability to rely on a static management strategy. A debt authority that rests under the control of the finance ministry or the central bank cannot strategically incorporate the impacts of their actions on portfolio composition and value. Both the existence of short-termist political problems and the potential for politically motivated optimization lead to my suggestion of an independent debt management authority.

INTRODUCTION[1]

Emerging-market countries face a host of economic and political risks that exacerbate the problems associated with low income. Among these problems is the management of the public debt. This paper argues that a variety of variables force emerging-market debt managers to balance a wider array

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of variables than do their developed-country counterparts and that classical tax–smoothing considerations provide an insufficiently nuanced normative framework to guide debt managers in these markets. To handle these complexities and to isolate the debt manager from the influences of the finance ministry and the central bank,[2] I suggest creating an independent debt authority and expanding the mandate of debt managers to include full responsibility for the debt-funding operations of the government.

This paper assumes that most governments attempt to maximize their economy's long-term growth. Driving this view is the underlying supposition that reduced output volatility contributes to this goal. Since output volatility cannot be controlled directly, governments utilize indirect instruments. Among these is sovereign debt management: i.e. the purchase, sale, issuance, and monitoring of government debt. Since debt management is generally not believed to affect economic growth or output stability directly, most theoretical work, as well as much operational practice, instead focuses on the ability of active debt management to influence government cash flows and taxation (Missale 1999). Further, debt managers are generally incorporated into the finance ministry or central bank in a dependent fashion. They are meant to primarily to issue securities ordered by the finance ministry and to report on the risks associated with their issuance.[3] However, in emerging markets, debt management potentially has a greater impact than in the developed world.

- First, drawing heavily on fiscal dominance literature, this paper suggests that emerging market environments are more likely to reflect non-Ricardian conditions. (The term "Non-Ricardian" is drawn from the well-known Ricardian equivalence theorem. Non-Ricardian conditions refer to the inability of a government to meet its fiscal obligations, which invalidates the assumption that there is a fixed permanent budget constraint. Without such a constraint, the government is free to print money to meet its obligations. Printing money spurs inflation, which can also be called monetary taxation.) Consequently, debt management can impact the economy not only through its own action through potential adverse interaction with the monetary policy regime. For example, an inflation-targeting regime can increase the complexity of the inflation-control game by creating a potential conflict between debt optimization at the treasury and inflation control at the central bank. One possible manifestation of this phenomenon is Loyo's explication of the fiscal impact of contractionary monetary action with predominantly variable-rate liabilities (Loyo 1997). Anticipation of anti-inflationary action would

precipitate a debt shortening, thereby decreasing the mitigating impacts of term-debt holdings. One manifestation of this: inflation targeting concentrates policy commitment on a single set of outcome variables and complicates construction of predictive functions. [4] (Bernanke *et al* 1999)

- Second, many emerging markets have been characterized by a history of large and varied economic shocks and frequent regime changes. By complicating the characterization and measurement of interest and exchange rate volatility under any system and particularly under a "dynamic" one, a debt manager's optimization function increasingly depends on changes *in regime* rather than changes *within* one.[5] Under changing fiscal, taxation, or monetary regimes, a particular set of debt management actions carry a different impact on the economy.

- Third, recent experience in crisis situations in Asia, Russia, and Brazil suggests that the relationship between inflationary shocks and output losses is non-linear. If so, the debt manager cannot easily smooth government cash flows over the long run without over-correcting in regular applications to smooth crisis events. In addition to leading to the well-known choice between high-cost duration and high-risk volatility, this suggests that such a decision magnifies as a function of monetary policy and policy changes. The risk of regime change adds to a debt manager's volatility calculation.

- Fourth, the vast distribution of domestic and foreign debt holdings among emerging nations impacts the nature of debt management and argues against generic suggestions for debt funding options (Dooley 1999; Barro 1995, 1997).[6] As an example, the increasing reliance of the Brazilian domestic financial system on the liquidity of sovereign debt has allowed a lower degree of refinancing risk and quite possibly lower funding costs than countries with primarily external debt.[7] In addition, the preponderance of Real-denominated debt implies that central-bank actions have a sharper effect on the debt burden than would be the case in countries with a larger share of foreign currency or currency-indexed debt.

- Fifth, asset[8] and liability positions in emerging markets often react differently to economic shocks than in developed markets. Real tax revenues in emerging markets often fall when inflation increases –

potentially due to output losses, revenue collection difficulties and other factors. Developed markets tend to show the opposite relationship. This suggests that the underlying "position" in these cases is substantially different. Differences in balance sheet positions can imply substantial differences in debt management action.

This paper will seek to challenge the conventional literature on debt management and explore the relevance of the above characteristics to the implementation of policy. I suggest that debt managers must consider not only fiscal cost smoothing and interest rate volatility, but must also include monetary authority activity, inflation effects, and finance ministry action into the strategic framework.

I first motivate this discussion by reviewing the existing literature on the rationale for debt management. Second, I argue for the use of fiscal theory literature over Barro-inspired tax smoothing in emerging markets. Third, I conclude with an argument for the creation of an independent debt authority.

Literature Review

I point to two concerns underlying academic discussions on optimal government debt management. The first is the nature of the appropriate social welfare function. Goals of value maximization appropriate for a corporate treasurer in the private sector clearly are not easily transferred to the environment of a sovereign government operating in a closed, national economy. Within the latter context, valuation changes (in individual securities, or in the net worth of the government as a whole) represent a redistribution of assets rather than aggregate wealth accumulation or loss. The second concern is the treatment of money. Consideration of money as a pure financial instrument can result in fundamentally different conclusions about the nature of monetary-fiscal interaction (and thus debt management) than traditional treatments of money demand as distinct from bond demand (Woodford 1998).[9]

Emerging markets have received considerably less attention in the literature than developed markets, which raises the possibility that reactions will occur other than those normally predicted. One possibility is that the assumption that output losses respond in a linear way to inflation, while appropriate in developed markets, could fundamentally mischaracterize emerging-market environments. Another is that sensitive central bank reaction functions can lead to high instrument instability. This is particularly the case in stabilization programs designed to ameliorate market reaction (Bernanke *et al* 1999).[10]

Debt Management Views

Robert Barro suggested that it is only through the distortions produced by taxation that debt managers have an impact on aggregate social value (Barro 1974, 1979). Since a change in interest rates or default probability only reallocates wealth among bondholders and taxpayers, efficiency is not affected. Viewing a single, nominal, government liability illustrates this. If the applicable interest rate or the probability of government default were to rise, the value of the asset would fall. Assuming that government expenditures remain constant, the payments on outstanding debt would fall. Correspondingly, the government's revenue collection requirement would decline, affecting a net wealth transfer from bondholders to taxpayers.

The implication is that governments should not bother with active debt management at all, as this might lead to volatile and irregular taxation. Barro explains that since generally all taxation mechanisms (barring lump-sum and some forms of capital taxation) distort and limit economic activity, changes in bond value which alter a government's need for taxation do have an impact on national wealth and should thus be curtailed. If interest rates show no long-term positive or negative bias, all current-period taxation benefits such as the one above will be offset in the long term by tax increases. Since tax volatility increases the proportion of dead-weight loss per unit of taxation, the key to debt management is solely to minimize variation in real taxation. In sum, this view calls for the use of zero-duration, infinite-maturity instruments (consols) to fund government obligations.[11] This would provide the greatest stability in real debt service payments and consequently taxation.[12]

A second view draws on the negative correlation between fiscal expenditures (primarily debt service costs) and inflation, to argue for the use of nominal debt.[13] If government expenditure should be counter-cyclical, then freeing up debt obligations during economic downturns would be desirable. Various studies have questioned the applicability or efficacy of indexed debt in tax smoothing[14] to the extent that it does not carry this counter-cyclical characteristic. The underlying theory here suggests that the social value function is improved more with a repayment schedule that offsets negative economic shocks than with one that smoothes real government debt payments. By explicitly linking the government's obligations to the state of the economy,[15] such an arrangement transfers "state-specific" risk to bond holders and away from the government consequently mitigating nominal tax volatility.[16] While this also draws on fiscal smoothing as the underlying rationale, the focus on nominal instead of real payments stability results in different conclusions than Barro. Given the

positive correlation between debt service on price- or interest-indexed debt and inflation, and the budgetary benefits from the above state-specific relationship, it is suggested that nominal debt may be preferable.[17]

A third view, drawn from practical debt management experience, simplifies the debt manager's job by focusing it on only the most immediate and pressing budgetary risks. Foremost among these in many emerging markets is the maturity structure of the national debt. A country with very short debt maturity must regularly return to the markets and must refinance itself at then-prevailing rates. This leaves the public finances particularly vulnerable to financial market volatility. It is clearly possible either that the markets fear default and refuse to reissue debt, or that the government increases its own risk of default by issuing large amounts of punitively priced debt.

Though these debt management techniques now encompass maturity structure and interest rate sensitivity, Barro has made clear that valuation changes in government financial positions may not be of relevance unless they impact the stability of tax rates (Barro 1979). This suggests that measuring interest sensitivity, while interesting, is not particularly relevant. Further, a government is exposed to a host of risks which differ from those faced by corporations, and its "assets" include a variety of items (e.g. taxation capacity) that are not easily categorized or evaluated as traditional financial assets.

Monetary Policy Views

Initially, a number of critical points relevant to debt management arise in inflation-targeting literature. First, Bernanke (1999), Svensson and Woodford (1999), and others stress that inflation targeting cannot be accomplished through either static measures or solely forward-looking measures. Because it's necessary to target inflation forecasts rather than inflation itself, only historically based measures can engender sufficient credibility with the private sector to allow monetary action to achieve desired results (Bernanke *et al* 1999). This is especially true given the generally accepted view that monetary action has a lagged impact on inflation, along with the difficulty of measuring inflation in real time. A historically based measure of inflation-forecast targeting commits the monetary authority to a particular course of action, giving the private sector some information about the type of intervention expected under various circumstances. If, instead, the monetary authority were to try to optimize on a solely forward-looking basis, the private sector would anticipate this and undermine the efficacy of central bank action. An

understanding of the central bank's methodology could allow further optimization through debt realignment in anticipation of upcoming policy actions.

Second, Woodford (1999a) outlines a critical relationship between the duration of public debt and inflation. Introductory macroeconomic models teach that monetary actions aim to restore equilibrium in both the goods and asset markets, and some consider this effect to be particularly relevant in emerging-market economies. While the stated aim of monetary policy is generally monetary aggregate or price-level targets, control of these variables is believed to maintain general market stability. In emerging-market economies, disequilibria in goods and assets markets have on occasion been extreme, causing sharp and painful inflationary shocks. However, it is argued that an economy with long-duration government debt suffers a smaller inflationary response to economic shocks than one with short or zero-duration debt. Since each unit of inflation will produce a greater impact on asset valuation when the public holds long-duration debt, such wealth effects imply that less inflation is "required" to reestablish equilibrium in the goods market (Woodford 1999a, 1999b). The implications for debt management and the need for central bank interaction are discussed below.[18]

Third, a literature discussed and expanded in Roubini and Sachs (1989) provides a political-economy perspective on the feasibility of consistent monetary and fiscal policy under regimes with low fiscal discipline. They find, unsurprisingly, that instability leads to an inability to maintain credibility or to conduct fiscal policy. If the central bank and/or the market regard fiscal authority as not credible, the debt management task becomes more complex. Debt management benchmarks might include compensation for the likely over-compensation of monetary authorities or markets in anticipation of fiscal under-performance.

Fourth, an additional literature examines the link between inflation and the real economy. Once the connection between debt management and inflation is clear, such studies shed light on liability management's impact on the economy. Several papers discuss the link between inflation and economic decline. Pindyck (1993) finds an inverse relationship between inflation and aggregate investment. Feldstein (1979) and Fischer (1984) model a negative relationship between inflation and consumption growth. Svensson (1997) takes Feldstein's case a bit further and calculates expected economic losses for the Swedish case in the 1990s. Hall (1988) attempts to refute this body of thinking by finding that the intertemporal elasticity of consumption in the future with respect to the present is close

to zero, suggesting that people shouldn't care about the level of permanent inflation. In sum, no clear link between inflation and the real economy has been found in developed economies, but anecdotal evidence suggests the costs to be high in emerging markets.

Looking for a Solution: Does Tax Smoothing Provide a Reasonable Proxy for Output Smoothing?

This section examines why the current application of tax-smoothing literature – in particular Robert Barro's model of debt valuation – is applicable to emerging-market environments. By assuming that government revenues and expenditures perfectly follow the inflation rate, and that inflation itself does not affect the real economy, Barro assumes that the only channel through which debt management affects national output is through fiscal policy. I argue that if the inflation-output loss relationship is non-linear and, perhaps as a result, government revenues do not track inflation, the tax-smoothing argument can no longer be the primary determinant of debt management. This is perhaps the relevant framework for emerging markets, suggesting further that smoothing government revenues cannot be the sole objective of management efficacy.

Barro studies dynamic optimal taxation to discover a basis for debt management in tax-smoothing methods. He uses a growth model that, with a few simplifying assumptions, leads to the use of indexed consols funded with proportional consumption taxation. A critical assumption is that the relationship between consumption and government spending is stable and not lagged or variable. If true, then the only factor that produces real variation in taxation is the use of nominal debt (Barro 1979). Without such variation, there is no social loss from inflation. This can be seen by the fact that inflation simply increases consumption and government expenditure in lock step, without causing changes to real taxation.

A more realistic scenario would be semi-random fluctuations of government expenditures and consumption. Here, in order to maintain theoretically beneficial stability in real taxation, governments would be need to condition government payments on the precise ratio of expenditures to consumption, a highly unrealistic requirement. With the introduction of tax collection that trails inflation incidence, or non-indexed revenues, Barro's conclusion to use indexed consols is called into question. If any of these factors exist, the use of indexed debt may still retain distortionary noise. In fact, the beneficial effects of the correlation between nominal debt value changes and inflation and the output gap may in fact yield lower variation.

Inflation and Duration: Does Fiscal Theory Offer a Solution?

Michael Woodford (1998) has proposed a method of viewing inflation that eschews the traditional focus on monetary variables and instead treats fiscal phenomena as the primary driver of price changes. The fundamental departure is the characterization of money as a pure financial instrument rather than an independent and unique means of exchange. By ignoring the classic treatment of "shoe leather" costs, Woodford develops a model that explains inflation volatility through fiscal action. If money acts as simply a type of government bond and there exists a possibility that a government may not meet its financial obligation through additional taxation, then fiscal actions have a direct impact on inflation. Increased expenditures not met by expected increased taxation lead to an increased need for money finance, and hence, inflation. The critical observation for emerging economies is that, under this framework, an increased duration of public debt can lead to decreased incidence of inflation as a response to changes in fiscal variables.

While Woodford's model may not rival monetary explanations for descriptive power in all markets, fiscal dominance[19] may be the relevant framework for some emerging-market settings. The critical distinction here is whether the fiscal authority can be expected to meet its obligations solely through taxation (the Ricardian condition).[20] Consideration of monetary (inflation) taxation, or a belief by the market that resorting to such taxation will become necessary, allows the fiscal authority direct influence over the price level. Woodford's fiscal managers hold not only the ability to spur high inflation through excess spending but also the ability to affect inflation incrementally through minor changes in spending.

Woodford's model relies on the existence of a "non-Ricardian" government budget constraint for fiscal dominance. If government is committed to offset all expenditures with changes in the present value of taxation, then monetary policy will dominate the determination of the price level.[21] However, within a non-Ricardian paradigm, fiscal expenditures can by themselves, and in small amounts, impact the price level (Loyo 1997). The relevance to relatively unstable fiscal environments in emerging markets is clear, and the rationale for insisting on fiscal control by the monetary authority obvious. Further, if the duration of public debt is able to offset fiscal changes by mitigating the impact on the general price level, it should have a similar impact on private sector shocks. What then, is the correct policy framework for economies in transition from unstable to stable, or

in an indeterminate regime? And, would they benefit from a reduction in expected inflation volatility? I suggest that Woodford's implied policy of increased debt duration is particularly applicable to emerging markets and could lower expected inflation volatility and the risk premium on future issuances of government debt. [22]

In fact, in situations of non-Ricardian policy, the monetary authority must not only be aware that the fiscal authority can disturb the equilibrium price level, but also that it may be difficult or impossible to prevent such activity from impacting the price level. Woodford demonstrates this last "impossibility" hypothesis through showing that even if the monetary authority is allowed to choose policy after the fiscal authority, there is no monetary policy that can maintain a stable equilibrium price.[23] However, Woodford urges that fiscal action can affect inflation even while the government is well beneath its debt limit. In sum, the argument is that monetary authorities *must* include fiscal actions into their calculus and policy makers *must* understand that complete monetary dominance cannot exist.

If Woodford's argument is correct, the implications are far-reaching. Most importantly, a corollary suggests that since fiscal actions impact the price level through the revaluation of government debt, the composition of government debt has relevance for the degree of price changes. Loyo's example of Brazil demonstrates this: a higher duration of public debt would have diminished the additional budgetary expenditures that led to monetary expansion (Loyo 1997).[24]

A second corollary is that such increases in the duration of public debt have a similar ameliorative impact on inflation that results from changes in private sector variables. While a complete exposition is beyond the scope of this paper, the logic should be clear. A change in government expenditures, without concomitant changes in future taxation, impacts the price level through a revaluation of government debt. This "wealth" effect is not far removed from arguments for asset price inflation, as it suggests that a change in the value of personal assets affects individual consumption decisions by altering their future consumption possibilities. While it should be clear that long-duration government assets would respond more to inflationary pressures than short-duration ones, there is no reason to suggest that assets will respond to only government inflationary pressures and not private sector-ones. In short, the duration of public debt can have an impact on the extent of inflation resulting from government and private-sector shocks.

It is important to note that such effects are clearly dependent on the

relative size of the government debt. Unless the debt comprises a large enough portion of the economy that the wealth effects of valuation changes impact consumers, no inflation impact will be seen. This straightforward logic can be seen by assuming that a government held only a single bond valued at $1. The term or duration of this instrument would be irrelevant. It is unclear at what level government debt begins to impact the price level, but this is a key area for future econometric analysis.

The critical question for practical application, however, is whether the expected output savings from reduced volatility of inflation outweighs the concomitant increased cost of debt issuance. It is well known that risk premia are non-linear with respect to credit quality, debt maturity and debt duration. As a consequence, an emerging-market country must pay often punitively high rates on a fixed-rate, long-maturity instrument. I suggest the simple solution holds: the government should increase the duration of its debt until the change in cost per unit of duration equals the benefit of change in output volatility per unit of duration. Further, I predict that such a tradeoff would need to be made at each point of the yield curve and on an ongoing basis.[25] Intuition suggests that use of either completely fixed or completely indexed debt, as suggested by Barro and Dooley respectively, cannot optimize this equation.

POLITICAL MOTIVATION AND CREATION OF A DEBT AUTHORITY

This paper has argued from a theoretical perspective that emerging-market countries face a host of risks that suggest that a passive debt manager cannot optimally manage the public debt. In particular, there is reason to believe that adverse interaction with monetary policy is possible. Finally, I want to argue that a viable and productive solution to these potential problems is to create an independent debt manager. This has the following key advantages:

- *It avoids inevitable political interference in the issuance of debt.* Short-term debt brings with it lower immediate costs. This can lead to pressure to fund government obligations for the sake of short-term political gain. However, because of the real constraint faced by many countries of the purchase of medium- or long-term debt, increased purchases of short-term debt could signal to the market that the government expects future difficulties. While such signaling costs could provide some deterrent, it also magnifies the consequences of short-term political action. An independent institution should be less

subject to these pressures and could allow the debt manager to make the decision to purchase expensive long-term debt with the goal of economic stabilization or to purchase short-term debt without the same market reaction.

- *It allows the debt manager to optimize the country's funding needs with an eye to the potential interactions between its own management, the fiscal authority, and the monetary authority.* A debt manager housed within the any single institution is clearly subject to political pressures from that institution itself. Since conflict may exist between the independent actions of various agencies, housing debt management within either of them can lead to the difficulties described above. The creation of an independent manager would prevent these conflicts from occurring and would give managers the largest possible space to manage the public debt.

Conclusions

A few key factors underlie my conclusions, and I encourage further research into the specific relationships mentioned. First, I believe that the assumption that government revenue and output are correlated is inappropriate for many markets. Second, I encourage further research into the relationship between inflation and output losses in emerging markets. Third, the risk of conflict between debt management and monetary policy is heightened in emerging markets. Fourth, political short-termism can lead to poor debt policy.

I encourage from these conclusions the creation of an independent debt manager. Further research is clearly necessary on this issue. Most pressing would be the econometric verification of the inflation-output and revenue-output links in various emerging markets. Following this, further research should be conducted along the line of Loyo's into the adverse or positive interactions between debt management and monetary policy (Loyo 1997). Finally, detailed thinking is necessary into the practical implementation of an independent debt authority.

Notes

1 Some portion of the logic and text of this paper – though not its principal conclusion – are drawn from prior work by the author and Suman Bery (Bery and Cohen-Cole 2000).

2 I use finance ministry and central bank as generic terms for the fiscal and monetary authorities of a country.

3 Clearly such functions vary by country, but this simplification is useful to illustrate the generally applicable nature of the dependency of debt managers on the instructions of finance ministry or central bank officials.

4 They have suggested that instrument instability may be higher under an inflation-targeting regime.

5 "Dynamic" is used here to suggest that the existing regime is not expected to persist, that instead the appropriate characterization of the system is one in a state of flux.

6 Each advocates a particular type of debt as widely applicable.

7 A country with primarily internal debt and a liquid domestic market is less likely to face liquidity crises associated with refinancing as the debt market becomes critical to private sector functioning. This same fact could contribute to a liquidity discount for the government.

8 I posit here that government "assets" include traditionally defined financial assets as well as the capacity to tax.

9 See reference for treatment of money demand that leads to fiscal dominance.

10 Again the suggestion of high instrument instability under inflation targeting regimes is applicable. This paper suggests that the mechanism for inflation targeting implementation in emerging markets can exacerbate this tendency.

11 Duration is the sensitivity of a financial instrument with respect to a change in interest rates. Maturity is the length of a financial contract. A zero-duration, infinite-maturity instrument would be a debt that required a floating rate interest payment on a daily basis (zero duration) and never required repayment (infinite maturity). Such instruments are called consols.

[12] For a review of the literature, see (Bevilaqua and Garcia 1999).

13 Others correlated factors include general government expenditures and production. See (Goldfajn 1999) for further review.

14 Bohn suggests that this and "non-traditional" securities such as foreign debt and stock market investing could provide additional smoothing benefits (Bohn 1990a; Bohn 1990b), in the absence of perfect real adjustment with indexed instruments (Calvo 1988; Calvo and Guidotti 1990), (Sims 1999). (Woodford 1999a) suggests a causal link between indexed debt and inflation in non-"Ricardian" tax environments. (Chari, Christiano, and Kehoe 1994) suggests that smoothing via indexed debt alone would only account for 20% of government tax volatility.

15 This is a particular version of state contingent debt. Fully state-contingent debt would theoretically preserve constant real debt payments regardless of economic or political outcomes.

16 The moral hazard associated with state-contingent loans has pushed research towards the advocacy of GDP-linked bonds or standard nominal debt.

17 (Bohn 1990a; Bohn 1990b) measures the necessary extent of nominal debt issuance to offset inflation-linked GDP volatility. (Svensson, Persson, and Persson 1997) measure the optimal levels of nominal and indexed debt.

18 For more on the debt management implications, see (Svensson, Persson, and Persson 1997; Svensson and Woodford 1999).

19 Fiscal dominance is used to refer to a market in which fiscal actions have a greater impact on price-level changes than corresponding monetary action.

20 Woodford uses "Ricardian" and "non-Ricardian" to identify governments bound by tax funding alone and those with implicit or explicit monetary taxation access respectively (Woodford 1998).

21 Though Woodford holds that there are multiple equilibria in the determination of the price level under the use of conventional monetary policy when combined with independent fiscal action. (Woodford 1998)

22 A full exposition exists in (Woodford 1998).

23 See (Woodford 1998), p 21. This is particularly meant to counter the concept that fiscal borrowing impacts the price level only after surpassing the debt borrowing capacity of the government (Sargent and Wallace 1981). The threat by a central bank, if credible, to refuse to "bail-out" the government's spending excesses through loose monetary policy theoretically has an impact on the budget process. In theory it should force the fiscal authorities to respect Ricardian limits.

24 See (Cochrane 1996) as well.

25 It should be clear that yield curve twists might lead to different output effects than simple shifts. If true, one might suppose that the government could optimize its anti-inflation position by "buying" duration at the most sensitive points. At least three factors prevent this from being effective. One, a weighted duration might yield the "sweet" spot but actually reflect a composition of different duration instrument. Two, the government would have to issue zero-coupon instruments of exactly the correct duration – potentially running contrary to market demand or government market development goals. Three, "drift" in maturity would quickly move government instruments from the sweet spot, necessitating issuance of longer-term instrument and returning to problem one.

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