Sacrifice Ratios and Monetary Policy Credibility: Do Smaller Budget Deficits, Inflation-Indexed Debt, and Inflation Targets Lower Disinflation Costs?

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Abstract

A growing empirical literature addresses the determinants of the sacrifice ratio, an imperfect measure of the tradeoff between inflation and aggregate output. This study endeavors to advance previous studies in three ways. First, the literature does not satisfactorily examine key fiscal and monetary policy practices that arguably affect policymaking credibility. These include the stock (and flow) of government debt, the issuance of inflation-indexed bonds, and the existence of explicit inflation targets. Second, previous studies unfortunately exclude non-OECD countries. Third, the literature is divided with respect to research design, and therefore this study produces sensitivity analyses of previous results. Given these addenda, the results generally suggest that credibility proxies are largely sensitive to research design. However, some data do support the hypothesis that governments with an incentive, rather than perhaps a publicized objective, to lower inflation achieve lower sacrifice ratios.

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1. Introduction

A growing literature addresses the empirical determinants of the tradeoff central banks face between inflation and output. Simply, monetary authorities that seek to lower inflation must reduce output to do so, which in turn places considerable pressure on central bankers and other government officials alike. What factors ameliorate this dilemma? This paper pursues three addenda to current research.

First and most important, this issue considerably concerns central bank credibility. Following rational expectations and the expectations augmented Phillips curve very crudely, if central banks could make a credible commitment to reduce inflation (and inflation is not inertial), expectations would accordingly adjust to leave output unchanged. The issue is that monetary authorities are tempted to renege in favor of a temporary boost in output. Therefore expectations incorporate such "time inconsistency," and expectations do not adjust. Unfortunately, the literature tests very few indicators under this rubric. Some studies do examine the effect of central bank independence on sacrifice ratios, but the literature surprisingly ignores a number of other variables that potentially signal a credible commitment to lower inflation. These factors have recently received increased attention from academics and practitioners.

For example, given that central bank policy influences the outstanding stock of government debt, perhaps fiscal policy indictors pertain to the time inconsistency problem. For example, the temptation to erase government debt via inflation presumably decreases with the amount of outstanding obligations, which appears to be decreasing among higher-income countries (Reinhart and Sack, 2000). A caveat to this view regards the innovation of sovereign inflation-indexed debt. Such temptations for monetization are perhaps less pronounced if government debt is credibly tied to realized price increases. Moreover, one might expect interactions between these monetary and fiscal policy variables – the more independent monetary from fiscal policymaker, the less likely the outstanding debt stock would be to influence the sacrifice ratio. Finally, and more directly germane to monetary policy, very few studies (Corbo et al. 2000, Bernanke et al., 1999) briefly examine whether central banks with inflation targets have lower sacrifice ratios.

Second, previous studies only address higher-income OECD countries. In addition, Ball (1993) does not consider cases in which the initial inflation rate exceeds 20 percent. But, especially to students of emerging markets, these very instances are also critical, especially with respect to credibility issues and the practical objective to design effective monetary and fiscal policymaking authorities. Beyond the general imperative to increase the sample size and address emerging economies, the focus on OECD cases contrasts with earlier studies in the rational expectations tradition. For example, Lucas (1973) and Sargent (1982) explicitly examine hyperinflations (such as episodes in Argentina and Paraguay). These studies assume that economists can learn about aggregate supply behavior under "typical" (OECD) conditions by studying extreme situations (Friedman, 1994, p. 185). Somewhat curiously, the approach in the sacrifice ratio literature takes the opposite tack and only examines lower inflation conditions, which makes conjecture regarding crisis cases difficult and perhaps even unnecessarily limits our understanding of the tradeoff in higher-income contexts. Therefore, this study examines lower-income countries in addition to the higher-income country sample in previous studies and examines complete and sub-samples given that that the process of disinflation may differ across initial income levels.

Third, empirical studies produce no consensus on research design. Such methodological choices include alternative econometric estimation techniques, the use of annual versus quarterly data, univariate as opposed to more complete multivariate conditioning sets, and the recent controversy regarding whether inflation follows a unit root or represents a (cyclical) time series with a break (Baltensperger and Kugler, 2000). The following analyses are largely agnostic regarding these issues and instead comprehensively consider previous examples in the literature, thereby producing robustness checks to published results.

The next section examines alternative measures of the sacrifice ratio and their shortcomings. Section 3 briefly outlines existing hypotheses regarding empirical determinants in the literature, and Section 4 outlines omitted measures that more fully address credibility. Section 5 describes the data and research design, and Section 6 reports the results. Section 7 concludes.

2. Measures of the sacrifice ratio

A vast literature examines the tradeoff (or positive correlation) between the level of economic activity relative to trend and inflation, perhaps most notably including the (expectations-augmented) Phillips curve. Very crudely, central banks that endeavor to lower inflation rates do so at a cost. Economists can quantify this relation given time-series data on output and the relevant price index – such an estimate of the Phillips curve captures the tradeoff over a given period. But as Ball (1993) argues, one disadvantage with this approach is that the estimated slope does not vary over time, which necessitates a pure cross-sectional design with limited degrees of freedom. A related problem is that the tradeoff between output and inflation is therefore assumed to be the same for different disinflation episodes within the time series, as Fischer suggests (1997, p. 7).

Alternatively, economists also consider a time-varying measure that calculates the tradeoff for each "disinflation episode." Generally speaking, the sacrifice ratio for some specific episode is the amount of aggregate real output (or employment) foregone per unit of lower inflation, as in

$$SR = \frac{\Delta Y}{\Delta p} \tag{1}$$

where SR is the sacrifice ratio, Y is real aggregate output, and p is the inflation rate.

2.1. Ball (1993)

Ball (1993) is perhaps the most widely cited empirical study of sacrifice ratios. With respect to (1), he defines the denominator as follows. A disinflation episode (based on quarterly data) starts at an inflation "peak" and ends at a "trough" – with an annual inflation rate at least two points lower than the peak and not greater than 20 percent, which purports to eliminate "shock-induced" periods. A peak is a quarter in which trend inflation is higher than in the previous four quarters and the following four quarters, and a trough is defined similarly vis-à-vis four quarters on either side of the current time period. Therefore, the denominator of the sacrifice ratio is the change in trend inflation over an episode – the difference between inflation at the peak and at the trough. (Ball defines trend inflation as a centered, nine-quarter moving average of actual inflation – the average from quarter $t - 4$ through quarter $t + 4$.)

The numerator of (1) is the sum of output losses over the disinflation episode – the deviations between actual output and its trend level "full employment." More specifically, Ball defines the trend level as the prevailing output at the peak, the beginning of the disinflation episode.[1] The trend returns to its "natural level" one year after the inflation trough (or the end of the episode. Ball (1993, p. 6) reasons that output returns to its trend level at the trough because inflation is again stable by definition. But in practice, "the effects of disinflation are persistent – output appears to return to trend with a lag of about a year" (as above-average growth tends to immediately follow the trough). Trend output is the fitted line that connects the two points, and the numerator is the sum of deviations between the fitted line and log output, and this measure assumes that monetary policy accounts for all cyclical output variation. More generally, the numerator is

$$\sum_{i=1}^{l}\left(Y_i - \dot{Y}_{Ball}\right) \tag{2}$$

where l is the length of the episode, Y_i is the actual output observed at time t, and $\dot{Y}_{Ball}$ is potential output, with a growth rate equal to the trend fit between the peak and four quarters after the trough.

Because quarterly data on output are limited, Ball (1993, p. 8) and others also define an alternative sacrifice ratio using annual data. Under this measure, trend inflation for a year is an eight-quarter moving average centered at the year (the average of the year and two quarters before and after the year). Year t is an inflation peak (trough) if trend inflation is greater (less) than trend inflation at t - *1* or t + *1*. Ball defines (annual) trend output by connecting output at the inflation peak to output one year after the trough. Also, disinflation occurs if trend inflation falls at least 1.5 percentage points.

2.2. Does Inflation Follow a Unit Root? Baltensperger and Kugler (2000)

In the specific context of central bank independence, discussed in more detail in Section 4, Baltensperger and Kugler (2000) critique previous measurement of the sacrifice ratio with respect to the time series properties of inflation. They argue that previous studies assume that disinflation episodes result from central bank efforts to lower inflation and that such reductions are permanent. In more technical terms, Ball (1993), Jordan (1997), and others assume that inflation is a non-stationary variable, and therefore has a time-varying mean and variance with

[1] Ball (1993, p. 6) argues that "(t)his assumption is reasonable because the change in inflation is zero at a peak. The natural level of output is often defined as the level consistent with stable inflation."

permanent shocks (p. 116). Baltensperger and Kugler question whether inflation indeed follows a unit root and argue that many of the episodes in previous studies "were purely transitory and had no permanent effect on the level of the inflation rate (p. 116)."[2] Instead, they argue that samples in previous studies include only a few disinflation periods that mark a (statistically) discernable transition to a monetary policy committed to price stability (and low inflation). This rationale implies a fundamentally different underlying process – a (cyclical) time series with a break, not a unit root (Perron, 1989, 1997). Given this development in current research, this paper tests this possibility along with previous methods in the literature.

Baltensperger and Kugler (2000) test the unit root hypothesis directly by taking into account an unknown break in the mean. This procedure entails the Augmented Dickey-Fuller (ADF) test with a break in the constant term sequentially for all possible break points b per case, as in

$$y_t = m + qD_t + dDb_t + ay_{t-1} + \sum_{i=1}^{k} c_i \Delta y_{t-i} + e_t \tag{3}$$

$$t = k + 1,\ldots,T; \qquad D_t = 0(t = k+1,\ldots,b);\ D_t = 1(t = b+1,\ldots,T);$$

$$Db_t = 0(t = k+1,\ldots,b,b+2,\ldots,T); \qquad Db_t = 1(t = b+1)$$ [3]

where y is the inflation rate.[4]

Given the estimate of b for each country, they consider whether the distinction between permanent and transitory disinflations affects the econometric relation between central bank independence (CBI) and the sacrifice ratio. The general (panel) regression follows

$$\mathrm{SR}_{it} = \alpha + \beta\mathbf{X} + \gamma \mathrm{D}_{it} + \delta \mathrm{D}_{it}\times\mathbf{X}_{it} + \mathrm{e}_{it}. \tag{4}$$

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[2] They argue that "(a) decisive and determined effort to permanently break and inflationary trend…relies crucially on the demonstration of…credibility…in contrast to halfhearted attempts to disinflate resulting in just a temporary dip in inflation (p. 115)."

[3] Perron (1997) considers two methods to select the break point, b. First, b is chosen by minimizing the t statistic for testing the unit root hypothesis $a = 1$. Second, b is chosen by maximizing the absolute value of the t statistic for the hypothesis $q = 0$. The results in this paper follow the second option.

[4] With respect to the fifth term in (3), Baltensperger and Kugler have to determine k, the lag length (or the number of difference terms in the ADF regressions). Instead of fixing k a priori, they use a recursive approach beginning with a maximum lag 8 and selecting all lags significant at the 10 percent level. This study follows this convention.

where *D* indicates whether the episode represents the permanent break in the inflation rate, and **X** is the set of explanatory variables, most notably including central bank independence in their study. Under the unit root assumption, Ball (1993) and others only estimate γ and β.[5]

2.3. Remaining Caveats and Shortcomings

This study does not address potentially problematic issues with respect to the precise measurement of the tradeoff between output and employment. Space does not permit a sufficient treatment, but some shortcomings are noteworthy. For example, the sacrifice ratio, as calculated in Ball (1993), explicitly assumes a statistically significant Phillips curve, which might not be sustainable empirically. For example, perhaps particularly given the experience in the 1970s, periods of stagflation would yield negative benefice ratios. Also, regarding the adjustment for possible breaks in the sample and the unit root assumption, the procedure outlined in (3) and (4) notably only calculates a single episode per case. Finally, the sacrifice ratio does not capture the specific inflationary trajectory – the distance in the denominator could be equivalent across two cases, but those disinflations might have varying degrees of significance given alternative initial levels of inflation. But again, given the objective to more fully examine the role of central bank credibility and provide sensitivity analyses, these issues are largely beyond the scope of this study.

3. What Determines the Sacrifice Ratio? Previous Results

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[5] Notation of alternative measures of the sacrifice ratio in the literature is instructive. With respect to the numerator in (1), Jordan (1997, pp. 3-4) defines trend inflation according to Ball (1993), but he divides the entire sample period into a sequence of alternating disinflation and accelerating inflation episodes. Therefore, by design, one disinflation period cannot follow another. Also, consistent with Cecchetti's (1994) suggestions, he considers both the sacrifice and the benefice ratio – the output gain per unit increase in inflation. With respect to the denominator, in contrast to Ball, Jordon (1997, p. 5) assumes a constant growth rate equal to the sample average. Also, actual output is at the level of potential output at the start of an episode. After the end of the episode, the calculation of potential output for the next episode restarts, and therefore potential output and actual output are the same at the beginning of every episode. Potential output is discontinuous over the sample at the points between the episodes, whereas the growth rate remains constant. This calculation "tells us how well the economy was doing compared to a situation where it was growing with the sample mean (p. 5)." Therefore, the numerator is similar to (2), but trend expansion is the mean growth rate for the sample period. But given that Jordan's design more forcefully assumes that all changes in the inflation rate are permanent, this study follows Ball (1993) and Baltensperger and Kugler (2000). Also, Schelde-Andersen estimates sacrifice ratios over a fixed period (1979-1988) for every country in the sample, and he examines both employment and output losses. However, this procedure does not produce time-varying estimates and therefore considerably limits the degrees of freedom.

Measures of policy credibility are not the only purported determinants of the tradeoff between inflation and output. Therefore, some regressions in this study control for other possibly critical variables, and a very brief review of these factors is necessary.

3.1. Speed (and Size) of Disinflation: "Gradualism" versus "Cold Turkey"

One view is that gradualism is less costly because wages and prices possess inertia and thus need time to adjust to monetary tightening. Taylor (1983) presents a model of staggered wage adjustment in which quick disinflation reduces output, but slow disinflation does not. Another view argues that disinflation is less costly if it is quick. Sargent (1983) argues that a sharp regime change enhances credibility, and hence a shift in expectations makes disinflation (relatively) costless. Gradualism, by contrast, induces speculation about policy commitment, and therefore expectations do not adjust. Speed, *S*, is simply

$$S = \frac{\Delta p}{l}, \tag{5}$$

and size of course is simply the numerator, *Dp*. While the regressions in this paper include this variable, previous results could suffer from reverse causation, as central banks may choose to lower inflation over shorter periods when the disinflation costs are lower (Friedman, 1994).

3.2. Initial Inflation

Some argue that at higher inflation rates, the central bank more frequently makes price adjustments (as inflation has higher variance), which can lower sacrifice ratios during disinflation. According to this view, less frequent adjustments induce a higher output loss per percentage point of disinflation. Given the close correlation between central bank independence and inflation rates, therefore, the effects of both variables on the sacrifice ratio should be carefully disentangled, and the multivariate regressions include initial inflation.

3.3. Trade Openness

Romer (1991) argues that in a more open economy, the exchange rate appreciation resulting from a monetary contraction has a larger direct effect on the price level. Therefore, inflation falls more for a given monetary tightening, all things being equal, and the sacrifice ratio decreases. Ball (1993, p. 19) finds no support for this hypothesis, but the multivariate regressions in the paper include the ratio of exports plus imports, divided by GDP.

3.4. Nominal Wage Rigidity (Incomes policies)

Grubb et al. (1983) argue that a higher degree of nominal wage rigidity leads to slower wage adjustment, and therefore the costs of disinflation rise. On the other hand, "New Keynesians" argue that if price rigidity determines disinflation costs, then wage-setting institutions are unimportant. Either way, while a number of other measures exist, the multivariate regressions include Bruno and Sacks' (1985) composite index of nominal wage rigidity and are therefore consistent with Ball's (1993) specification.

4. Credibility and Sacrifice Ratios

The issue of credibility directly addresses the rational expectations hypothesis and the expectations augmented Phillips curve. That is, correctly anticipated monetary policy affects wage and price setting directly via expectations, with no effect on real activity. Therefore, according to this optimistic view, if economic agents view the central bank as "credible," then disinflation is potentially less costly (if not costless). If these variables were insignificant, then the rational expectations view – and the prospects for costless disinflation through the configuration of "transparent" yet autonomous monetary (and fiscal) policymaking institutions – would seem dubious. Insignificant or perverse results would highlight sluggish nominal adjustment, or suggest that current proxies for "best practices" for central banks and fiscal authorities are unsatisfactory.

Before consideration of fiscal and monetary policy variables that are absent from the literature – including the size of government debt, inflation-indexed debt issuance, and inflation targets – the discussion next summarizes existing empirical studies on central bank independence.

4.1. Central Bank Independence

Under this general rubric, several economists and policymakers advance the virtues of "independent" central banks. Briefly, a central bank that is insulated from political pressures conceivably binds governments that in the short run are tempted to inflate (and produce short run booms, perhaps in anticipation of elections). Also, autonomous monetary authorities make policy more predictable and therefore reduce economic instability and reduce risk premia in real interest rates (Fischer, 1997, p. 5). With more specific respect to varying disinflation costs, independent central banks should face steeper Phillips curves and experience less costly disinflations.

Contrary to this intuition, some studies find a positive correlation between central bank independence, measured with various proxies, and the sacrifice ratio (Fisher, 1997; Gärtner, 1996). The finding – "a caveat to today's euphoria for central bank independence (Gärtner, 1996)" – is surprising because economists widely suggest that central bank independence, again, enhances credibility, which in turn supposedly improves the tradeoff between inflation and output (and lowers the costs of disinflation). However, some note that the initial inflation rate also correlates positively with sacrifice ratios according to some cases, which might suggest that autonomy affects the output-inflation tradeoff through its effect on inflation.[6] But then again, Fischer (1997, p. 12) finds that independence is robust in specifications that include initial inflation, average inflation, and inflation variance on the right-hand-side. As suggested in Section 2, a remaining caveat is that sacrifice ratio calculations in such studies do not measure the specific path of inflation – the distance in the denominator could be equivalent, say from 15 percent to 10 or from seven percent to two percent, but those paths might have varying degrees of economic significance and interpretations (in addition to their stationary properties).[7]

But, the critique of Baltensperger and Kugler (2000) usefully addresses previous (counterintuitive) results. In short, using the distinction between a unit root and a time series with a break, they find that central bank independence correlates negatively with sacrifice ratios, as δ is negative, and γ is positive following (4). This supports the intuitive view regarding credibility, and some updated data in this study confirm this pattern, at least for higher-income

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[6] The German case is instructive. As Baltensperger and Kugler (2000, p. 114) note, German recessions are similar in severity across cases, but Germany monetary policy produces lower inflation peaks and therefore requires comparatively smaller disinflations. Therefore, output losses per percentage point of reduced inflation are greater. Gärtner (1996, p. 528) also discusses "endogenous expectations formation" and suggests that the greater inflation variance (associated with central bank dependence), the more economic agents replace usual adaptive expectations by structural, rational equations ("individuals are being kept more on their toes"). "By proving less inflation variability…an independent central bank may…lure individuals into settling for very simple, low-cost adaptive expectations formations. As a consequence, they are ill-prepared for…even in a credibly engineered disinflation (p. 533)."

[7] Also, this relation does not address the possibility that independent central banks have to disinflate less frequently, thereby mitigating the output costs over time.

countries using alternative measures of central bank independence (Cukierman et al., 1993; Mahadeva and Sterne, 2000).[8]

4.2. Omitted Variables: Monetary and Fiscal Policy

While this literature on central bank independence certainly addresses the critical issue of credibility in the context of sacrifice ratios, additional analyses of different variables seems instructive. After all, proxies for central bank autonomy – based on surveys and/or assessments of legal issues – are inherently somewhat subjective, if perhaps not endogenously selected. But more importantly, more concrete indicators of both fiscal and monetary policy might quite conceivably enhance credibility and might therefore affect the tradeoff between inflation and output.

4.2.1. Central Government Deficits

Governments with substantial debt are more likely tempted to inflate or monetize their outstanding obligations. This notion might be more germane to emerging markets, but all things being equal, governments with lower debt are perhaps less likely to reverse disinflationary policy. Therefore, the hypothesis is that the data exhibit a positive correlation between the stock (and less plausibly the flow) of debt and sacrifice ratios, as economic agents under comparatively frugal fiscal authorities more likely view disinflation campaigns credibly. In addition to the cross-sectional variance in government debt, time series trends perhaps also recommend examination of this issue. As Reinhart and Sack (2000) document, at least with respect to higher-income countries, total (marketable) debt outstanding has decreased in recent years. This trend might affect real interest rates as they suggest, but this study of course examines possible effects on the sacrifice ratio.

A caveat is instructive. This hypothesis implies that the formulation of fiscal and monetary policy are closely linked. However, autonomous central banks are often formally separate from fiscal authorities. Therefore, this effect is perhaps more pronounced for dependent central banks that bear more direct responsibility for debt obligations. This implies an interactive effect between debt and central bank independence, as in

[8] However, alternative measures, such as Alesina and Summers (1993) and Grilli et al. (1991) do not corroborate these findings but rather simply indicate the positive correlation (a statistically significant γ). Results are available on request.

$$SR_{it} = \beta_0 + \beta_1\mathbf{X} + \beta_2 CBI_{it} \times DEBT_{it} + e_{it} \quad (6)$$

where *CBI* is central bank independence (such that greater index values imply less autonomy), *DEBT* is a measure of government debt, and *X* is the set of control variables.

4.2.2. Inflation-Indexed Sovereign Debt

Of course, if sovereign debt is (credibly) indexed to inflation, then the rationale regarding nominal debt and the incentive for monetization becomes more complicated. If government debt is indexed to inflation, whatever the size, government authorities will have less fiscal disincentive to fight inflation. In addition, whatever the proportion of indexed to total government debt, indexation perhaps represents a broader commitment to lower inflation levels. Moreover, in addition to any inflation risk premium, central governments further save if inflation is lower than expectations. Therefore, all things being equal, governments with debt tied to realized inflation should enjoy enhanced credibility, which possibly lowers sacrifice ratios. The measure used in the following regressions is simply a dummy variable for the existence of inflation-indexed debt outstanding, which should exhibit a negative coefficient. (Perhaps a more accurate measure would be the ratio of indexed to total government marketable debt, but data are quite limited.)

The empirical analyses examine three general variables under this rubric. In addition to the simple dummy variable for the issuance of inflation-indexed debt, the regressions consider the duration of the indexation program. That is, this alternative variable is simply the number of years or quarters that the fiscal authority has issued such debt – perhaps the longer the government has had indexed debt outstanding, the more credible its commitment to lower inflation.

Also, the analyses consider an interaction term between the stock of debt and another dummy variable indicating whether all marketable government securities are nominal, as in

$$SR_{it} = \beta_0 + \beta_1\mathbf{X} + \beta_2 NOMINAL_{it} \times DEBT_{it} + e_{it}. \quad (7)$$

Therefore, countries that issue some debt tied to inflation take a value of zero for the interaction term. This formulation captures the notion that government debt affects the sacrifice ratio only if all debt is nominal, thereby indicating some incentive for monetization.[9]

4.2.3. Inflation Targeting

Recent studies advance the virtues of inflation targeting monetary regimes (Miskin, 1999). The key advantages according to proponents include increased transparency, accountability, and credibility. In short, countries with explicit (and credible) inflation targets should have less incentive to renege on disinflation measures, and therefore sacrifice ratios should be lower (and Phillips curves should be steeper), ceteris paribus. This issue has increasing relevance, as a survey by the Bank of England found that 54 of 91 central banks in high- and low-income countries had an explicit inflation target in 1998, compared with only eight in 1990 (Sterne, 1999, 2001).[10]

There is considerable theoretical debate about whether inflation targets produce lower sacrifice ratios but little cross-country evidence. For example, using a sample of 9 OECD countries and 25 disinflation episodes, Bernanke et al. (1999) find no relation between the adoption of an inflation target and lower sacrifice ratios. In contrast, given a larger but nonetheless still limited sample of nine inflation targeters, five potential inflation targeters, and 11 non-inflation targeters, Corbo et al. (2001) find that the average sacrifice ratio is greater for the 11 countries without targets during the 1990s. Notably, these difference-in-mean tests over a spatially and temporally select sample do not control for other possible determinants of the sacrifice ratio. Also, Corbo et al. (2001) find that among seven inflation targeters (excluding Canada and Finland as outliers), the sacrifice ratio was actually lower before the adoption of the target, which contradicts the view that targets lower output costs. (The averages are nonetheless less than the averages for non-inflation targeters during the 1990s.) Additional multivariate analysis covering additional cases would therefore be instructive.

[9] Another variable under the general rubric of fiscal policy, the maturity structure of government debt might be instructive. For example, Missale and Blanchard (1994) argue that the duration of government debt effects inflation fighting credibility, given evidence from Belgium, Ireland, and Italy. They suggest that "the *maximum* maturity consistent with a credible no-inflation pledge will decreased with the level of debt (original emphasis, p. 309)." Unfortunately, the series that they construct are not available for the number of countries under consideration in this study.

[10] Gärtner's (1996, p. 520) finding that "(t)he ability of CB (central bank) independence to explain disinflation costs during…fixed exchange rates is more limited" suggests the general relevance of monetary regimes.

In terms of econometric estimation below, the analyses consider two variables. First, a simple dummy variable captures whether the central bank has an explicit inflation target, and the hypothesized sign of γ and δ, where applicable, is negative. Second, similar to the discussion of the duration of inflation-indexed bond issuance, the length of the targeting regime – the years or quarters since adoption of the target – might also be instructive. Again, central banks presumably gain credibility the longer they target inflation directly – the greater the time since the initial installation of the regime, the lower the sacrifice ratio.[11] (Cases without targets of course have a zero value.) In addition, given the differences in inflation-targeting regimes (Mishkin and Schmidt-Hebbel, 2001) the analyses consider alternative proxies and classification schemes for both variables.

5. Data and Research Design

Following previous studies, log differences in the consumer price index (CPI) capture inflation, and log differences in real GDP measure output. Data are from the IMF's International Financial Statistics (IFS).[12] Given inflation and output data for various countries from 1957 through the first quarter of 2001, the sacrifice ratios under consideration occurred between 1960 and 1998.

This study considers alternative designs across five general dimensions. First, as argued earlier, expanded and divided samples are critical, as no study empirically addresses sacrifice ratios in emerging market as well as developed countries. Therefore, the analyses consider divisions of the sample, including higher-income countries, the Ball (1993) sample, low-income countries, and the complete sample. The 19 higher-income countries using annual data include Australia, Austria, Belgium, Canada, Denmark, Finland, Germany, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Spain, Sweden, Switzerland, the United Kingdom, and the United States. The lower-income sample comprises up to 59 lower-income cases. These include Argentina, the Bahamas, Bahrain, Barbados, Bolivia, Burundi, Cameroon, Chile, Colombia, the Democratic Republic of Congo, Cyprus, the Dominican Republic, Ecuador, Egypt, El Salvador, Fiji, Ghana, Greece, Guatemala, Haiti, Honduras, India, Indonesia, Israel, Jamaica, Kenya, Korea, Madagascar, Malaysia, Malta, Mauritius, Mexico, Morocco, Nepal,

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[11] The author thanks William B. English for helpful discussions regarding the possible importance of the duration as opposed to the mere existence of inflation-targeting regimes.

[12] Results using the World Bank's World Development Indicators are available on request.

Niger, Nigeria, Norway, Pakistan, Paraguay, Peru, the Philippines, Portugal, Samoa, Saudi Arabia, Senegal, Seychelles, Sierra Leone, Singapore, South Africa, Sri Lanka, St. Lucia, Suriname, Swaziland, Tanzania, Thailand, Trinidad and Tobago, Turkey, Uruguay, and Venezuela.[13]

Second, while quarterly data are arguably more valid, in order to increase the degrees of freedom, the analyses also include annual data.[14] Third, the regressions follow both univariate specifications that singularly include the fiscal or monetary policy variable on the right hand side and multivariate models that include common control variables (which some studies ignore altogether). Fourth, the regressions follow the alternative time-series assumptions regarding trend inflation – a unit root (Ball, 1993) or a time-series with a break (Baltensperger and Kugler, 2000). Finally, there is no consensus on estimation techniques in the literature. Therefore, the analyses report both standard Ordinary Least Squares (OLS) regressions, following Ball (1993) and Feasible Generalize Least Squares (FGLS) models that treat the data as a single panel design, following Baltensperger and Kugler (2000).

6. Econometric Results

This section describes the regression results, considering all sensitivity analyses. While, again, the tables present findings under each alternative sample, frequency, specification, time series assumption, and estimation technique, multivariate models using quarterly data are perhaps the preferred test. Unfortunately, degrees of freedom are somewhat limited in certain cases, and therefore the remaining results are nonetheless informative. In addition, this study is somewhat agnostic on research design issues. For example, Baltnesperger and Kulger (2000) are perhaps correct to suggest that only permanent disinflations are economically meaningful. However, given that most post-war recessions coincide with monetary tightening and

[13] The 15 higher-income countries for which quarterly data are available for at least one regression include Australia, Austria, Belgium, Canada, Finland, France, Germany, Italy, Japan, New Zealand, Netherlands, Norway, Spain, Switzerland, the United Kingdom, and the United States. The 15 lower-income countries include Argentina, Chile, Greece, Israel, Korea, Malaysia, Mexico, Morocco, Peru, Philippines, Portugal, Singapore, South Africa, Thailand, and Turkey.

[14] As Gärtner (1996, p. 520) suggests, use of annual data is inferior to higher frequency observations, as disinflation episodes rarely begin and end with a calendar year. He finds that sacrifice ratios from annual data only explain about 53 percent of the variance in sacrifice ratios computed from quarterly data.

disinflation, it would seem that the costs of those output contractions, whatever the time series properties of inflation, are still noteworthy.[15]

To very generally review, the specifications follow

$$SR_{it} = \beta_0 + \beta_1\mathbf{X} + \gamma CRED_{it} + e_{it} \tag{8}$$

where *CRED* is any of the credibility measures, such as (7), outlined in previous sections. Again, **X** is either empty or includes the controls discussed in Section 3, and an additional interaction term would capture the interaction of *CRED* with the dummy variable for the break point in the series, similar to the fourth term in (4) (δ).

6.1. Fiscal Policy Variables

The regressions first consider fiscal policy variables, namely the stock and flow of central government debt, as well as inflation-indexed bond issuance. The analyses next consider monetary policy strategy, specifically variables based on whether the central bank has an explicit inflation target.

6.1.1. The Stock and Flow of Government Debt (as a Percentage of GDP)

As Table 1A indicates, limited quarterly data support the notion that countries with smaller outstanding debt have lower sacrifice ratios. At least among the sample of higher-income countries, FGLS multivariate regressions (Models 6 and 8) suggest that lower stocks of government debt correlate positively with lower sacrifice ratios. Interestingly, the inclusion of the interaction term that captures the break in the time series of trend inflation is not significant. However, expanded samples using quarterly data do not corroborate this result. No regression using the exclusive sample of lower-income countries or the total sample produces a statistically significant estimate across any specification assumption (Models 9 through 24).

The annual data, which again permit increased degrees of freedom, are somewhat consistent with these findings, at least with respect to higher-income countries. For example, as Table 1B indicates, three of the four multivariate equations (Models 4, 6, and 8) that cover higher-income countries produce statistically significant estimates, at least with 10 percent

[15] Perhaps Ball (1993) and others examine sacrifice ratios that entail lowering inflation to trend, whereas Baltnesperger and Kulger (2000) examine sacrifice ratios in which central bank attempt to lower trend inflation.

confidence, with the expected positive sign. (Also, while the coefficient on the break point interaction term is curiously negative in Models 11 and 15, Models 12, 14, 15, and 16 also suggest a positive relation using Ball's [1993] data set.) However, some annual data on lower-income countries produce perverse results. For example, univariate FGLS regressions that cover the lower-income and complete samples – under both the assumption of a unit root and a time-series with a break – produce statistically significant and curiously negative coefficients for the stock of government debt (Models 21, 23, 29, and 31). Consistent with the hypothesis, the coefficient on the time series break interaction term is positive and significant with 10 percent confidence for the FGLS univariate equation covering the lower-income sample. But, the same coefficient is curiously negative using the multivariate specification in the lower-income and complete sample FGLS regressions (Models 24 and 32).

Therefore, some quarterly and annual data lend support to the hypothesis that lower debt stocks improve the sacrifice ratio. But these findings are limited to the developed country sample and sensitive to data and/or model design. Inclusion of lower-income countries largely produces statistically insignificant if not perverse results.

The results using flow data, which less effectively test the hypothesis but increase the degrees of freedom, tell a similar but more compelling story. For example, according to Tables 2A and 2B, some results suggest that higher-income countries with larger budget deficits have greater sacrifice ratios. The OLS and FGLS regressions using quarterly data, with the exception of the multivariate FGLS model that assumes a unit root process, produce positive and statistically significant coefficients (Table 2A, Models, 1, 2, 3, 4, 5, 7, and 8). The annual data also produce robust results for the higher-income sample. Each FGLS regression (Table 2B, Models 5 through 8) produces significant results for γ. In addition, both the OLS (Model 4) and FGLS (Model 8) multivariate equations that include the time series break interaction produce a safely significant estimate of δ.

(The [annual] Ball data produce fewer statistically significant results. The univariate FGLS model produces a marginally significant estimate for δ, but the corresponding multivariate equation produces a significantly negative estimate.)

Some limited results that cover lower-income countries are consistent with the hypothesis. With respect to quarterly data, while the exclusive lower-income sample does not produce significant results, each FGLS regression (Table 2A, Models 21 through 24) suggests that larger flows of government debt deteriorate the sacrifice ratio. The OLS support this view less substantially, as only the univariate model that assumes a unit root process (Model 17) produces a statistically significant estimate with 10 percent confidence. With respect to annual data, only the univariate FGLS unit root model (Table 2B, Model 21) suggests a positive relation using the lower-income sample, but the univariate FGLS with a time series break (Model 23) indicates a perverse result, as δ is significantly negative. Among the eight annual regressions that cover the complete sample, only the univarite FGLS equations (Models 29 and 31) indicate that increased debt leads to greater sacrifice ratios.

Again, use of flow data is sub-optimal, but inclusion of these data does increase the degrees of freedom. The distinction between flow and stock is perhaps far from trivial, as increased deficits might more acutely reflect business cycle dynamics, as government spending might increase during downturns.[16]

6.1.2. Inflation-Indexed Bond Issuance

As previous sections suggest, the incentive for monetization should decrease if sovereign debt is tied to inflation. Therefore, perhaps countries that issue inflation-indexed debt experience less costly disinflations. Some data support this view, but similar to the results on government debt, the results are sensitive to frequency, specification, and sample selection. For example, while the quarterly data using Campbell and Shiller's (updated) (1996) classification indicate no significant relation (Table 3A, Models 1 through 4),[17] some limited annual data suggest that, exclusively considering higher-income countries, issuance of indexed debt correlates negatively with sacrifice ratios, as the univariate FGLS equations (Table 3B, Models 5 and 7) are statistically significant with the expected negative sign.

A few results also support the hypothesis using wider samples, but quarterly rather than annual data produce more significant results. For example, considering the complete quarterly sample, all FGLS regressions (Models 17 through 20) suggest that countries with inflation-indexed debt have less costly disinflations. But, as Table 3B indicates (Models 13 through 28), none of the regressions based on annual data corroborate these results.

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[16] The author again thanks William B. English for helpful discussions regarding this issue.

[17] Considering the Ball (1993) data, the multivariate FGLS equations support the hypothesis that countries with inflation-indexed debt have lower sacrifice ratios (Table 3A, Models 10 and 12).

The use of the "cumulative" measure of inflation-indexed bond issuance provides some evidence that supports the hypothesis, but the results are highly sensitive to data and/or model specification. For example, the quarterly and annual data that cover higher-income countries (Tables 3C and 3D, Models 1 through 4 and 1 through 8) largely indicate no significant relation, although the quarterly FGLS multivariate model (Table 3C, Model 4) perversely suggests that the duration of issuance correlates positively with the sacrifice ratio. Some data given wider samples support the hypothesis. While none of the quarterly data for exclusively lower-income samples indicate a significant relation (Table 3C, Models 5 through 12), all FGLS regressions that cover the entire quarterly sample, except the univariate model that assumes a break in the sample, produces a statistically significant and negative γ. Some annual data also support the hypothesis, for example, among the regressions that exclusively include lower-income countries, all model that assume a break in the time series produce a significantly negative estimate (Table 3D, Models, 15, 16, 19, 20), albeit with 10 percent confidence. Also, all four OLS regressions that include the complete sample (Models 21 through 24) support the hypothesis that the longer inflation-indexed bonds are outstanding, the lower the sacrifice ratio.

An alternative (and more comprehensive) proxy for inflation-indexed bond issuance (Deacon and Derry, 1998) casts some doubt on these results, however infrequently significant. For example, considering the developed country sample, the quarterly multivariate FGLS unit root model (Table 4A, Model 4) suggests, contrary to the hypothesis, that countries with inflation-indexed debt have higher sacrifice ratios, and none of the remaining annual or quarterly regressions for the developed sample (Table 4B, Models 1 through 8) produce a significant estimate.[18]

Turning to samples that include lower-income countries, very limited quarterly data suggest that issuance of inflation-indexed debt correlates positively with more favorable sacrifice ratios. For example, considering the exclusive lower-income sample, the univariate multivariate FGLS regressions (Table 4A, Models 9 and 11) produce statistically significant estimates of γ, at least with 10 percent confidence. But multivariate models, as well as every OLS regression, indicates no relation. All FGLS regressions that cover the complete sample suggest a statistically significant and negative γ, as expected, but the OLS models produce insignificant estimates, however negative. In addition, according to Table 4B, no regression using annual data (Models 17 through 32) produces a statistically significant estimate.

The cumulative measure similarly produces few significant results. Again, considering the higher-income sample, only the quarterly FGLS multivariate regression (Table 4C, Model 4) produces a significant, but notably positive, result. Also, few samples that include lower-income countries support the hypothesis. Among the quarterly regressions, and similar to the Campbell and Shiller (1996) data in Table 3C, each FGLS regressions that cover the entire sample, except the univariate model that include assumes a break, supports that hypothesis (Models 17, 18, and 20). The annual data also produce few robust results, as only the OLS regressions that exclusively cover lower-income countries and assume time series breaks (Table 4D, Models 19 and 20) produce negative and statistically significant estimates for γ.[19]

6.1.3. Interaction Terms: The Size of Government Debt, Indexation, and Central Bank Independence

This section examines conditional hypotheses regarding the size of government debt. First, as Section 4 argues, the size of government debt might not reflect authorities' incentive for monetization if such liabilities are tied to inflation. Therefore, the analyses modify the investigation by examining the interaction between the size of the government debt stock and issuance of inflation-indexed debt, as in (7). Again, the interaction is simply the product of the stock and a dummy variable for whether the government exclusively issues nominal obligations.

While not insensitive to data design, some regressions support the hypothesis. For example, all quarterly multivariate FGLS regressions that use the higher-income sample suggest that the stock of government debt (Table 5A, Models, 6 and 8), adjusted for inflation-indexed issuance, correlates positively with the sacrifice ratio.[20] Given the quarterly data, the relation is also somewhat robust using lower-income countries. Considering the exclusive sample of lower-income countries, three of the four FGLS regressions (Models 13, 15, and 16), except the multivariate model that assumes a unit root process, indicate a significantly positive γ. Given the complete sample, all univariate and multivariate FGLS models under both time-series

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[18] Some regressions that replicate (annual) Ball (1993) support the hypothesis. For example, the FGLS unit root regressions (Table 4B, Models, 13 and 14) indicate the hypothesized negative relation, in addition to the univariate FGLS regression with a break (Model 15).

[19] Similar results using updated classifications from Page and Trollope (1974) are available on request.

assumptions corroborate the hypothesis (Models 21 through 24), but notably, no OLS regression for quarterly data produces a significant result.

The annual data produce comparatively fewer significant results, at least with respect to lower-income countries. Considering the developed country sample, the FGLS regressions (Table 5B, Models 5 through 8) support the hypothesis, but the OLS models (Models 1 through 4) do not. Furthermore, none of the regressions that exclusively include lower-income countries indicate a positive estimate for γ, and in contrast to the hypothesis, δ is statistically significant and perversely negative for FGLS models that assume a break in the time series (Models 23 and 24). Finally, the complete sample of annual data lends little support to the hypothesis. In fact, the data produce some perverse results, as the estimate for δ is negative and significant in the univariate FGLS model that assumes a unit root process (Model 29). And, similar to the models using the exclusive lower-income sample, the FGLS models that assume a break in the time series produce significantly negative estimates for γ.

Second, the organization of fiscal vis-à-vis monetary policymaking might mitigate the correlation between the stock of government debt and the sacrifice ratio. That is, the stock of government debt might more adversely affect the sacrifice ratio, the more dependent or less autonomous the central bank, as in (6). But, only very limited data covering lower-income countries support this view. For example, considering the quarterly data and despite few degrees of freedom, the univariate FGLS regressions (Table 6A, Models, 9 and 11) produce the hypothesized statistically significant positive estimates of γ, albeit only with 10 percent confidence. Considering annual data on lower-income countries, the univariate FGLS equation that assumes a unit root process (Table 6B, Model 21) corroborates the (limited) findings using quarterly data. However, while the estimates of γ are positively significant as expected, δ for both FGLS regressions that assume a time series with a break (Models 23 and 24) are curiously negative.

The inclusion of higher-income countries further casts doubt on any significant relation. For example, the quarterly unit root FGLS regressions that cover exclusive sample of developed economies (Table 6A, Models 1 through 4) produce no statistically significant estimates of γ or δ. Also, three of the four FGLS regressions using annual data contradict the hypothesis (Table 6B, Models 5, 6, and 8). (However, the multivariate specifications using both OLS and FGLS

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[20] The estimate for γ is curiously negative and significant, however, for the univariate OLS regressions (Model 3)

produce significant estimates of δ, which supports the hypothesis.)[21] Consistent with these results across higher- and lower-income samples, the total sample produces inconsistent, if not largely insignificant, results (Table 6A, Models 13 through 20; Table 6B, Models 25 through 32). In short, similar to previous ambiguous findings regarding the (conditional) effect of central bank independence, these results indicate no clear pattern.

6.2. Inflation Targeting

The previous subsections examine aspects of policymaking credibility particularly germane to fiscal policy. Therefore, the remainder of the section examines current arguments regarding "best practices" for monetary policy, particularly the increasingly popular notion of inflation targeting.

6.2.1. Inflation Targeting Dummy Variables and the Duration of Targeting Regimes

The first inflation targeting dummy variable (Mahadeva and Sterne, 2000) produces little evidence that explicit targets lower sacrifice ratios. For example, considering the quarterly data, only the univariate FGLS regression that covers higher-income samples produces the hypothesized negative relation (Table 7A, Model 3).[22] The remaining estimates of γ for higher-income countries using annual data have the expected negative sign, but only the FGLS regressions are statistically significant. Among the quarterly and annual regressions that include lower-income countries, none produce significantly negative estimates for γ. In fact, the univariate FGLS model using quarterly data perversely suggests that inflation targeters have higher sacrifice ratios (Table 7A, Model 7). The complete sample produces some limited evidence in support of the hypothesis. The multivariate FGLS regressions produce a statistically significant and positive estimate for γ, but no other quarterly or annual estimate is robust. Therefore, in sum, little evidence using the Mahadeva and Sterne (2000) classification suggests that targeting lowers sacrifice ratios. While some models covering developed countries produce

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[21] Some annual data using Ball's (1993) calculations do support the hypothesis. For example , the univariate OLS and FGLS regressions indicate that δ is positive and significant. Also, the univariate unit root FGLS regression produces a significantly positive γ. However, the multivariate FGLS regressions that includes a break dummy variable suggests that γ is negative.

[22] The insufficient number of observations for the quarterly data does not permit consideration of the possibility of a stationary time-series with a break.

the expected result, the relation is highly sensitive to data design, especially considering lower-income countries.

The "cumulative" measure that captures the longevity of the inflation-targeting regime produces some significant results, but again, the estimates are highly sensitive to data design. For example, considering higher-income countries, most quarterly data (Table 7C) support the hypothesis, as both FGLS regressions and the univarite OLS regression (Models 1, 3, and 4) produce negative and statistically significant estimates of γ, as expected. However, while the parameter estimates are negative, the annual data do not produce any significant estimates for γ (Table 7D, Models 1 through 4). The evidence is less compelling for samples that include lower-income countries. For example, none of the remaining regressions that use annual data produce significant results (Models 5 through 20), and the quarterly univarite FGLS regression (Table 7C, Model 7) curiously suggests that the older the inflation-targeting regime, the higher the sacrifice ratio in exclusively lower-income countries. The quarterly multivariate FGLS regressions that covers the entire sample, however, (Model 12) does support the hypothesis.

A second classification scheme that covers the same number of countries (Mishkin and Schmidt-Hebbel, 2000) suggests a similarly weak relation. Given quarterly data, Table 8A suggests that higher-income inflation targeters have lower sacrifice ratios, at least according to the univariate and multivariate FGLS regressions (Models 3 and 4). But, the annual data (Table 8B) do not corroborate these findings. Similar to the results using the Mahadeva and Sterne (2000) scheme, some quarterly data perversely suggest that lower-income inflation targeters have higher sacrifice ratios, as the FGLS regressions produce significantly positive estimates for γ, but the OLS quarterly models and all annual regressions suggest no relation. Finally, while seven of the eight annual and quarterly regressions for the complete sample produce negative parameter estimates of γ, none are statistically significant.

The results on the cumulative specification using this second classification scheme are both not consistent across frequency and are highly sensitive to sample composition. For example, none of the results using annual data (Table 8D) produce significant results). With respect to quarterly data, all models the cover higher-income countries, except the multivariate OLS regression (Table 8A, Model 2), support the hypothesis. However, both FGLS regressions for lower-income countries indicate a perversely positive correlation between the longevity of inflation-targeting regimes and sacrifice ratios (Models 7 and 8). Considering the complete sample, the FGLS regressions (Models 11 and 12) support the hypothesis, but the OLS models do not.

The third and final classification, following Corbo et al. (2001), which covers a smaller range of countries, limitedly supports the hypothesis, particularly with respect to annual data. The quarterly data outlined in Table 9A produces some statistically significant estimates, at least with respect to higher-income countries, as both FGLS regressions are significant (Models 3 and 4). But, the data again contradict the hypothesis for higher-income countries, as the quarterly FGLS regressions produce significantly positive results (Models 7 and 8), and the total sample using quarterly data indicate not statistically significant relation.

However, every equation that uses annual data and includes lower-income countries (Table 9B, Models 5 through 12) supports the view that inflation targets correlate negatively with sacrifice ratios. Among the higher-income cases, the FGLS regressions (Models 3 and 4) also corroborate the finding, but the OLS models do not. Therefore, the annual data are generally robust, but again, the Corbo et al. (2001) measure clearly spans fewer cases compared to the Mahadeva and Sterne (2000) and Mishkin and Schmidt-Hebbel (2000) classifications.[23]

Furthermore, the data on inflation-targeting regime longevity produces conflicting results. Similar to the Mishkin and Schmidt-Hebbel (2000) data, some quarterly data covering higher-income countries support the hypothesis (Table 9C, Models 1, 3, and 4), but some lower-income samples clearly do not (Models 7 and 8). To further question the hypothesis, however negative each estimate of γ, none of the annual regressions (Table 9D) produce a statistically significant result.

6.2.2. Inflation Targeting: Alternative Measures

The use of a dichotomous dummy variable for inflation targeting is perhaps misleading. Therefore, the analyses also include Mahadeva and Sterne's (2000) ordinal measure of "inflation focus," which subjectively captures the relative importance of inflation in the reaction function of central banks. While the variable is cross-sectional and therefore captures no time-varying information, some regressions produce the expected negative correlation. For example, all

[23] The Mahadeva and Sterne (2000) classification includes more countries than the alternative schemes. With respect to annual data, the 14 cases with at least one disinflation episode under inflation-targeting regimes include Australia, Colombia, Greece, India, Indonesia, Israel, Italy, Malaysia, Mexico, New Zealand, Sierra Leone, Spain, Sweden,

univariate OLS and FGLS regressions using the higher-income sample produce significant results for quarterly data (Table 10A, Models 1, 3, 5, and 7). But, no multivariate specification or model that exclusively includes lower-income countries (Models 9 through 16) supports the hypothesis. The total sample supports the hypothesis, as every FGLS equation (Models 21 through 24) as well as the OLS unit root univariate equation (Model 17) produces a statistically significant estimate for γ.

However, the annual data in Table 10B are not consistent with these results, as the higher-income, lower-income, and total samples all produce insignificant estimates. (Three of the four FGLS regressions, Models 14 through 16, do support the hypothesis using Ball's [1993] data.)

A final simple measure of policy credibility is a dummy variable for whether or not the government has an explicit inflation target (Mahadeva and Sterne, 2000) or has inflation-indexed debt outstanding (Deacon and Derry, 1998). This variable, which purports to more comprehensively capture current "best practices" among central banks and fiscal authorities, produces a few findings that are consistent with the hypothesis. For example, considering the quarterly data, the univariate FGLS regressions for the higher-income sample produces a significantly positive γ (Model 3), but all lower-income regressions using quarterly data are insignificant. The complete sample does support the hypothesis, as every FGLS equation indicates that countires with either inflation targets or marketable debt linked to inflation have lower sacrifice ratios (Models 17 through 20), as the estimates of γ are statistically significant, but no OLS regression confirms these findings. The annual data also produce some limited results, as the univariate FGLS regressions (Table 11B, Models 5 and 7) using the higher-income sample support the hypothesis.[24] But, neither the lower-income nor the complete samples produce statistically significant estimates, although every estimate of γ has a negative sign.

7. Summary and Discussion

While a growing number of studies examine the determinants of the sacrifice ratio, however imperfect this measure of the tradeoff between output and inflation, few satisfactorily address the critical issue of monetary policy credibility. Some economists do consider the role of

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and Tanzania. This compares with six for Mishkin and Schmidt-Hebbel (2000) (Australia, Colombia, Israel, New Zealand, Spain, and Sweden), and five for Corbo et al. (2001) (Australia, Chile, Israel, New Zealand, and Sweden).

inherently subjective measures of central bank autonomy, but none comprehensively consider other aspects of fiscal and monetary policymaking that purportedly might signal a more concerted commitment to lower inflation. Also, the existing literature unfortunately does not consider lower-income countries, which, particularly in the case of inflation targeting, often follow higher-income countries practices and also contain useful information. Finally, several studies do not consider the range of data designs in the literature, particularly regarding the distinction between unit root processes and time series with a break.

This study attempts to amend these oversights, and some very general characterizations of the findings are instructive. With respect to methodological controversies, some assumptions seem critical, while others do not. For example, while these data largely confirm the distinction regarding time series processes and the possibility of a break with respect to measures of central bank independence, this consideration is not critical with respect to the fiscal and monetary policy variables in this study. Perhaps this result is largely due to the generally limited degrees of freedom, particularly in the case of dummy variables for inflation targeting, but more parameter estimates of γ are statistically significant compared with estimates of δ. Therefore, however robust the results in this study, significant findings largely rest on the assumption that inflation follows a unit root process.

Regarding substantive findings, all in all, the data largely suggest that the key variables in this study, including government debt measures, inflation-indexed bond issuance, and inflation targets, are sensitive to data design, particularly with respect to OLS estimation and expanded conditioning sets. Therefore, even given some significant results in support of the hypothesis, perhaps particularly with respect to fiscal as opposed to monetary policy variables, the results are not strikingly compelling, especially given the inclusion of lower-income countries. A clear "credibility bonus" does not emerge from the data.[25]

This sweeping inference does not, however, imply that the examination of policy credibility indicators in this context is not a promising avenue for additional research. Indeed, the proxies used in this paper are imperfect. For instance, the dummy variable for inflation-

[24] All FGLS regressions using Ball's (1993) annual data support the hypothesis.

[25] Further examination of reverse causation might be instructive. That is, countries that face more serious credibility gaps might be more apt to adopt the "best practices" examined in this study but might not achieved their desired ends in the near term. (For example, countries that experience hyperinflation sometimes issue indexed debt.) Therefore, perhaps the "cumulative" measures, such as alternative consideration of the duration of the inflation-targeting regime, might be the most instructive measures.

indexed bond issuance might be inferior to a measure that captures the ratio of indexed to total marketable government debt. Also, inflation targeting is a rather new phenomenon, and the results are perhaps limited by the degrees of freedom. In point of fact, the duration of the Bank of England's inflation target since 1992, widely cited as an exemplar of the practice, does not include a single quarterly or annual disinflation episode. Perhaps future data will be particularly useful with respect to this research question. But these caveats aside, in general and at this juncture, little empirical evidence supports the view that these "best practices" improve the tradeoff between output and inflation in both higher- and lower-income countries, at least as measured by the sacrifice ratio.

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Table 1A Government Debt (Stock, % GDP), Sacrifice Ratio Regressions, Quarterly Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$	δ	t stat$_\delta$
1	Higher-income	Unit Root	Univariate	OLS	28	-0.038	0.005	0.080		
2	Higher-income	Unit Root	Multivariate	OLS	26	0.063	0.079	1.137		
3	Higher-income	Break	Univariate	OLS	28	-0.098	0.017	0.252	-0.122	-0.623
4	Higher-income	Break	Multivariate	OLS	26	-0.119	0.080	0.944	-0.030	-0.068
5	Higher-income	Unit Root	Univariate	FGLS	28	1.656	0.005	1.287		
6	Higher-income	Unit Root	Multivariate	FGLS	26	25.591	0.087**	2.878		
7	Higher-income	Break	Univariate	FGLS	28	2.708	0.033	1.294	-0.144	-1.241
8	Higher-income	Break	Multivariate	FGLS	26	29.995	0.099**	3.132	-0.096	-0.456
9	Lower-income	Unit Root	Univariate	OLS	28	-0.037	-0.004	-0.163		
10	Lower-income	Unit Root	Multivariate	OLS	27	-0.130	-0.031	-0.579		
11	Lower-income	Break	Univariate	OLS	28	-0.119	0.003	0.062	-0.013	-0.248
12	Lower-income	Break	Multivariate	OLS	27	-0.255	-0.018	-0.286	0.333	1.020
13	Lower-income	Unit Root	Univariate	FGLS	28	0.427	-0.004	-0.653		
14	Lower-income	Unit Root	Multivariate	FGLS	27	3.560	-0.014	-0.795		
15	Lower-income	Break	Univariate	FGLS	28	0.349	-0.003	-0.223	-0.002	-0.087
16	Lower-income	Break	Multivariate	FGLS	27	4.921	-0.006	-0.284	0.321	1.089
17	Total	Unit Root	Univariate	OLS	56	-0.017	-0.005	-0.260		
18	Total	Unit Root	Multivariate	OLS	55	-0.070	0.001	0.025		
19	Total	Break	Univariate	OLS	56	-0.050	0.002	0.066	-0.015	-0.378
20	Total	Break	Multivariate	OLS	55	-0.160	0.007	0.160	0.100	0.639
21	Total	Unit Root	Univariate	FGLS	56	2.503	-0.008	-1.582		
22	Total	Unit Root	Multivariate	FGLS	55	7.935	0.002	0.207		
23	Total	Break	Univariate	FGLS	56	2.099	-0.009	-0.881	-0.001	-0.057
24	Total	Break	Multivariate	FGLS	55	8.317	-0.002	-0.144	0.063	0.443

Table 1B Government Debt (Stock, % GDP), Sacrifice Ratio Regressions, Annual Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$	δ	t stat$_\delta$
1	Higher-income	Unit Root	Univariate	OLS	38	-0.027	0.002	0.144		
2	Higher-income	Unit Root	Multivariate	OLS	33	0.005	0.013	0.971		
3	Higher-income	Break	Univariate	OLS	38	-0.040	0.009	0.614	-0.0250	-0.9538
4	Higher-income	Break	Multivariate	OLS	33	0.063	0.026*	1.684	-0.0330	-0.2946
5	Higher-income	Unit Root	Univariate	FGLS	38	0.765	0.005	0.875		
6	Higher-income	Unit Root	Multivariate	FGLS	33	14.693	0.016*	1.877		
7	Higher-income	Break	Univariate	FGLS	38	2.668	0.008	1.041	-0.0087	-0.5543
8	Higher-income	Break	Multivariate	FGLS	33	22.674	0.021*	1.817	-0.0397	-0.5476
9	Higher-income (Ball)	Unit Root	Univariate	OLS	27	-0.018	-0.006	-0.731		
10	Higher-income (Ball)	Unit Root	Multivariate	OLS	22	0.208	0.012	1.313		
11	Higher-income (Ball)	Break	Univariate	OLS	24	0.260	0.008	0.881	-0.0436**	-2.6702
12	Higher-income (Ball)	Break	Multivariate	OLS	22	0.251	0.016*	1.699	0.0275	0.5274
13	Higher-income (Ball)	Unit Root	Univariate	FGLS	27	2.076	-0.006	-1.441		
14	Higher-income (Ball)	Unit Root	Multivariate	FGLS	22	39.859	0.010*	1.749		
15	Higher-income (Ball)	Break	Univariate	FGLS	24	21.792	0.012**	2.639	-0.0512**	-4.2234
16	Higher-income (Ball)	Break	Multivariate	FGLS	22	69.646	0.013**	2.503	0.0318	1.1684
17	Lower-income	Unit Root	Univariate	OLS	136	-0.002	-0.003	-0.841		
18	Lower-income	Unit Root	Multivariate	OLS	134	0.100	-0.002	-0.646		
19	Lower-income	Break	Univariate	OLS	136	-0.013	-0.005	-1.076	0.0044	0.7176
20	Lower-income	Break	Multivariate	OLS	134	0.072	-0.003	-0.796	-0.0045	-0.3361
21	Lower-income	Unit Root	Univariate	FGLS	136	3.089	-0.001*	-1.758		
22	Lower-income	Unit Root	Multivariate	FGLS	134	59.765	0.000	-0.456		
23	Lower-income	Break	Univariate	FGLS	136	37.709	-0.004**	-6.040	0.0028*	1.6620
24	Lower-income	Break	Multivariate	FGLS	134	582.199	0.000	-0.258	-0.0065*	-1.7878
25	Total	Unit Root	Univariate	OLS	174	0.005	-0.004	-1.369		
26	Total	Unit Root	Multivariate	OLS	172	0.104	-0.003	-1.075		
27	Total	Break	Univariate	OLS	174	-0.002	-0.006	-1.441	0.0034	0.5839
28	Total	Break	Multivariate	OLS	172	0.093	-0.005	-1.135	-0.0067	-0.5708
29	Total	Unit Root	Univariate	FGLS	174	19.042	-0.003**	-4.364		
30	Total	Unit Root	Multivariate	FGLS	172	158.322	-0.001	-1.511		
31	Total	Break	Univariate	FGLS	174	36.047	-0.005**	-5.865	0.0028	1.4660
32	Total	Break	Multivariate	FGLS	172	130.743	-0.002	-1.535	-0.0132**	-3.4801

Table 2A Government Debt (Flow, % GDP), Sacrifice Ratio Regressions, Quarterly Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$	δ	t stat$_\delta$
1	Higher-income	Unit Root	Univariate	OLS	39	0.070	0.654*	1.959		
2	Higher-income	Unit Root	Multivariate	OLS	35	0.031	0.644*	1.734		
3	Higher-income	Break	Univariate	OLS	39	0.039	0.761**	1.986	-0.462	-0.559
4	Higher-income	Break	Multivariate	OLS	35	-0.126	0.868*	1.904	-0.869	-0.488
5	Higher-income	Unit Root	Univariate	FGLS	39	34.552	0.581**	5.878		
6	Higher-income	Unit Root	Multivariate	FGLS	35	31.512	0.243	1.144		
7	Higher-income	Break	Univariate	FGLS	39	81.892	0.665**	8.722	-0.297	-1.483
8	Higher-income	Break	Multivariate	FGLS	35	78.289	0.750**	6.672	-1.030	-0.174
9	Lower-income	Unit Root	Univariate	OLS	32	-0.018	0.231	0.675		
10	Lower-income	Unit Root	Multivariate	OLS	31	-0.141	-0.054	-0.123		
11	Lower-income	Break	Univariate	OLS	32	-0.085	0.189	0.478	0.331	0.344
12	Lower-income	Break	Multivariate	OLS	31	-0.348	-0.157	-0.307	0.684	0.372
13	Lower-income	Unit Root	Univariate	FGLS	32	0.010	-0.013	-0.099		
14	Lower-income	Unit Root	Multivariate	FGLS	31	7.098	-0.081	-0.541		
15	Lower-income	Break	Univariate	FGLS	32	1.700	-0.023	-0.163	0.701	1.138
16	Lower-income	Break	Multivariate	FGLS	31	4.345	-0.090	-0.418	0.463	0.459
17	Total	Unit Root	Univariate	OLS	71	0.028	0.397*	1.727		
18	Total	Unit Root	Multivariate	OLS	68	-0.037	0.288	1.049		
19	Total	Break	Univariate	OLS	71	0.005	0.397	1.508	0.092	0.160
20	Total	Break	Multivariate	OLS	68	-0.113	0.258	0.817	0.019	0.023
21	Total	Unit Root	Univariate	FGLS	71	18.134	0.360**	4.258		
22	Total	Unit Root	Multivariate	FGLS	68	45.874	0.293**	3.266		
23	Total	Break	Univariate	FGLS	71	27.898	0.424**	4.763	0.005	0.023
24	Total	Break	Multivariate	FGLS	68	639.455	0.329**	3.137	-0.063	-0.161

Table 2B Government Debt (Flow, % GDP), Sacrifice Ratio Regressions, Annual Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$	δ	t stat$_\delta$
1	Higher-income	Unit Root	Univariate	OLS	55	0.010	0.052	1.252		
2	Higher-income	Unit Root	Multivariate	OLS	45	0.026	0.067	1.408		
3	Higher-income	Break	Univariate	OLS	55	0.000	0.066	1.264	-0.0229	-0.2598
4	Higher-income	Break	Multivariate	OLS	45	0.222	0.046	0.939	0.2900**	2.3560
5	Higher-income	Unit Root	Univariate	FGLS	55	2.837	0.033*	1.684		
6	Higher-income	Unit Root	Multivariate	FGLS	45	18.118	0.063**	2.399		
7	Higher-income	Break	Univariate	FGLS	55	7.681	0.062**	2.641	-0.0499	-1.3130
8	Higher-income	Break	Multivariate	FGLS	45	47.621	0.062*	1.655	0.2785**	3.3466
9	Higher-income (Ball)	Unit Root	Univariate	OLS	42	0.034	0.061	1.565		
10	Higher-income (Ball)	Unit Root	Multivariate	OLS	28	0.073	-0.020	-0.395		
11	Higher-income (Ball)	Break	Univariate	OLS	32	-0.033	0.009	0.137	0.2902	1.1430
12	Higher-income (Ball)	Break	Multivariate	OLS	28	0.025	-0.036	-0.661	-1.2267	-1.3611
13	Higher-income (Ball)	Unit Root	Univariate	FGLS	42	2.486	0.034	1.577		
14	Higher-income (Ball)	Unit Root	Multivariate	FGLS	28	33.363	-0.008	-0.312		
15	Higher-income (Ball)	Break	Univariate	FGLS	32	3.919	-0.009	-0.511	0.3506*	1.8626
16	Higher-income (Ball)	Break	Multivariate	FGLS	28	55.478	-0.025	-1.035	-1.5089**	-2.8514
17	Lower-income	Unit Root	Univariate	OLS	167	-0.006	2.43E-07	0.123		
18	Lower-income	Unit Root	Multivariate	OLS	164	0.117	4.47E-07	0.241		
19	Lower-income	Break	Univariate	OLS	167	-0.007	2.17E-07	0.109	-0.0681	-1.2659
20	Lower-income	Break	Multivariate	OLS	164	0.098	3.99E-07	0.213	0.0029	0.0490
21	Lower-income	Unit Root	Univariate	FGLS	167	4.148	3.74E-07**	2.037		
22	Lower-income	Unit Root	Multivariate	FGLS	164	19.865	4.40E-07	1.603		
23	Lower-income	Break	Univariate	FGLS	167	28.617	3.03E-07	1.507	-0.0527**	-2.3322
24	Lower-income	Break	Multivariate	FGLS	164	2066.341	3.78E-07	1.405	-0.0262	-0.7790
25	Total	Unit Root	Univariate	OLS	222	-0.004	5.98E-07	0.304		
26	Total	Unit Root	Multivariate	OLS	217	0.099	7.72E-07	0.416		
27	Total	Break	Univariate	OLS	222	-0.002	5.10E-07	0.259	-0.0332	-0.7318
28	Total	Break	Multivariate	OLS	217	0.108	6.39E-07	0.346	0.0187	0.4116
29	Total	Unit Root	Univariate	FGLS	222	21.984	5.82E-07**	4.689		
30	Total	Unit Root	Multivariate	FGLS	217	66.904	6.49E-07	1.482		
31	Total	Break	Univariate	FGLS	222	42.326	5.20E-07**	5.897	-0.0175	-0.8667
32	Total	Break	Multivariate	FGLS	217	30.816	5.58E-07	1.429	-0.0105	-0.4571

Table 3A Inflation-Indexed Bond Issuance (Campbell and Shiller, 1996), Sacrifice Ratio Regressions, Quarterly Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$	δ	t stat$_\delta$
1	Higher-income	Unit Root	Univariate	OLS	52	-0.020	-0.205	-0.040		
2	Higher-income	Unit Root	Multivariate	OLS	46	0.045	3.109	0.585		
3	Higher-income	Unit Root	Univariate	FGLS	52	0.070	-0.441	-0.265		
4	Higher-income	Unit Root	Multivariate	FGLS	46	27.008	2.097	1.205		
5	Lower-income	Unit Root	Univariate	OLS	39	-0.017	-2.390	-0.601		
6	Lower-income	Unit Root	Multivariate	OLS	38	-0.091	-2.311	-0.531		
7	Lower-income	Break	Univariate	OLS	39	-0.075	-2.308	-0.526	-0.618	-0.051
8	Lower-income	Break	Multivariate	OLS	38	-0.232	-2.132	-0.447	77.157	0.878
9	Lower-income	Unit Root	Univariate	FGLS	39	1.181	-0.933	-1.087		
10	Lower-income	Unit Root	Multivariate	FGLS	38	10.584	-1.496	-1.327		
11	Lower-income	Break	Univariate	FGLS	39	1.429	-0.768	-0.858	-1.626	-0.456
12	Lower-income	Break	Multivariate	FGLS	38	11.652	-1.686	-1.414	51.330	0.816
13	Total	Unit Root	Univariate	OLS	91	-0.006	-1.933	-0.656		
14	Total	Unit Root	Multivariate	OLS	86	-0.024	-1.790	-0.561		
15	Total	Break	Univariate	OLS	91	-0.021	-1.416	-0.452	-3.554	-0.353
16	Total	Break	Multivariate	OLS	86	-0.060	-1.305	-0.393	18.813	0.627
17	Total	Unit Root	Univariate	FGLS	91	17.242	-2.068**	-4.152		
18	Total	Unit Root	Multivariate	FGLS	86	41.999	-1.675**	-2.490		
19	Total	Break	Univariate	FGLS	91	16.694	-1.685**	-2.917	-3.108	-0.989
20	Total	Break	Multivariate	FGLS	86	53.969	-1.204*	-1.697	19.002	1.349

Table 3B Inflation-Indexed Bond Issuance (Campbell and Shiller, 1996), Sacrifice Ratio Regressions, Annual Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$	δ	t stat$_\delta$
1	Higher-income	Unit Root	Univariate	OLS	83	-0.002	-0.569	-0.913		
2	Higher-income	Unit Root	Multivariate	OLS	69	-0.006	-0.281	-0.424		
3	Higher-income	Break	Univariate	OLS	83	-0.023	-0.593	-0.869	0.2370	0.1327
4	Higher-income	Break	Multivariate	OLS	69	-0.089	-0.349	-0.473	0.3103	0.1393
5	Higher-income	Unit Root	Univariate	FGLS	83	3.812	-0.545*	-1.952		
6	Higher-income	Unit Root	Multivariate	FGLS	69	10.931	-0.149	-0.357		
7	Higher-income	Break	Univariate	FGLS	83	7.130	-0.675**	-2.214	0.3308	0.5435
8	Higher-income	Break	Multivariate	FGLS	69	11.893	-0.324	-0.732	0.8153	0.6312
9	Higher-income (Ball)	Unit Root	Univariate	OLS	65	-0.001	-0.515	-0.963		
10	Higher-income (Ball)	Unit Root	Multivariate	OLS	41	0.004	-0.159	-0.277		
11	Higher-income (Ball)	Unit Root	Univariate	FGLS	65	2.044	-0.431	-1.430		
12	Higher-income (Ball)	Unit Root	Multivariate	FGLS	41	19.514	-0.199	-0.610		
13	Lower-income	Unit Root	Univariate	OLS	304	0.002	-0.672	-1.249		
14	Lower-income	Unit Root	Multivariate	OLS	292	0.017	-0.772	-1.388		
15	Lower-income	Break	Univariate	OLS	304	-0.003	-0.854	-1.419	0.9678	0.6996
16	Lower-income	Break	Multivariate	OLS	292	0.004	-1.039	-1.586	1.0575	0.5569
17	Lower-income	Unit Root	Univariate	FGLS	304	0.910	-0.333	-0.954		
18	Lower-income	Unit Root	Multivariate	FGLS	292	7.391	-0.443	-1.150		
19	Lower-income	Break	Univariate	FGLS	304	1.597	-0.417	-1.086	0.3531	0.2909
20	Lower-income	Break	Multivariate	FGLS	292	8689.119	-0.660	-1.552	0.8038	0.4635
21	Total	Unit Root	Univariate	OLS	387	0.001	-0.544	-1.255		
22	Total	Unit Root	Multivariate	OLS	372	0.013	-0.604	-1.362		
23	Total	Break	Univariate	OLS	387	-0.002	-0.650	-1.358	0.5188	0.4537
24	Total	Break	Multivariate	OLS	372	0.007	-0.691	-1.371	0.4155	0.2936
25	Total	Unit Root	Univariate	FGLS	387	0.244	-0.133	-0.494		
26	Total	Unit Root	Multivariate	FGLS	372	2.023	-0.134	-0.489		
27	Total	Break	Univariate	FGLS	387	3.887	-0.242	-0.835	0.4717	0.6605
28	Total	Break	Multivariate	FGLS	372	41.566	-0.271	-0.923	0.2307	0.3260

Table 3C Cumulative Inflation-Indexed Bond Issuance (Campbell and Shiller, 1996), Sacrifice Ratio Regressions, Quarterly Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$	δ	t stat$_\delta$
1	Higher-income	Unit Root	Univariate	OLS	52	-0.020	0.001	0.004		
2	Higher-income	Unit Root	Multivariate	OLS	46	0.047	0.110	0.669		
3	Higher-income	Unit Root	Univariate	FGLS	52	0.000	-0.001	-0.016		
4	Higher-income	Unit Root	Multivariate	FGLS	46	32.346	0.118**	2.269		
5	Lower-income	Unit Root	Univariate	OLS	39	-0.024	-0.013	-0.316		
6	Lower-income	Unit Root	Multivariate	OLS	38	-0.096	-0.014	-0.338		
7	Lower-income	Break	Univariate	OLS	39	-0.082	-0.010	-0.222	-0.016	-0.146
8	Lower-income	Break	Multivariate	OLS	38	-0.240	-0.009	-0.192	0.685	0.863
9	Lower-income	Unit Root	Univariate	FGLS	39	0.181	-0.005	-0.426		
10	Lower-income	Unit Root	Multivariate	FGLS	38	11.042	-0.001	-0.116		
11	Lower-income	Break	Univariate	FGLS	39	0.975	0.000	-0.003	-0.025	-0.742
12	Lower-income	Break	Multivariate	FGLS	38	12.203	0.002	0.192	0.445	0.794
13	Total	Unit Root	Univariate	OLS	91	-0.009	-0.016	-0.452		
14	Total	Unit Root	Multivariate	OLS	86	-0.024	-0.020	-0.541		
15	Total	Break	Univariate	OLS	91	-0.023	-0.009	-0.245	-0.035	-0.376
16	Total	Break	Multivariate	OLS	86	-0.061	-0.012	-0.307	0.170	0.626
17	Total	Unit Root	Univariate	FGLS	91	3.393	-0.018*	-1.842		
18	Total	Unit Root	Multivariate	FGLS	86	47.493	-0.020**	-2.992		
19	Total	Break	Univariate	FGLS	91	6.576	-0.012	-1.187	-0.031	-1.005
20	Total	Break	Multivariate	FGLS	86	54.565	-0.014*	-1.957	0.175	1.347

Table 3D Cumulative Inflation-Indexed Bond Issuance (Campbell and Shiller, 1996), Sacrifice Ratio Regressions, Annual Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$	δ	t stat$_\delta$
1	Higher-income	Unit Root	Univariate	OLS	83	-0.010	-0.041	-0.450		
2	Higher-income	Unit Root	Multivariate	OLS	69	-0.009	0.015	0.150		
3	Higher-income	Break	Univariate	OLS	83	-0.031	-0.036	-0.373	-0.035	-0.103
4	Higher-income	Break	Multivariate	OLS	69	-0.093	0.014	0.133	-0.022	-0.050
5	Higher-income	Unit Root	Univariate	FGLS	83	0.460	-0.030	-0.678		
6	Higher-income	Unit Root	Multivariate	FGLS	69	12.766	0.039	0.638		
7	Higher-income	Break	Univariate	FGLS	83	2.540	-0.025	-0.532	-0.047	-0.329
8	Higher-income	Break	Multivariate	FGLS	69	13.462	0.030	0.475	0.073	0.276
9	Higher-income (Ball)	Unit Root	Univariate	OLS	65	-0.009	-0.066	-0.641		
10	Higher-income (Ball)	Unit Root	Multivariate	OLS	41	0.002	0.013	0.121		
11	Higher-income (Ball)	Unit Root	Univariate	FGLS	65	0.567	-0.050	-0.753		
12	Higher-income (Ball)	Unit Root	Multivariate	FGLS	41	21.299	0.038	0.702		
13	Lower-income	Unit Root	Univariate	OLS	304	0.005	-0.051	-1.628		
14	Lower-income	Unit Root	Multivariate	OLS	292	0.019	-0.052	-1.601		
15	Lower-income	Break	Univariate	OLS	304	0.002	-0.067*	-1.879	0.072	0.956
16	Lower-income	Break	Multivariate	OLS	292	0.007	-0.067*	-1.833	0.074	0.767
17	Lower-income	Unit Root	Univariate	FGLS	304	2.150	-0.043	-1.466		
18	Lower-income	Unit Root	Multivariate	FGLS	292	6.936	-0.047	-1.534		
19	Lower-income	Break	Univariate	FGLS	304	3.526	-0.058*	-1.758	0.054	0.775
20	Lower-income	Break	Multivariate	FGLS	292	7914.540	-0.069**	-2.035	0.078	0.811
21	Total	Unit Root	Univariate	OLS	387	0.006	-0.052*	-1.783		
22	Total	Unit Root	Multivariate	OLS	372	0.016	-0.052*	-1.718		
23	Total	Break	Univariate	OLS	387	0.003	-0.065*	-1.945	0.051	0.709
24	Total	Break	Multivariate	OLS	372	0.011	-0.063*	-1.841	0.053	0.580
25	Total	Unit Root	Univariate	FGLS	387	1.009	-0.027	-1.004		
26	Total	Unit Root	Multivariate	FGLS	372	2.384	-0.025	-0.927		
27	Total	Break	Univariate	FGLS	387	4.831	-0.039	-1.319	0.037	0.568
28	Total	Break	Multivariate	FGLS	372	40.922	-0.037	-1.277	0.031	0.379

Table 4A Inflation-Indexed Bond Issuance (Deacon and Derry, 1998), Sacrifice Ratio Regressions, Quarterly Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$	δ	t stat$_\delta$
1	Higher-income	Unit Root	Univariate	OLS	52	-0.020	-0.463	-0.114		
2	Higher-income	Unit Root	Multivariate	OLS	46	0.049	3.220	0.720		
3	Higher-income	Unit Root	Univariate	FGLS	52	0.447	-0.892	-0.668		
4	Higher-income	Unit Root	Multivariate	FGLS	46	31.181	2.621*	1.733		
5	Lower-income	Unit Root	Univariate	OLS	39	-0.014	-2.536	-0.691		
6	Lower-income	Unit Root	Multivariate	OLS	38	-0.091	-2.102	-0.534		
7	Lower-income	Break	Univariate	OLS	39	-0.072	-2.498	-0.621	-0.428	-0.036
8	Lower-income	Break	Multivariate	OLS	38	-0.232	-1.937	-0.445	76.962	0.876
9	Lower-income	Unit Root	Univariate	FGLS	39	3.168	-1.514*	-1.780		
10	Lower-income	Unit Root	Multivariate	FGLS	38	11.640	-1.142	-1.139		
11	Lower-income	Break	Univariate	FGLS	39	3.305	-1.485*	-1.649	-0.863	-0.239
12	Lower-income	Break	Multivariate	FGLS	38	11.651	-1.264	-1.143	50.947	0.806
13	Total	Unit Root	Univariate	OLS	91	-0.005	-1.925	-0.744		
14	Total	Unit Root	Multivariate	OLS	86	-0.024	-1.540	-0.559		
15	Total	Break	Univariate	OLS	91	-0.020	-1.427	-0.523	-3.543	-0.357
16	Total	Break	Multivariate	OLS	86	-0.060	-1.069	-0.371	18.578	0.620
17	Total	Unit Root	Univariate	FGLS	91	18.145	-2.313**	-4.260		
18	Total	Unit Root	Multivariate	FGLS	86	48.780	-1.864**	-3.535		
19	Total	Break	Univariate	FGLS	91	17.873	-1.982**	-3.197	-2.849	-0.904
20	Total	Break	Multivariate	FGLS	86	60.093	-1.422**	-2.324	19.254	1.357

Table 4B Inflation-Indexed Bond Issuance (Deacon and Derry, 1998), Sacrifice Ratio Regressions, Annual Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$	δ	t stat$_\delta$
1	Higher-income	Unit Root	Univariate	OLS	83	-0.004	-0.427	-0.835		
2	Higher-income	Unit Root	Multivariate	OLS	69	-0.006	-0.254	-0.434		
3	Higher-income	Break	Univariate	OLS	83	-0.025	-0.406	-0.743	0.0504	0.0289
4	Higher-income	Break	Multivariate	OLS	69	-0.089	-0.319	-0.484	0.2801	0.1272
5	Higher-income	Unit Root	Univariate	FGLS	83	2.188	-0.363	-1.479		
6	Higher-income	Unit Root	Multivariate	FGLS	69	10.709	-0.062	-0.177		
7	Higher-income	Break	Univariate	FGLS	83	4.110	-0.363	-1.367	-0.0058	-0.0091
8	Higher-income	Break	Multivariate	FGLS	69	11.184	-0.188	-0.509	0.6640	0.5231
9	Higher-income (Ball)	Unit Root	Univariate	OLS	65	0.015	-0.577	-1.402		
10	Higher-income (Ball)	Unit Root	Multivariate	OLS	41	0.007	-0.197	-0.419		
11	Higher-income (Ball)	Break	Univariate	OLS	47	-0.027	-0.648	-1.162	-0.0473	-0.0372
12	Higher-income (Ball)	Break	Multivariate	OLS	41	-0.106	-0.365	-0.639	-1.2258	-0.6355
13	Higher-income (Ball)	Unit Root	Univariate	FGLS	65	4.797	-0.474**	-2.190		
14	Higher-income (Ball)	Unit Root	Multivariate	FGLS	41	30.111	-0.324*	-1.834		
15	Higher-income (Ball)	Break	Univariate	FGLS	47	5.108	-0.531**	-2.082	0.2883	0.4704
16	Higher-income (Ball)	Break	Multivariate	FGLS	41	34.209	-0.503	-2.237	-1.0879	-0.9919
17	Lower-income	Unit Root	Univariate	OLS	304	0.000	-0.529	-1.070		
18	Lower-income	Unit Root	Multivariate	OLS	292	0.015	-0.627	-1.231		
19	Lower-income	Break	Univariate	OLS	304	-0.005	-0.648	-1.196	0.7618	0.5603
20	Lower-income	Break	Multivariate	OLS	292	0.001	-0.777	-1.343	0.7959	0.4242
21	Lower-income	Unit Root	Univariate	FGLS	304	0.017	-0.030	-0.129		
22	Lower-income	Unit Root	Multivariate	FGLS	292	5.355	-0.085	-0.365		
23	Lower-income	Break	Univariate	FGLS	304	0.519	-0.053	-0.219	-0.0082	-0.0069
24	Lower-income	Break	Multivariate	FGLS	292	9603.47	-0.147	-0.563	0.2875	0.1649
25	Total	Unit Root	Univariate	OLS	387	-0.001	-0.334	-0.874		
26	Total	Unit Root	Multivariate	OLS	372	0.011	-0.370	-0.951		
27	Total	Break	Univariate	OLS	387	-0.005	-0.372	-0.903	0.2401	0.2147
28	Total	Break	Multivariate	OLS	372	0.004	-0.371	-0.870	0.0945	0.0679
29	Total	Unit Root	Univariate	FGLS	387	0.319	0.090	0.565		
30	Total	Unit Root	Multivariate	FGLS	372	1.740	0.067	0.430		
31	Total	Break	Univariate	FGLS	387	3.167	0.072	0.429	0.1912	0.2875
32	Total	Break	Multivariate	FGLS	372	40.303	0.058	0.355	-0.0676	-0.1034

Table 4C Cumulative Inflation-Indexed Bond Issuance (Deacon and Derry, 1998), Sacrifice Ratio Regressions, Quarterly Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$	δ	t stat$_\delta$
1	Higher-income	Unit Root	Univariate	OLS	52	-0.020	0.000	-0.002		
2	Higher-income	Unit Root	Multivariate	OLS	46	0.048	0.074	0.698		
3	Higher-income	Unit Root	Univariate	FGLS	52	0.020	-0.005	-0.141		
4	Higher-income	Unit Root	Multivariate	FGLS	46	31.861	0.061*	2.004		
5	Lower-income	Unit Root	Univariate	OLS	39	-0.024	-0.013	-0.326		
6	Lower-income	Unit Root	Multivariate	OLS	38	-0.096	-0.014	-0.339		
7	Lower-income	Break	Univariate	OLS	39	-0.082	-0.011	-0.232	-0.016	-0.141
8	Lower-income	Break	Multivariate	OLS	38	-0.240	-0.009	-0.192	0.685	0.863
9	Lower-income	Unit Root	Univariate	FGLS	39	0.206	-0.005	-0.453		
10	Lower-income	Unit Root	Multivariate	FGLS	38	11.131	-0.001	-0.110		
11	Lower-income	Break	Univariate	FGLS	39	0.965	0.000	-0.025	-0.024	-0.730
12	Lower-income	Break	Multivariate	FGLS	38	12.270	0.002	0.212	0.445	0.793
13	Total	Unit Root	Univariate	OLS	91	-0.009	-0.015	-0.444		
14	Total	Unit Root	Multivariate	OLS	86	-0.024	-0.018	-0.502		
15	Total	Break	Univariate	OLS	91	-0.023	-0.008	-0.226	-0.036	-0.388
16	Total	Break	Multivariate	OLS	86	-0.061	-0.010	-0.255	0.168	0.617
17	Total	Unit Root	Univariate	FGLS	91	3.024	-0.018*	-1.739		
18	Total	Unit Root	Multivariate	FGLS	86	45.731	-0.021*	-3.318		
19	Total	Break	Univariate	FGLS	91	6.156	-0.011	-1.035	-0.032	-1.052
20	Total	Break	Multivariate	FGLS	86	54.674	-0.014*	-2.027	0.175	1.347

Table 4D Cumulative Inflation-Indexed Bond Issuance (Deacon and Derry, 1998), Sacrifice Ratio Regressions, Annual Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$	δ	t stat$_\delta$
1	Higher-income	Unit Root	Univariate	OLS	83	-0.010	-0.023	-0.392		
2	Higher-income	Unit Root	Multivariate	OLS	69	-0.009	0.004	0.054		
3	Higher-income	Break	Univariate	OLS	83	-0.031	-0.018	-0.288	-0.033	-0.135
4	Higher-income	Break	Multivariate	OLS	69	-0.094	0.003	0.041	-0.009	-0.028
5	Higher-income	Unit Root	Univariate	FGLS	83	0.120	-0.009	-0.346		
6	Higher-income	Unit Root	Multivariate	FGLS	69	12.445	0.022	0.582		
7	Higher-income	Break	Univariate	FGLS	83	2.347	-0.003	-0.099	-0.050	-0.493
8	Higher-income	Break	Multivariate	FGLS	69	13.236	0.020	0.519	0.053	0.284
9	Higher-income (Ball)	Unit Root	Univariate	OLS	65	-0.003	-0.062	-0.912		
10	Higher-income (Ball)	Unit Root	Multivariate	OLS	41	0.003	-0.011	-0.167		
11	Higher-income (Ball)	Break	Univariate	OLS	47	-0.040	-0.071	-0.891	-0.045	-0.217
12	Higher-income (Ball)	Break	Multivariate	OLS	41	-0.117	-0.028	-0.347	-0.237	-0.744
13	Higher-income (Ball)	Unit Root	Univariate	FGLS	65	1.514	-0.051	-1.231		
14	Higher-income (Ball)	Unit Root	Multivariate	FGLS	41	21.620	-0.027	-0.757		
15	Higher-income (Ball)	Break	Univariate	FGLS	47	2.614	-0.047	-1.364	0.000	-0.001
16	Higher-income (Ball)	Break	Multivariate	FGLS	41	24.840	-0.043	-0.971	-0.223	-1.182
17	Lower-income	Unit Root	Univariate	OLS	304	0.005	-0.050	-1.609		
18	Lower-income	Unit Root	Multivariate	OLS	292	0.019	-0.051	-1.588		
19	Lower-income	Break	Univariate	OLS	304	0.002	-0.066*	-1.856	0.071	0.944
20	Lower-income	Break	Multivariate	OLS	292	0.006	-0.066*	-1.814	0.073	0.758
21	Lower-income	Unit Root	Univariate	FGLS	304	1.167	-0.030	-1.080		
22	Lower-income	Unit Root	Multivariate	FGLS	292	5.634	-0.031	-1.126		
23	Lower-income	Break	Univariate	FGLS	304	2.170	-0.040	-1.314	0.037	0.533
24	Lower-income	Break	Multivariate	FGLS	292	8230.924	-0.048	-1.543	0.057	0.600
25	Total	Unit Root	Univariate	OLS	387	0.003	-0.042	-1.513		
26	Total	Unit Root	Multivariate	OLS	372	0.014	-0.041	-1.433		
27	Total	Break	Univariate	OLS	387	0.000	-0.051	-1.625	0.038	0.542
28	Total	Break	Multivariate	OLS	372	0.008	-0.048	-1.506	0.038	0.431
29	Total	Unit Root	Univariate	FGLS	387	0.005	0.002	0.070		
30	Total	Unit Root	Multivariate	FGLS	372	1.571	0.001	0.043		
31	Total	Break	Univariate	FGLS	387	2.831	-0.004	-0.151	0.008	0.127
32	Total	Break	Multivariate	FGLS	372	39.107	-0.004	-0.153	0.001	0.011

Table 5A Interaction: Government Debt (Stock) Inflation-Indexed Bond Issuance, Sacrifice Ratio Regressions, Quarterly Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$	δ	t stat$_\delta$
1	Higher-income	Unit Root	Univariate	OLS	28	-0.038	0.008	0.150		
2	Higher-income	Unit Root	Multivariate	OLS	26	0.058	0.072	1.090		
3	Higher-income	Break	Univariate	OLS	28	-0.098	0.016	0.260	-0.121	-0.624
4	Higher-income	Break	Multivariate	OLS	26	-0.133	0.073	0.831	-0.034	-0.076
5	Higher-income	Unit Root	Univariate	FGLS	28	0.735	0.007	0.857		
6	Higher-income	Unit Root	Multivariate	FGLS	26	36.798	0.094**	3.321		
7	Higher-income	Break	Univariate	FGLS	28	3.411	0.035	1.521	-0.146	-1.271
8	Higher-income	Break	Multivariate	FGLS	26	38.574	0.114**	3.406	-0.182	-0.933
9	Lower-income	Unit Root	Univariate	OLS	28	-0.009	0.073	0.867		
10	Lower-income	Unit Root	Multivariate	OLS	27	-0.141	0.036	0.352		
11	Lower-income	Break	Univariate	OLS	28	-0.087	0.087	0.911	-0.089	-0.371
12	Lower-income	Break	Multivariate	OLS	27	-0.250	0.048	0.403	7.030	0.978
13	Lower-income	Unit Root	Univariate	FGLS	28	5.816	0.059**	2.412		
14	Lower-income	Unit Root	Multivariate	FGLS	27	5.236	0.045	1.517		
15	Lower-income	Break	Univariate	FGLS	28	8.131	0.074**	2.800	-0.080	-1.159
16	Lower-income	Break	Multivariate	FGLS	27	8.038	0.064*	1.683	7.025	1.097
17	Total	Unit Root	Univariate	OLS	56	-0.007	0.040	0.796		
18	Total	Unit Root	Multivariate	OLS	55	-0.070	0.010	0.175		
19	Total	Break	Univariate	OLS	56	-0.038	0.049	0.901	-0.083	-0.557
20	Total	Break	Multivariate	OLS	55	-0.168	0.016	0.253	-0.084	-0.422
21	Total	Unit Root	Univariate	FGLS	56	17.828	0.041**	4.222		
22	Total	Unit Root	Multivariate	FGLS	55	11.374	0.027*	1.691		
23	Total	Break	Univariate	FGLS	56	97.436	0.050**	8.867	-0.068	-1.158
24	Total	Break	Multivariate	FGLS	55	14.766	0.047*	2.082	-0.100	-0.785

Table 5B Interaction: Government Debt (Stock) Inflation-Indexed Bond Issuance, Sacrifice Ratio Regressions, Annual Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$	δ	t stat$_\delta$
1	Higher-income	Unit Root	Univariate	OLS	38	-0.015	0.007	0.665		
2	Higher-income	Unit Root	Multivariate	OLS	33	0.010	0.011	1.042		
3	Higher-income	Break	Univariate	OLS	38	-0.024	0.014	1.052	-0.0261	-1.0954
4	Higher-income	Break	Multivariate	OLS	33	0.080	0.021	1.612	0.0574	0.5968
5	Higher-income	Unit Root	Univariate	FGLS	38	4.935	0.010**	2.221		
6	Higher-income	Unit Root	Multivariate	FGLS	33	13.683	0.014*	1.812		
7	Higher-income	Break	Univariate	FGLS	38	6.266	0.015**	2.222	-0.0140	-1.0755
8	Higher-income	Break	Multivariate	FGLS	33	22.564	0.020*	2.033	0.0500	0.7602
9	Higher-income (Ball)	Unit Root	Univariate	OLS	27	-0.027	0.004	0.563		
10	Higher-income (Ball)	Unit Root	Multivariate	OLS	22	0.229	0.010	1.489		
11	Higher-income (Ball)	Break	Univariate	OLS	24	0.165	0.015*	1.663	-0.0328**	-2.0403
12	Higher-income (Ball)	Break	Multivariate	OLS	22	0.354	0.018**	2.296	-0.0061	-0.4085
13	Higher-income (Ball)	Unit Root	Univariate	FGLS	27	2.630	0.008	1.622		
14	Higher-income (Ball)	Unit Root	Multivariate	FGLS	22	38.054	0.007*	1.830		
15	Higher-income (Ball)	Break	Univariate	FGLS	24	29.266	0.017**	4.864	-0.0399**	-3.7171
16	Higher-income (Ball)	Break	Multivariate	FGLS	22	102.686	0.017**	4.596	-0.0056	-0.5689
17	Lower-income	Unit Root	Univariate	OLS	136	-0.007	-0.001	-0.183		
18	Lower-income	Unit Root	Multivariate	OLS	134	0.097	0.000	-0.105		
19	Lower-income	Break	Univariate	OLS	136	-0.021	0.000	-0.011	-0.0034	-0.3116
20	Lower-income	Break	Multivariate	OLS	134	0.068	0.001	0.205	-0.0104	-0.7412
21	Lower-income	Unit Root	Univariate	FGLS	136	0.202	0.000	-0.449		
22	Lower-income	Unit Root	Multivariate	FGLS	134	122.739	0.000	-0.530		
23	Lower-income	Break	Univariate	FGLS	136	15.326	0.000	0.481	-0.0058**	-3.1805
24	Lower-income	Break	Multivariate	FGLS	134	320.287	-0.001	-0.793	-0.0064**	-2.0230
25	Total	Unit Root	Univariate	OLS	174	-0.003	-0.003	-0.689		
26	Total	Unit Root	Multivariate	OLS	172	0.099	-0.002	-0.473		
27	Total	Break	Univariate	OLS	174	-0.011	-0.002	-0.368	-0.0058	-0.5892
28	Total	Break	Multivariate	OLS	172	0.087	0.000	-0.017	-0.0122	-1.0142
29	Total	Unit Root	Univariate	FGLS	174	15.057	-0.002**	-3.880		
30	Total	Unit Root	Multivariate	FGLS	172	63.764	0.000	-0.502		
31	Total	Break	Univariate	FGLS	174	20.744	-0.001	-1.499	-0.0063**	-3.2084
32	Total	Break	Multivariate	FGLS	172	46.241	0.000	0.263	-0.0126**	-3.2519

Table 6A Interaction: Government Debt (Stock) Central Bank Independence (Cukierman et al, 1992), Sacrifice Ratio Regressions, Quarterly Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$	δ	t stat$_\delta$
1	Higher-income	Unit Root	Univariate	OLS	22	-0.050	-0.015	-0.044		
2	Higher-income	Unit Root	Multivariate	OLS	20	-0.027	0.040	0.118		
3	Higher-income	Unit Root	Univariate	FGLS	22	0.547	0.109	0.740		
4	Higher-income	Unit Root	Multivariate	FGLS	20	19.497	-0.125	-1.049		
5	Lower-income	Unit Root	Univariate	OLS	15	-0.048	0.029	0.594		
6	Lower-income	Unit Root	Multivariate	OLS	15	-0.223	-0.098	-0.581		
7	Lower-income	Break	Univariate	OLS	15	-0.233	0.039	0.416	-0.010	-0.088
8	Lower-income	Break	Multivariate	OLS	15	-0.479	-0.060	-0.281	-0.903	-1.049
9	Lower-income	Unit Root	Univariate	FGLS	15	5.225	0.027**	2.286		
10	Lower-income	Unit Root	Multivariate	FGLS	15	0.951	0.009	0.079		
11	Lower-income	Break	Univariate	FGLS	15	8.881	0.040**	2.428	-0.034	-1.180
12	Lower-income	Break	Multivariate	FGLS	15	9.068	0.066	0.572	-1.029	-1.335
13	Total	Unit Root	Univariate	OLS	37	-0.016	0.027	0.647		
14	Total	Unit Root	Multivariate	OLS	37	-0.058	-0.031	-0.305		
15	Total	Break	Univariate	OLS	37	-0.069	0.031	0.429	0.001	0.014
16	Total	Break	Multivariate	OLS	37	-0.179	-0.017	-0.130	-0.252	-0.733
17	Total	Unit Root	Univariate	FGLS	37	8.706	0.028**	2.951		
18	Total	Unit Root	Multivariate	FGLS	37	31.574	-0.060**	-1.993		
19	Total	Break	Univariate	FGLS	37	9.931	0.039**	2.599	-0.017	-0.853
20	Total	Break	Multivariate	FGLS	37	41.132	-0.005	-0.131	-0.297	-1.429

Table 6B Interaction: Government Debt (Stock) Central Bank Independence (Cukierman et al, 1992), Sacrifice Ratio Regressions, Annual Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$	δ	t stat$_\delta$
1	Higher-income	Unit Root	Univariate	OLS	31	-0.031	-0.020	-0.331		
2	Higher-income	Unit Root	Multivariate	OLS	28	-0.057	-0.039	-0.637		
3	Higher-income	Break	Univariate	OLS	31	-0.056	-0.056	-0.751	0.1300	0.9734
4	Higher-income	Break	Multivariate	OLS	28	0.085	-0.093	-1.380	1.0005*	1.8278
5	Higher-income	Unit Root	Univariate	FGLS	31	2.843	-0.065*	-1.686		
6	Higher-income	Unit Root	Multivariate	FGLS	28	17.554	-0.078*	-1.899		
7	Higher-income	Break	Univariate	FGLS	31	6.025	-0.065	-1.362	0.0662	0.6159
8	Higher-income	Break	Multivariate	FGLS	28	152.244	-0.114**	-2.859	1.0005**	3.5950
9	Higher-income (Ball)	Unit Root	Univariate	OLS	26	0.003	0.027	1.035		
10	Higher-income (Ball)	Unit Root	Multivariate	OLS	22	0.180	-0.038	-1.055		
11	Higher-income (Ball)	Break	Univariate	OLS	23	0.271	-0.035	-0.756	0.1854**	2.5860
12	Higher-income (Ball)	Break	Multivariate	OLS	22	0.177	-0.050	-1.247	-0.0856	-0.5097
13	Higher-income (Ball)	Unit Root	Univariate	FGLS	26	2.726	0.014*	1.651		
14	Higher-income (Ball)	Unit Root	Multivariate	FGLS	22	37.869	-0.028	-1.339		
15	Higher-income (Ball)	Break	Univariate	FGLS	23	18.122	-0.038	-1.212	0.2157**	3.9287
16	Higher-income (Ball)	Break	Multivariate	FGLS	22	59.123	-0.040**	-2.176	-0.0979	-1.1154
17	Lower-income	Unit Root	Univariate	OLS	61	-0.008	0.006	0.728		
18	Lower-income	Unit Root	Multivariate	OLS	61	-0.004	0.017	0.950		
19	Lower-income	Break	Univariate	OLS	61	-0.032	0.015	1.049	-0.0144	-0.8000
20	Lower-income	Break	Multivariate	OLS	61	0.002	0.028	1.388	-0.1426	-0.8570
21	Lower-income	Unit Root	Univariate	FGLS	61	28.466	0.007**	5.335		
22	Lower-income	Unit Root	Multivariate	FGLS	61	9.238	0.010	1.467		
23	Lower-income	Break	Univariate	FGLS	61	23.588	0.012**	3.999	-0.0215**	-2.4770
24	Lower-income	Break	Multivariate	FGLS	61	235.607	0.017**	2.733	-0.0959*	-1.7856
25	Total	Unit Root	Univariate	OLS	92	0.001	0.009	1.054		
26	Total	Unit Root	Multivariate	OLS	92	0.021	0.010	0.586		
27	Total	Break	Univariate	OLS	92	-0.010	0.017	1.171	-0.0108	-0.5972
28	Total	Break	Multivariate	OLS	92	0.051	0.024	1.274	-0.0268	-0.3400
29	Total	Unit Root	Univariate	FGLS	92	0.320	0.004	0.566		
30	Total	Unit Root	Multivariate	FGLS	92	35.199	0.002	0.196		
31	Total	Break	Univariate	FGLS	92	5.859	0.008	1.324	-0.0030	-0.2230
32	Total	Break	Multivariate	FGLS	92	454.436	0.022**	3.107	-0.0591**	-2.7116

Table 7A Inflation Targeting Dummy (Mahadeva and Sterne, 2000), Sacrifice Ratio Regressions, Quarterly Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$
1	Higher-income	Unit Root	Univariate	OLS	52	0.025	-6.673	-1.515
2	Higher-income	Unit Root	Multivariate	OLS	46	0.070	-5.810	-1.201
3	Higher-income	Unit Root	Univariate	FGLS	52	4.416	-4.772*	-2.101
4	Higher-income	Unit Root	Multivariate	FGLS	46	28.941	-4.080	-1.635
5	Lower-income	Unit Root	Univariate	OLS	34	-0.030	1.197	0.186
6	Lower-income	Unit Root	Multivariate	OLS	33	-0.124	-0.578	-0.077
7	Lower-income	Unit Root	Univariate	FGLS	34	4.164	3.625**	2.041
8	Lower-income	Unit Root	Multivariate	FGLS	33	30.992	-1.475	-0.762
9	Total	Unit Root	Univariate	OLS	86	-0.002	-3.370	-0.915
10	Total	Unit Root	Multivariate	OLS	81	-0.015	-4.447	-1.154
11	Total	Unit Root	Univariate	FGLS	86	1.754	-1.976	-1.324
12	Total	Unit Root	Multivariate	FGLS	81	106.292	-5.536*	-5.821

Table 7B Inflation Targeting Dummy (Mahadeva and Sterne, 2000), Sacrifice Ratio Regressions, Annual Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$	δ	t stat$_\delta$
1	Higher-income	Unit Root	Univariate	OLS	80	-0.003	-0.600	-0.889		
2	Higher-income	Unit Root	Multivariate	OLS	69	-0.003	-0.473	-0.595		
3	Higher-income	Unit Root	Univariate	FGLS	80	3.357	-0.784*	-1.832		
4	Higher-income	Unit Root	Multivariate	FGLS	69	16.055	-0.743*	-1.791		
5	Lower-income	Unit Root	Univariate	OLS	165	-0.004	-0.415	-0.624		
6	Lower-income	Unit Root	Multivariate	OLS	158	0.017	-0.429	-0.601		
7	Lower-income	Break	Univariate	OLS	165	-0.014	-0.597	-0.808	1.0339	0.5895
8	Lower-income	Break	Multivariate	OLS	158	-0.014	-0.518	-0.659	0.2665	0.1197
9	Lower-income	Unit Root	Univariate	FGLS	165	0.006	0.013	0.077		
10	Lower-income	Unit Root	Multivariate	FGLS	158	320.289	0.108	0.493		
11	Lower-income	Break	Univariate	FGLS	165	1.560	-0.045	-0.211	0.4906	0.8417
12	Lower-income	Break	Multivariate	FGLS	158	195.668	-0.015	-0.058	-0.0251	-0.0300
13	Total	Unit Root	Univariate	OLS	245	0.000	-0.518	-1.010		
14	Total	Unit Root	Multivariate	OLS	235	0.023	-0.504	-0.936		
15	Total	Break	Univariate	OLS	245	-0.007	-0.574	-1.036	0.4136	0.2760
16	Total	Break	Multivariate	OLS	235	0.008	-0.493	-0.860	-0.3057	-0.1677
17	Total	Unit Root	Univariate	FGLS	245	2.627	-0.195	-1.621		
18	Total	Unit Root	Multivariate	FGLS	235	22.748	-0.121	-0.708		
19	Total	Break	Univariate	FGLS	245	8.161	-0.176	-1.181	0.3016	0.5522
20	Total	Break	Multivariate	FGLS	235	131.327	-0.116	-0.599	-0.2098	-0.3204

Table 7C Cumulative Inflation Targeting Dummy (Mahadeva and Sterne, 2000), Sacrifice Ratio Regressions, Quarterly Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$
1	Higher-income	Unit Root	Univariate	OLS	52	0.037	-0.523*	-1.715
2	Higher-income	Unit Root	Multivariate	OLS	46	0.078	-0.437	-1.335
3	Higher-income	Unit Root	Univariate	FGLS	52	66.807	-0.520*	-8.174
4	Higher-income	Unit Root	Multivariate	FGLS	46	174.255	-0.440*	-8.897
5	Lower-income	Unit Root	Univariate	OLS	34	-0.026	0.037	0.394
6	Lower-income	Unit Root	Multivariate	OLS	33	-0.123	-0.021	-0.134
7	Lower-income	Unit Root	Univariate	FGLS	34	89.187	0.044*	9.444
8	Lower-income	Unit Root	Multivariate	FGLS	33	154.710	-0.005	-0.142
9	Total	Unit Root	Univariate	OLS	86	-0.012	-0.001	-0.017
10	Total	Unit Root	Multivariate	OLS	81	-0.023	-0.087	-0.842
11	Total	Unit Root	Univariate	FGLS	86	0.960	0.027	0.980
12	Total	Unit Root	Multivariate	FGLS	81	380.731	-0.067*	-3.162

Table 7D Cumulative Inflation Targeting Dummy (Mahadeva and Sterne, 2000), Sacrifice Ratio Regressions, Annual Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$	δ	t stat$_\delta$
1	Higher-income	Unit Root	Univariate	OLS	80	-0.004	-0.171	-0.847		
2	Higher-income	Unit Root	Multivariate	OLS	69	-0.003	-0.135	-0.623		
3	Higher-income	Unit Root	Univariate	FGLS	80	1.732	-0.226	-1.316		
4	Higher-income	Unit Root	Multivariate	FGLS	69	12.277	-0.177	-0.917		
5	Lower-income	Unit Root	Univariate	OLS	165	-0.002	-0.044	-0.774		
6	Lower-income	Unit Root	Multivariate	OLS	158	0.015	-0.017	-0.283		
7	Lower-income	Break	Univariate	OLS	165	-0.015	-0.047	-0.796	0.054	0.208
8	Lower-income	Break	Multivariate	OLS	158	-0.016	-0.017	-0.277	-0.110	-0.311
9	Lower-income	Unit Root	Univariate	FGLS	165	0.037	-0.004	-0.193		
10	Lower-income	Unit Root	Multivariate	FGLS	158	310.849	0.006	0.378		
11	Lower-income	Break	Univariate	FGLS	165	0.816	-0.005	-0.196	-0.007	-0.061
12	Lower-income	Break	Multivariate	FGLS	158	182.677	-0.001	-0.052	-0.162	-0.821
13	Total	Unit Root	Univariate	OLS	245	0.002	-0.061	-1.219		
14	Total	Unit Root	Multivariate	OLS	235	0.021	-0.033	-0.627		
15	Total	Break	Univariate	OLS	245	-0.005	-0.060	-1.164	-0.010	-0.045
16	Total	Break	Multivariate	OLS	235	0.007	-0.031	-0.556	-0.162	-0.536
17	Total	Unit Root	Univariate	FGLS	245	0.822	-0.020	-0.907		
18	Total	Unit Root	Multivariate	FGLS	235	18.731	-0.012	-0.839		
19	Total	Break	Univariate	FGLS	245	7.798	-0.017	-0.748	-0.051	-0.430
20	Total	Break	Multivariate	FGLS	235	147.303	-0.010	-0.647	-0.186	-0.962

Table 8A Inflation Targeting Dummy (Mishkin and Schmidt-Hebbel, 2000), Sacrifice Ratio Regressions, Quarterly Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_{\gamma}$
1	Higher-income	Unit Root	Univariate	OLS	52	0.032	-8.197	-1.634
2	Higher-income	Unit Root	Multivariate	OLS	46	0.076	-7.091	-1.299
3	Higher-income	Unit Root	Univariate	FGLS	52	7.674	-8.109**	-2.770
4	Higher-income	Unit Root	Multivariate	FGLS	46	33.870	-7.840**	-2.480
5	Lower-income	Unit Root	Univariate	OLS	34	-0.025	4.788	0.445
6	Lower-income	Unit Root	Multivariate	OLS	33	-0.116	4.827	0.442
7	Lower-income	Unit Root	Univariate	FGLS	34	7.746	5.892**	2.783
8	Lower-income	Unit Root	Multivariate	FGLS	33	49.141	5.062**	2.156
9	Total	Unit Root	Univariate	OLS	86	-0.001	-4.658	-0.975
10	Total	Unit Root	Multivariate	OLS	81	-0.022	-4.443	-0.922
11	Total	Unit Root	Univariate	FGLS	86	0.709	-2.056	-0.842
12	Total	Unit Root	Multivariate	FGLS	81	23.609	-2.215	-0.834

Table 8B Inflation Targeting Dummy (Mishkin and Schmidt-Hebbel, 2000), Sacrifice Ratio Regressions, Annual Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$
1	Higher-income	Unit Root	Univariate	OLS	80	-0.005	-0.555	-0.754
2	Higher-income	Unit Root	Multivariate	OLS	69	-0.006	-0.373	-0.423
3	Higher-income	Unit Root	Univariate	FGLS	80	2.165	-0.780	-1.471
4	Higher-income	Unit Root	Multivariate	FGLS	69	12.641	-0.666	-1.052
5	Lower-income	Unit Root	Univariate	OLS	165	-0.006	0.051	0.028
6	Lower-income	Unit Root	Multivariate	OLS	158	0.015	-0.065	-0.036
7	Lower-income	Unit Root	Univariate	FGLS	165	0.588	0.264	0.767
8	Lower-income	Unit Root	Multivariate	FGLS	158	1695.547	0.016	0.034
9	Total	Unit Root	Univariate	OLS	245	-0.004	-0.015	-0.017
10	Total	Unit Root	Multivariate	OLS	235	0.019	-0.116	-0.131
11	Total	Unit Root	Univariate	FGLS	245	0.026	0.055	0.160
12	Total	Unit Root	Multivariate	FGLS	235	29.208	-0.125	-0.314

Table 8C Cumulative Inflation Targeting Dummy (Mishkin and Schmidt-Hebbel, 2000), Sacrifice Ratio Regressions, Quarterly Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$
1	Higher-income	Unit Root	Univariate	OLS	52	0.036	-0.521*	-1.708
2	Higher-income	Unit Root	Multivariate	OLS	46	0.077	-0.434	-1.327
3	Higher-income	Unit Root	Univariate	FGLS	52	67.050	-0.518*	-8.188
4	Higher-income	Unit Root	Multivariate	FGLS	46	168.716	-0.439*	-8.778
5	Lower-income	Unit Root	Univariate	OLS	34	-0.025	0.266	0.445
6	Lower-income	Unit Root	Multivariate	OLS	33	-0.116	0.268	0.442
7	Lower-income	Unit Root	Univariate	FGLS	34	7.746	0.327*	2.783
8	Lower-income	Unit Root	Multivariate	FGLS	33	49.141	0.281*	2.156
9	Total	Unit Root	Univariate	OLS	86	0.000	-0.284	-1.001
10	Total	Unit Root	Multivariate	OLS	81	-0.020	-0.279	-0.974
11	Total	Unit Root	Univariate	FGLS	86	5.290	-0.287*	-2.300
12	Total	Unit Root	Multivariate	FGLS	81	28.191	-0.308*	-2.420

Table 8D Cumulative Inflation Targeting Dummy (Mishkin and Schmidt-Hebbel, 2000), Sacrifice Ratio Regressions, Annual Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$
1	Higher-income	Unit Root	Univariate	OLS	80	-0.005	-0.161	-0.792
2	Higher-income	Unit Root	Multivariate	OLS	69	-0.004	-0.123	-0.566
3	Higher-income	Unit Root	Univariate	FGLS	80	1.247	-0.196	-1.117
4	Higher-income	Unit Root	Multivariate	FGLS	69	11.356	-0.105	-0.520
5	Lower-income	Unit Root	Univariate	OLS	165	-0.006	0.015	0.052
6	Lower-income	Unit Root	Multivariate	OLS	158	0.015	-0.009	-0.029
7	Lower-income	Unit Root	Univariate	FGLS	165	0.625	0.039	0.791
8	Lower-income	Unit Root	Multivariate	FGLS	158	1712.526	0.003	0.038
9	Total	Unit Root	Univariate	OLS	245	-0.004	-0.029	-0.146
10	Total	Unit Root	Multivariate	OLS	235	0.020	-0.047	-0.238
11	Total	Unit Root	Univariate	FGLS	245	0.067	0.015	0.258
12	Total	Unit Root	Multivariate	FGLS	235	29.130	-0.014	-0.174

Table 9A Inflation Targeting Dummy (Corbo et al., 2001), Sacrifice Ratio Regressions, Quarterly Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t $stat_\gamma$
1	Higher-income	Unit Root	Univariate	OLS	47	0.040	-7.915*	-1.714
2	Higher-income	Unit Root	Multivariate	OLS	41	0.108	-6.588	-1.296
3	Higher-income	Unit Root	Univariate	FGLS	47	7.508	-7.944**	-2.740
4	Higher-income	Unit Root	Multivariate	FGLS	41	26.742	-7.421**	-2.474
5	Lower-income	Unit Root	Univariate	OLS	23	-0.018	7.832	0.782
6	Lower-income	Unit Root	Multivariate	OLS	23	-0.142	6.634	0.610
7	Lower-income	Unit Root	Univariate	FGLS	23	20.292	6.967**	4.505
8	Lower-income	Unit Root	Multivariate	FGLS	23	9.292	6.870**	2.828
9	Total	Unit Root	Univariate	OLS	70	-0.005	-3.588	-0.803
10	Total	Unit Root	Multivariate	OLS	66	-0.045	-3.878	-0.831
11	Total	Unit Root	Univariate	FGLS	70	0.245	-1.208	-0.495
12	Total	Unit Root	Multivariate	FGLS	66	4.698	-1.744	-0.671

Table 9B Inflation Targeting Dummy (Corbo et al., 2001), Sacrifice Ratio Regressions, Annual Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$
1	Higher-income	Unit Root	Univariate	OLS	69	0.011	-1.314	-1.323
2	Higher-income	Unit Root	Multivariate	OLS	62	0.011	-1.317	-1.264
3	Higher-income	Unit Root	Univariate	FGLS	69	4.002	-1.142**	-2.000
4	Higher-income	Unit Root	Multivariate	FGLS	62	14.829	-1.383**	-2.287
5	Lower-income	Unit Root	Univariate	OLS	46	0.177	-3.089**	-3.265
6	Lower-income	Unit Root	Multivariate	OLS	45	0.124	-3.147**	-3.107
7	Lower-income	Unit Root	Univariate	FGLS	46	15.696	-4.728**	-3.962
8	Lower-income	Unit Root	Multivariate	FGLS	45	17.903	-4.959**	-4.093
9	Total	Unit Root	Univariate	OLS	115	0.053	-2.024**	-2.722
10	Total	Unit Root	Multivariate	OLS	111	0.040	-2.111**	-2.783
11	Total	Unit Root	Univariate	FGLS	115	4.336	-1.288**	-2.082
12	Total	Unit Root	Multivariate	FGLS	111	9.456	-1.412**	-2.240

Table 9C Cumulative Inflation Targeting Dummy (Corbo et al., 2001), Sacrifice Ratio Regressions, Quarterly Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$
1	Higher-income	Unit Root	Univariate	OLS	47	0.052	-0.761*	-1.876
2	Higher-income	Unit Root	Multivariate	OLS	41	0.116	-0.623	-1.425
3	Higher-income	Unit Root	Univariate	FGLS	47	79.713	-0.740**	-8.928
4	Higher-income	Unit Root	Multivariate	FGLS	41	137.297	-0.622**	-7.620
5	Lower-income	Unit Root	Univariate	OLS	23	-0.018	0.435	0.782
6	Lower-income	Unit Root	Multivariate	OLS	23	-0.142	0.369	0.610
7	Lower-income	Unit Root	Univariate	FGLS	23	20.292	0.387**	4.505
8	Lower-income	Unit Root	Multivariate	FGLS	23	9.292	0.382**	2.828
9	Total	Unit Root	Univariate	OLS	70	-0.008	-0.224	-0.666
10	Total	Unit Root	Multivariate	OLS	66	-0.048	-0.251	-0.715
11	Total	Unit Root	Univariate	FGLS	70	0.413	-0.118	-0.643
12	Total	Unit Root	Multivariate	FGLS	66	4.822	-0.173	-0.921

Table 9D Cumulative Inflation Targeting Dummy (Corbo et al., 2001), Sacrifice Ratio Regressions, Annual Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$
1	Higher-income	Unit Root	Univariate	OLS	69	0.001	-0.327	-1.042
2	Higher-income	Unit Root	Multivariate	OLS	62	0.002	-0.330	-1.013
3	Higher-income	Unit Root	Univariate	FGLS	69	2.008	-0.365	-1.417
4	Higher-income	Unit Root	Multivariate	FGLS	62	8.398	-0.312	-1.101
5	Lower-income	Unit Root	Univariate	OLS	46	-0.006	-0.244	-0.848
6	Lower-income	Unit Root	Multivariate	OLS	45	-0.073	-0.232	-0.752
7	Lower-income	Unit Root	Univariate	FGLS	46	0.213	-0.193	-0.461
8	Lower-income	Unit Root	Multivariate	FGLS	45	1.367	-0.232	-0.554
9	Total	Unit Root	Univariate	OLS	115	0.006	-0.296	-1.310
10	Total	Unit Root	Multivariate	OLS	111	-0.012	-0.317	-1.372
11	Total	Unit Root	Univariate	FGLS	115	0.786	-0.204	-0.886
12	Total	Unit Root	Multivariate	FGLS	111	5.911	-0.238	-1.009

Table 10A Inflation Focus (Mahadeva and Sterne, 2000), Sacrifice Ratio Regressions, Quarterly Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$	δ	t stat$_\delta$
1	Higher-income	Unit Root	Univariate	OLS	52	0.054	-0.065**	-1.984		
2	Higher-income	Unit Root	Multivariate	OLS	46	0.043	-0.022	-0.518		
3	Higher-income	Break	Univariate	OLS	52	0.041	-0.068*	-1.888	0.022	0.245
4	Higher-income	Break	Multivariate	OLS	46	-0.094	-0.030	-0.582	0.027	0.104
5	Higher-income	Unit Root	Univariate	FGLS	52	23.751	-0.061**	-4.874		
6	Higher-income	Unit Root	Multivariate	FGLS	46	26.063	-0.006	-0.303		
7	Higher-income	Break	Univariate	FGLS	52	50.002	-0.060**	-3.659	0.003	0.068
8	Higher-income	Break	Multivariate	FGLS	46	1112.832	-0.007	-0.336	-0.004	-0.025
9	Lower-income	Unit Root	Univariate	OLS	34	-0.014	-0.040	-0.728		
10	Lower-income	Unit Root	Multivariate	OLS	33	-0.111	-0.032	-0.572		
11	Lower-income	Break	Univariate	OLS	34	-0.068	-0.022	-0.341	-0.082	-0.612
12	Lower-income	Break	Multivariate	OLS	33	-0.288	-0.009	-0.129	-0.211	-0.865
13	Lower-income	Unit Root	Univariate	FGLS	34	0.809	-0.014	-0.900		
14	Lower-income	Unit Root	Multivariate	FGLS	33	9.877	-0.010	-0.639		
15	Lower-income	Break	Univariate	FGLS	34	1.375	0.004	0.233	-0.052	-1.152
16	Lower-income	Break	Multivariate	FGLS	33	12.034	0.007	0.435	-0.179	-0.743
17	Total	Unit Root	Univariate	OLS	86	0.027	-0.053*	-1.841		
18	Total	Unit Root	Multivariate	OLS	81	-0.005	-0.043	-1.443		
19	Total	Break	Univariate	OLS	86	0.014	-0.050	-1.551	-0.018	-0.246
20	Total	Break	Multivariate	OLS	81	-0.050	-0.040	-1.166	-0.013	-0.137
21	Total	Unit Root	Univariate	FGLS	86	36.531	-0.057**	-6.044		
22	Total	Unit Root	Multivariate	FGLS	81	1113.460	-0.034**	-4.890		
23	Total	Break	Univariate	FGLS	86	267.262	-0.048**	-3.920	-0.037*	-1.780
24	Total	Break	Multivariate	FGLS	81	159.133	-0.034**	-3.612	0.022	0.291

Table 10B Inflation Focus (Mahadeva and Sterne, 2000), Sacrifice Ratio Regressions, Annual Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$	δ	t stat$_\delta$
1	Higher-income	Unit Root	Univariate	OLS	80	-0.009	-0.003	-0.542		
2	Higher-income	Unit Root	Multivariate	OLS	69	-0.006	0.003	0.461		
3	Higher-income	Break	Univariate	OLS	80	-0.026	-0.002	-0.307	-0.0032	-0.2503
4	Higher-income	Break	Multivariate	OLS	69	-0.086	0.002	0.303	0.0083	0.4306
5	Higher-income	Unit Root	Univariate	FGLS	80	0.008	0.000	-0.090		
6	Higher-income	Unit Root	Multivariate	FGLS	69	17.647	0.004	1.365		
7	Higher-income	Break	Univariate	FGLS	80	5.137	0.002	0.641	-0.0067	-1.0398
8	Higher-income	Break	Multivariate	FGLS	69	18.131	0.003	0.881	0.0125	1.0847
9	Higher-income (Ball)	Unit Root	Univariate	OLS	64	-0.001	-0.003	-0.955		
10	Higher-income (Ball)	Unit Root	Multivariate	OLS	41	0.009	-0.002	-0.511		
11	Higher-income (Ball)	Break	Univariate	OLS	46	-0.023	-0.006	-1.314	0.0109	0.8917
12	Higher-income (Ball)	Break	Multivariate	OLS	41	-0.078	-0.006	-1.081	0.0291	1.0740
13	Higher-income (Ball)	Unit Root	Univariate	FGLS	64	2.216	-0.003	-1.489		
14	Higher-income (Ball)	Unit Root	Multivariate	FGLS	41	23.350	-0.004*	-1.834		
15	Higher-income (Ball)	Break	Univariate	FGLS	46	4.529	-0.004*	-1.793	0.0127	1.5532
16	Higher-income (Ball)	Break	Multivariate	FGLS	41	42.181	-0.007**	-2.477	0.0302*	1.8623
17	Lower-income	Unit Root	Univariate	OLS	158	-0.006	-0.001	-0.180		
18	Lower-income	Unit Root	Multivariate	OLS	151	0.017	-0.005	-0.627		
19	Lower-income	Break	Univariate	OLS	158	-0.019	-0.001	-0.080	-0.0048	-0.2299
20	Lower-income	Break	Multivariate	OLS	151	-0.016	-0.004	-0.424	-0.0082	-0.3528
21	Lower-income	Unit Root	Univariate	FGLS	158	0.065	0.000	0.254		
22	Lower-income	Unit Root	Multivariate	FGLS	151	508.256	-0.001	-0.617		
23	Lower-income	Break	Univariate	FGLS	158	1.706	0.001	0.700	-0.0041	-0.5724
24	Lower-income	Break	Multivariate	FGLS	151	1702.389	0.000	0.079	-0.0023	-0.2457
25	Total	Unit Root	Univariate	OLS	238	-0.004	0.000	0.084		
26	Total	Unit Root	Multivariate	OLS	228	0.022	-0.003	-0.549		
27	Total	Break	Univariate	OLS	238	-0.011	0.001	0.225	-0.0038	-0.2893
28	Total	Break	Multivariate	OLS	228	0.007	-0.001	-0.205	-0.0087	-0.6176
29	Total	Unit Root	Univariate	FGLS	238	0.434	0.001	0.659		
30	Total	Unit Root	Multivariate	FGLS	228	35.820	0.000	0.011		
31	Total	Break	Univariate	FGLS	238	8.671	0.002	1.170	-0.0056	-1.0050
32	Total	Break	Multivariate	FGLS	228	90.357	0.002	0.946	-0.0077	-1.2531

Table 11A Inflation-Indexed Bond Issuance/Inflation Targeting Dummy, Sacrifice Ratio Regressions, Quarterly Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$	δ	t stat$_\delta$
1	Higher-income	Unit Root	Univariate	OLS	52	0.005	-3.652	-1.111		
2	Higher-income	Unit Root	Multivariate	OLS	46	0.041	-1.516	-0.416		
3	Higher-income	Unit Root	Univariate	FGLS	52	2.767	-2.456*	-1.663		
4	Higher-income	Unit Root	Multivariate	FGLS	46	22.508	-0.538	-0.328		
5	Lower-income	Unit Root	Univariate	OLS	34	-0.027	-1.448	-0.373		
6	Lower-income	Unit Root	Multivariate	OLS	33	-0.117	-1.921	-0.428		
7	Lower-income	Break	Univariate	OLS	34	-0.094	-1.203	-0.278	-1.724	-0.135
8	Lower-income	Break	Multivariate	OLS	33	-0.297	-1.646	-0.322	76.671	0.809
9	Lower-income	Unit Root	Univariate	FGLS	34	0.208	-0.368	-0.456		
10	Lower-income	Unit Root	Multivariate	FGLS	33	18.477	-0.741	-0.653		
11	Lower-income	Break	Univariate	FGLS	34	1.398	0.148	0.162	-2.789	-0.826
12	Lower-income	Break	Multivariate	FGLS	33	12.083	-0.586	-0.427	50.112	0.815
13	Total	Unit Root	Univariate	OLS	86	0.003	-2.707	-1.118		
14	Total	Unit Root	Multivariate	OLS	81	-0.015	-3.073	-1.163		
15	Total	Break	Univariate	OLS	86	-0.014	-2.233	-0.871	-2.738	-0.272
16	Total	Break	Multivariate	OLS	81	-0.058	-2.552	-0.905	20.060	0.657
17	Total	Unit Root	Univariate	FGLS	86	15.219	-2.342**	-3.901		
18	Total	Unit Root	Multivariate	FGLS	81	275.613	-2.857**	-3.775		
19	Total	Break	Univariate	FGLS	86	18.280	-2.011**	-3.135	-2.804	-0.867
20	Total	Break	Multivariate	FGLS	81	81.395	-2.463**	-2.882	20.243	1.431

Table 11B Inflation-Indexed Bond Issuance/Inflation Targeting Dummy, Sacrifice Ratio Regressions, Annual Data

Model	Sample	Time Series	Specification	Estimation	Obs.	R^2/χ^2	γ	t stat$_\gamma$	δ	t stat$_\delta$
1	Higher-income	Unit Root	Univariate	OLS	80	0.006	-0.537	-1.214		
2	Higher-income	Unit Root	Multivariate	OLS	69	0.001	-0.418	-0.798		
3	Higher-income	Break	Univariate	OLS	80	-0.014	-0.493	-1.049	0.0199	0.0115
4	Higher-income	Break	Multivariate	OLS	69	-0.082	-0.466	-0.795	0.4265	0.1962
5	Higher-income	Unit Root	Univariate	FGLS	80	5.097	-0.524**	-2.258		
6	Higher-income	Unit Root	Multivariate	FGLS	69	13.457	-0.454	-1.529		
7	Higher-income	Break	Univariate	FGLS	80	7.507	-0.511**	-2.049	0.0667	0.1081
8	Higher-income	Break	Multivariate	FGLS	69	14.431	-0.559*	-1.799	1.0124	0.8197
9	Higher-income (Ball)	Unit Root	Univariate	OLS	64	0.015	-0.582	-1.404		
10	Higher-income (Ball)	Unit Root	Multivariate	OLS	41	0.007	-0.197	-0.419		
11	Higher-income (Ball)	Break	Univariate	OLS	46	-0.027	-0.663	-1.178	-0.0319	-0.0248
12	Higher-income (Ball)	Break	Multivariate	OLS	41	-0.106	-0.365	-0.639	-1.2258	-0.6355
13	Higher-income (Ball)	Unit Root	Univariate	FGLS	64	5.060	-0.489**	-2.249		
14	Higher-income (Ball)	Unit Root	Multivariate	FGLS	41	30.111	-0.324*	-1.834		
15	Higher-income (Ball)	Break	Univariate	FGLS	46	5.421	-0.547**	-2.131	0.3085	0.5070
16	Higher-income (Ball)	Break	Multivariate	FGLS	41	34.209	-0.503**	-2.237	-1.0879	-0.9919
17	Lower-income	Unit Root	Univariate	OLS	165	0.002	-0.577	-1.148		
18	Lower-income	Unit Root	Multivariate	OLS	158	0.025	-0.690	-1.277		
19	Lower-income	Break	Univariate	OLS	165	-0.006	-0.767	-1.379	1.1141	0.8226
20	Lower-income	Break	Multivariate	OLS	158	-0.004	-0.832	-1.398	0.4667	0.2354
21	Lower-income	Unit Root	Univariate	FGLS	165	0.029	-0.028	-0.172		
22	Lower-income	Unit Root	Multivariate	FGLS	158	130.359	-0.035	-0.178		
23	Lower-income	Break	Univariate	FGLS	165	1.582	-0.106	-0.549	0.4664	0.8525
24	Lower-income	Break	Multivariate	FGLS	158	225.823	-0.129	-0.585	-0.0654	-0.0785
25	Total	Unit Root	Univariate	OLS	245	0.005	-0.548	-1.476		
26	Total	Unit Root	Multivariate	OLS	235	0.028	-0.551	-1.419		
27	Total	Break	Univariate	OLS	245	-0.002	-0.604	-1.497	0.3611	0.3425
28	Total	Break	Multivariate	OLS	235	0.015	-0.574	-1.372	-0.3297	-0.2428
29	Total	Unit Root	Univariate	FGLS	245	2.219	-0.151	-1.490		
30	Total	Unit Root	Multivariate	FGLS	235	22.383	-0.126	-0.984		
31	Total	Break	Univariate	FGLS	245	8.132	-0.125	-1.047	0.1819	0.4103
32	Total	Break	Multivariate	FGLS	235	129.701	-0.105	-0.744	-0.4809	-0.9386