Revisiting Sacrifice Ratio and Disinflation: New Evidence from a Meta-Analysis

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1. Motivation and Outline:

The post-COVID-19 inflation spike has revived debates over the trade-offs of disinflation, particularly the *sacrifice ratio*—the GDP loss incurred to reduce inflation through tighter monetary policy. Historically, disinflation has been associated with significant output costs and recessions (Cecchetti et al., 2023). Many prominent economists have argued that disinflation in the 2020s will require a recession (Blanchard, 2022; Larry Summers, 2022). However, the post-pandemic disinflation (2022-2023) has been "essentially costless" so far, leading to the concept of a "missing recession".

Concurrently, political pressures, exemplified by the Trump Administration's push for lower interest rates to boost GDP growth, have clashed with the Federal Reserve's (Fed) efforts to combat inflation via rate hikes, raising concerns about central bank independence.

This research proposes a meta-analysis to synthesize empirical evidence on sacrifice ratios, explore the trade-offs between inflation control policy and GDP growth objectives.

Central banks often face tradeoffs in how their monetary policy decisions impact economic activity (including employment), inflation and the price level. These tradeoffs have evolved over time and varied across countries (Forbes & Kose, 2025).

The correlations between central bank independence and macroeconomic performance variables are not always confirmed, the causal relationship between central bank independence and inflation is controversial (Cornel & Coroiu). While central bank independence (CBI) is often theorized to reduce disinflation costs by anchoring expectations, empirical findings are mixed. Some studies find that greater central bank independence reduces inflation persistence and thus lowers the sacrifice ratio, enabling faster and less costly disinflation (Diana & Sidiropoulos, 2003), while others suggest that the effect is insignificant or even the opposite.

Similarly, the adoption of inflation targeting (IT) appears to reduce sacrifice ratio in some studies focused on low-inflation OECD countries, though broader samples show weaker results (Haque & Jalil, 2020). Yet, targeting inflation policy helped industrial countries achieve both lower inflation and lower unemployment, but the transition has been gradual, not immediate. However, in some Eurozone and emerging market economies, maintaining low and stable inflation under inflation targeting has come with adverse employment effects, suggesting that disinflation can still involve output and labor market costs depending on context.

Critiques of the literature, including the study of Brito (2010), challenges the finding that inflation targeting reduces disinflation costs, arguing that this result is not robust. When accounting for differences in timing and macroeconomic context—such as common shocks or Maastricht Treaty effects—inflation targeting has no significant impact on disinflation outcomes.

Empirical and theoretical literature consistently underscores the critical role of speed in determining the output cost of disinflation. Evidence from 65 disinflation episodes across moderate-inflation OECD countries shows that rapid "cold turkey" approaches are generally associated with lower sacrifice ratios than gradual disinflation strategies (Ball, 1993).

However, the effectiveness of such strategies depends heavily on monetary policy credibility and transparency. For instance, a general equilibrium model of three U.S. disinflation episodes—post-Civil War, post-WWI, and the Volcker era—demonstrates that when the credibility is high, a gradualist approach minimizes output losses; when

credibility is low, a sharp, aggressive disinflation (as under Volcker) helps signal commitment and anchor expectations more effectively (Bordo et al., 2007).

Studies also suggest that gradual disinflation strategies—especially those linked to announced intermediate inflation targets — helps minimize output costs by building credibility over time—explaining the successful low-cost disinflation experiences of Chile and Colombia in the 1990s (Duggal & Rojas, 2023).

Comparative analyses of open and closed economies reveal that disinflation is generally more costly in small open economies than in closed ones when both follow the same Taylor rule. However, under optimized monetary policy rules, the small open economy achieves a slightly lower sacrifice ratio (Faryna et al., 2019).

Evidence on the role of trade openness in shaping the sacrifice ratio is mixed. Some studies, particularly those using New Keynesian open economy models, argue that globalization—through capital and trade liberalization—weakens the link between the output gap and household welfare, thereby lowering the sacrifice ratio and making disinflation less costly. This reinterpretation of evidence suggests that greater openness lowers the sacrifice ratio, supporting the idea that disinflation becomes less costly in more globalized economies (Razin & Loungani, 2005).

While some cross-country studies find that openness reduces output losses, others report that the degree of economic openness does not significantly influence the sacrifice ratio. Notably, since the 1990s, financial openness has played a more prominent role than trade openness in shaping the inflation-output trade-off, with larger, faster disinflations associated with lower sacrifice ratios in highly open economies (Ball, 1993; Badinger & Nindl, 2012).

Wage-setting flexibility significantly influences disinflation costs, with countries that have adaptable labor markets experiencing lower sacrifice ratios (Ball, 1993). However, these output losses are not evenly distributed across income groups. Studies show a U-shaped distributional impact—disproportionately affecting both low and high-income segments—with disinflation periods often accompanied by rising income inequality (Gini Index), especially benefiting the top 1% (Acevedo & Hofstetter, 2023, 2024, 2025). Additionally, wage indexation, central bank credibility, and targeted policies shape the effectiveness and equity of disinflation outcomes, highlighting that both labor market structures and household heterogeneity are critical in assessing the real cost of disinflation (Gómez, 2003; Kwicklis, 2025).

Some Euro area estimates show sacrifice ratios between -1 and 2, with occasional negative values—implying that disinflation can occur without output loss, or even alongside economic growth (Belke & Böing, 2014). Similarly, a DSGE model shows that active macroprudential policy can limit the output costs of disinflation, though welfare effects are uneven—helping savers but hurting borrowers—highlighting the importance of coordinated monetary and macroprudential policy.

Moreover, sacrifice ratios vary widely across models and often exceed historical norms, but the formation of inflation expectations and the credibility of policy are key determinants of the magnitude of potential output costs (Tetlow, 2022). Further compounding the issue, studies that accounting for long-lived effects (such as persistence or hysteresis) leads to significantly higher estimates of the sacrifice ratio. It finds that standard methods like Ball's underestimate these costs—especially in economies with stronger long-lived effects (Zhang, 2001).

Finaly, the broader political and institutional context also plays a critical role. Countries with strong governance and stable regimes tend to experience lower output losses during disinflation. Finally, methodological differences, such as how potential output and inflation episodes are measured, significantly influence sacrifice ratio estimates and limit direct cross-country comparisons. Overall, these factors highlight that the cost of disinflation is context-dependent and sensitive to both economic structure and policy credibility (Haque & Jalil, 2020).

Despite decades of empirical research on disinflation episodes, estimates of the sacrifice ratio remain widely dispersed. This proposed research seeks to advance knowledge by addressing how methodological choices and measurement approaches affect the reported sacrifice ratios across studies. This research will provide a systematic meta-analysis of sacrifice ratio estimates across countries, and offering broader implications for institutional design and monetary policy credibility.

The final paper will be organized into five sections. The introduction will present the research question on sacrifice ratio and disinflation. The second section will offer a systematic review on sacrifice ratio, identifying key gaps. The third section will describe the meta-analysis methodology, including data sources, coding procedures,

and hypothesis testing. The fourth section will report the empirical findings and robustness checks, with attention to cross-country heterogeneity. Finally, the conclusion will summarize the findings and discuss their policy implications.

2. Methodology and Analysis:

This study will conduct a meta-analysis to synthesize empirical estimates of sacrifice ratios across diverse countries and economic contexts. The sacrifice ratio will be defined as the cumulative percentage loss in GDP per percentage point reduction in inflation, typically estimated through output gaps or unemployment rates.

1. Meta-Dataset Construction:

1.1. Search Strategy:

Our search for studies, data collection, coding and reporting of the results will follow the MAER-NET guidelines (Havranek et al., 2020). The systematic search and review of the literature for this paper will begin by identifying all relevant primary studies on sacrifice ratio and disinflation. Sources will include: NBER, Google Scholar, IDEAS, ResearchGate, EconLit, JSTOR, Scopus, RePEc, and SSRN. We will use combinations of keywords like "sacrifice ratio" and "disinflation". Furthermore, a snowballing technique (i.e., checking references of identified papers) will also be applied.

1.2. Inclusion Criteria:

The criteria for inclusion in the meta-analysis will be as follows:

- ✓ Only empirical studies reporting regression-based results will be included; purely theoretical analyses, descriptive statistics, and qualitative surveys will be excluded.
- ✓ Studies must provide sufficient statistics information (e.g., correlation, coefficients and standard errors or t-statistics) from which standardized measures of sacrifice ratio could be computed.
- ✓ Only studies written in English will be considered.
- ✓ All types of publications – including peer-reviewed journal articles, working papers, and book chapters - will be eligible.
- ✓ Studies must report quantitative estimates of the sacrifice ratios, include clear methodologies and cover diverse economic contexts.

1.3. Data Coding and Extraction

We will record and extract features related to the data, study design, and estimation characteristics. We will collect information on sacrifice ratio estimates, and accompanying statistical measures such as sample size, t-tests, F-tests, regression coefficients, and correlations, as well as the publication details (authors, publication year, sample size, region, methodology).

2. Standardization of Effect Sizes:

Consistent with prior meta-analysis studies (Mookerjee, 2006; Tingvall & Ljungwall, 2012), and to ensure comparability across studies, we will adopt the partial correlation coefficient (PCC) to standardize the effect sizes. This approach is necessary because the individual estimates of the sacrifice ratio vary in their measurement methods and are therefore not directly comparable.

3. Meta-Regression Analysis :

3.1. Rational for Using Random Effects:

When undertaking a meta-analysis, the researcher must decide between using fixed or random effects (Borenstein et al., 2009). In the fixed effects model, the studies in the meta-analysis are assumed to constitute the entire universe of studies and, thus, the model only uses within-study variability in the error term. In the random effects model, on the other hand, studies in the meta-analysis are assumed to be only a sample of all possible studies and, thus, the error term includes both within-study variability and variability arising from differences between studies. The random effects model therefore results in much larger standard errors and more conservative significance tests than in the case of the fixed effects model (Field, 2001). As such, the fixed effects model can

overestimate the degree of precision in meta-analysis findings (Hunter and Schmidt, 2000), whereas the random effects model facilitates "unconditional" inferences".

3.2. Detecting Publication Bias:

This section aims to assess the presence and magnitude of publication bias, which refers to the tendency for studies with statistically significant results to be more likely published. Publication selection bias occurs when the various actors (i.e., authors, reviewers, editors) in the publishing process have preferred for statistically significant results or those results that are consistent with mainstream theory (Stanley, 2005). Available meta-analysis literature shows a significant presence of publication selection bias in economics (Mookerjee, 2006; Stanley & Doucouliagos, 2012; Tingvall & Ljungwall, 2012).

We employ both visual and statistical methods to detect potential publication bias in the meta-analysis:

- ✓ **Visual Method: Funnel Plots:** are used for visual detection of publication bias. In the absence of bias, a plot of point estimates against precision (reciprocal of standard error) should be symmetric. Asymmetry indicates publication bias, often because "expected" positive or negative effect sizes introduce a correlation between the point estimate and its standard error.
- ✓ **Formal Tests**: include the **Funnel Plot Asymmetry Test and Precision-Effect Test (FAT-PET):** This involves a meta-regression of the point estimates on a constant and their standard error.

3.3. Analyzing Heterogeneity:

This part of the analysis explores the reasons behind the varied estimates found in the primary studies, attributing variability to factors such as the level of analysis (e.g., country-level vs. cross-country), country selection (e.g., emerging vs. advanced economies), time periods covered, and methodological approaches (e.g., estimation techniques, inflation measures, treatment of output gaps). By identifying and modeling these sources of heterogeneity, the meta-analysis aims to explain why sacrifice ratio estimates differ and which study features systematically influence their magnitude.

Moderator Variables: The study will perform a robustness check by including a full set of control variables in the meta-regression. These variables capture various data, estimation, and study characteristics, such as:

- **Economic growth measures**: GDP growth rate, GDP per capita.
- **Study characteristics**: Publication year to check for time-lag bias, and whether the study was published or unpublished, to assess potential publication bias.
- **Spatial characteristics**: Level of data (city, regional, country).
- **Country origin**: OECD, Europe, US, Africa, Asia.
- **Data type** (time series, panel data, or cross-sectional data).
- **Estimation method** (OLS, GLS, correction for endogeneity like 2SLS, GMM).

C. Estimation Approach: To address model uncertainty in the presence of multiple moderator variables, the analysis will apply both Bayesian Model Averaging (BMA) and Frequentist Model Averaging (FMA) techniques. These methods help avoid the pitfalls of arbitrary model selection and ensure robust inference.

Bayesian Model Averaging (BMA): will be employed to handle model uncertainty and identify important variables without arbitrarily excluding controls. This involves running numerous models with all possible combinations of explanatory variables, calculating Posterior Model Probability (PMP), and determining Posterior Inclusion Probability (PIP) for each variable.

Frequentist Model Averaging (FMA): will be applied as robustness check. This method assigns model weights using Mallow's Model Averaging (MMA) and reduces model space through orthogonalization of covariates.

Software: Stata and the R package 'metafor' will be used for meta-regression, and Meta-Essentials for conducting meta-analyses.

3. Expected Results:

- Higher sacrifice ratios in low-credibility regimes, countries with weak central bank independence, and during election years.

- Studies using Phillips curve estimation may yield higher ratios than those using VAR or local projections.
- Countries with inflation targeting frameworks may have smaller output costs of disinflation.
- Higher starting inflation may be associated with higher sacrifice ratios due to structural rigidity.
- Weak institutional quality might predict higher output losses.
- Publication bias: Show whether only studies with large or significant sacrifice ratios are published.
- Show whether developing countries systematically face higher sacrifice ratios — and under what conditions they can reduce that cost.
- For policymakers facing political pressure or external shocks, the results can quantify the hidden cost of interference with monetary policy.

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