Vol. 8

THE ECONOMICS REVIEW

AT NEW YORK UNIVERSITY

Volume 8

THE ECONOMICS REVIEW

AT NEW YORK UNIVERSITY

Cover design by Revan Aponso

Contents

Academic Papers

Letter from our Editor-in-Chief

It is with great pride that I preside over Volume XIII of the Print Publication of The Economics Review at New York University, It has become a tradition for our publication to serve as a platform for promoting emerging scholarship in the field of economic sciences and this year we steadfastly continue with this mission. This year has been truly remarkable as we regained a sense of community in the institution and engaged in challenging inquiry, which has facilitated the development of some of the highest-quality writing this publication has had the pleasure of publishing. We likewise connected with leading experts in our field which allowed us to better navigate this challenging and confusing global economic environment.

Volume XIII of the Print Publication is made possible by the tireless work of our staff. The Co-Editors of the Print Publication, Stuti Saria and Taran Agarwal, curated and edited the works that exemplify some of the most pressing themes in modern economic research. For this and all their other contributions to the operations of our publication, I thank them. I also would like to thank and commend Ellie Kim and Anoushey Gajial for deftly serving as Managing Editors of our Online Publication. Their devotion to supporting our writers in the production of innovative and thought-provoking work for our readership was unwavering week in and week out. Ellie, along with our Treasurer Abhinav Madamanchi, will serve as Co-Presidents next academic year and I cannot think of two better candidates to guide this publication into the future. Thank you to the remainder of our Executive Board including Revan Aponso, Augustine Langlet, and Angel Cortes. You all supported the operations of our publication well, and we could not have done it without every single one of you. Lastly, I would like to thank Eugene Seong, the Co-President who worked with me to manage and grow this publication that we both devoted so much to. I speak for both of us when I say that the Economics Review is in great hands and that we cannot wait to see how Ellie and Abhinav improve on our mission of providing outstanding student scholarships to the university community.

The papers in this year's Print Publication represent research techniques and topics at the forefront of economic inquiry. I hope that they inspire our readership to seek change and improvement in our world. In our view, this can be achieved by harnessing the power of economic research as exemplified by our works. The Economics Review is grateful for our readers who continue to support and inspire our research as well as our predecessors, including the former Presidents Tomasz Jankowski and Will Rojas, for establishing a foundation on which we were able to build

Happy Reading!

Sincerely,

Kyung Ho Joseph Kwon

Letter from the Managing Editors of the Print Publication

Our Print Publication is a means for our audience to conduct research, present their work, and advance their academic prospects. Not only do we strive to provide our authors with a reading audience, but we also try to cultivate research skills in all members of our community. Our Print Publication authors are unique in their commitment to independent research, exploring crucial queries about our economic and societal realities. Their experience in research and willingness to transcend traditional boundaries have brought them here; their work reflects a sincere passion to dig deeper and go further. We would like to present to you, with great pleasure, the Editorial of the Economics Review at New York University.

For the 2023-24 Academic Year issue, the print publication committee selected five papers to present to our readers. These papers represent research techniques and topics at the forefront of economic inquiry The researchers discuss a wide array of topics related to the Taylor rule for setting the federal funds rate, gender differences in labor market outcomes, multiple equilibria, and foreign aid.

This publication would not have been possible without the comprehensive and thoughtful contributions of our executive board. Throughout this entire process, they have been diligent in their efforts to keep the Economics Review team centered and focused. Finally, we want to extend our thanks to Rushil Reddy Yelma and Zhexin Zhou, who have contributed their honors theses to this year's issue.

As a creative and ardent team of editors and writers, the Economics Review aims to provide New York University students with an informative, analytical, and inspirational source of articles and research papers that encourage students to think analytically and conduct original research. The subjects in this volume cover a wide range of interesting and thought-provoking topics that promote inquiry and critical thinking. We hope each piece in the publication provides you with a new perspective.

Happy Reading!

Sincerely,

Stuti Saria & Taran Agarwal

Academic Papers

Enhancing the Taylor Rule: Optimizing Monetary Policy for Economic Efficiency[1]

Rushil Reddy Yelma

New York University

Abstract

The Federal Reserve calculates the Effective Federal Funds Rate (EFFR) using the Taylor Rule (1993). Over time, the Taylor Rule has been ineffective in predicting the real EFFR. This study uses data from 2000-2023 to include unique macroeconomic variables in the Taylor Rule equation to improve its predictability. Using OLS, I ran multiple regressions to determine which combination of variables accurately reflects the present day. Finally, I assess variations of existing macroeconomic variables to recommend an updated Taylor Rule model.

[1] This thesis was written in conjunction with the Honors Program for the B.A. in Economics at NYU. The author would like to thank his thesis advisor for their consistent feedback and advice.

1. Introduction

The Federal Reserve has encountered various economic upheavals in the past fifteen years, such as the Great Financial Crisis of 2008 and the COVID-19 Pandemic in 2019-2020. These events necessitated unique approaches in determining the Effective Federal Funds Rate (EFFR). The EFFR is the interest rate at which financial institutions lend liquidity to other financial institutions overnight (Taylor, 1993). The EFFR is instrumental in pursuing two primary macroeconomic objectives: low inflation rates and less unemployment in the U.S. economy. However, there lies a tradeoff, wherein adjustments to the real EFFR can bolster one objective while deteriorating the other. The persistent challenge of sticky inflation, measured at 3.7% as of September 2023, prompted the Federal Reserve to uphold interest rates at 5.5%.[2] Consequently, this decision sparked controversy concerning unemployment levels. Notably, statements from key figures such as Austin Goolsbee, the Head of the Chicago Fed, and Patrick Harker, the Head of the Philadelphia Fed, underscored the imperative for Jerome Powell, Chair of the Federal Reserve, to devise a strategy aimed at reducing the EFFR in 2024.[3]

Despite these disagreements in the Fed, there has been a traditional benchmark known as the Taylor Rule that the Fed uses for monetary policy. Developed by John Taylor in 1993, it offers a method for the Federal Reserve to compute the real EFFR based on specific economic conditions, incorporating variables like the *Inflation Gap* and *Output Gap* (Taylor,1993). However, a notable discrepancy exists between the Taylor Rule's predicted values and the historical real EFFR values, averaging around 1.5%. This paper aims to identify key qualitative variables contributing to the observed disparity and proposes to integrate these variables into the

[2] Jay, Marley. "Inflation Rate Leveled off at 3.7% in September 2023: How the Economy Is Looking Now." NBCNews.Com, NBCUniversal News Group, 12 Oct. 2023, www.nbcnews.com/business/economy/inflation-september-2023-how-economy-looks-now-consumer-price-index-rcna119776.

[3] Reuters. "Dollar Edges down before Comments from Fed's Powell." CNBC, 9 Nov. 2023, www.cnbc.com/2023/11/09/euro-finds-footing-on-hawkish-policy-remarks-lower-energy-prices.html.

Taylor Rule. The objective is to improve the accuracy of predicting the real Effective Federal Funds Rate, considering recent economic events and their impact. Hence, I attempt to answer: *What key economic variables can optimize the Taylor Rule in prescribing the real Effective Federal Funds Rate?*

Various macroeconomic papers have discussed the different methods of calculating the Taylor Rule. Clarida, Gali, and Gertler (2000) discuss methods of CPI calculation within the interest rate, while Orphanides (2007) suggests replacing the *Inflation Gap* and *Output Gap* with other forward-looking variables. This paper leverages these concepts while employing various macroeconomic variables and variations of measuring inflation and output to identify combinations that closely resemble historical patterns of the real EFFR.

This paper examines extensions to the Taylor Rule using five key variables: *Oil Price Change, Stock Price Change, Federal Open Market Committee (FOMC) Meeting Analysis, Bank Runs,* and the *Yield Curve Inversion*. Additionally, I examined *Inflation Expectations* within the Taylor Rule from preliminary analysis. This paper analyzes three distinct regression models, each representing different components under examination in conjunction with the original Taylor Rule. Policymakers can see the differences and select any model based on the available variables. The key takeaway is that the argument discusses the inefficiency of the *Inflation Gap*, as shown statistically representing a small fraction of the real EFFR. Using the *Inflation Expectations Gap* over the *Inflation Gap* is more reliable because it is strongly correlated with the real EFFR and is forward-looking as mentioned in Orphanides (2007).

The paper is organized below. Section 2 discusses the theoretical information regarding the Taylor Rule and why it lacks accuracy in predicting the real EFFR. Section 3 values the previous literature that discusses extensions in the Taylor Rule. Section 4 discusses the dataset

while Section 5 showcases the various regression output using an OLS estimator. Section 6 concludes.

2. Background

This paper uses the estimation of the real EFFR from Taylor (1993). The Taylor Rule predicts the real Effective Federal Funds Rate using the *Inflation Gap*, *Output Gap*, and the long-term equilibrium inflation rate:

$$r_t^* = \beta[\mathrm{E}(\pi_t|\Omega_t) - \pi^*] + \gamma[\mathrm{E}(y_t|\Omega_t)] \quad \{1\}$$

$r_t^* = the\ target\ rate\ for\ the\ real\ Effective\ Federal\ Funds\ Rate$

$\pi^* = the\ long-run\ equilibrium\ inflation\ rate\ \approx 2\%$

$\beta = the\ \%\ change\ in\ the\ EFFR\ assuming\ a\ 1\%\ increase\ in\ the\ Inflation\ Gap$

$\gamma = the\ \%\ change\ in\ the\ EFFR\ assuming\ a\ 1\%\ increase\ in\ the\ Output\ Gap$

$\pi_t = the\ \%\ change\ in\ inflation\ in\ period\ t$

$y_t = the\ measure\ of\ the\ Output\ Gap\ in\ time\ period\ t$

$\Omega_t = information\ set\ containing\ macroeconomic\ conditions\ at\ time\ t$

Equation 1 represents the Taylor Rule. It assumes that r_t^* is the target real EFFR given time t. It is a function of the expected *Inflation Gap*, $[\mathrm{E}(\pi_t|\Omega_t) - \pi^*]$ and the expected *Output Gap* $[\mathrm{E}(y_t|\Omega_t)]$, assuming the long-run equilibrium inflation rate is approximately 2%. The coefficients of β and γ are the effects of a 1% change in either gap towards the real EFFR.

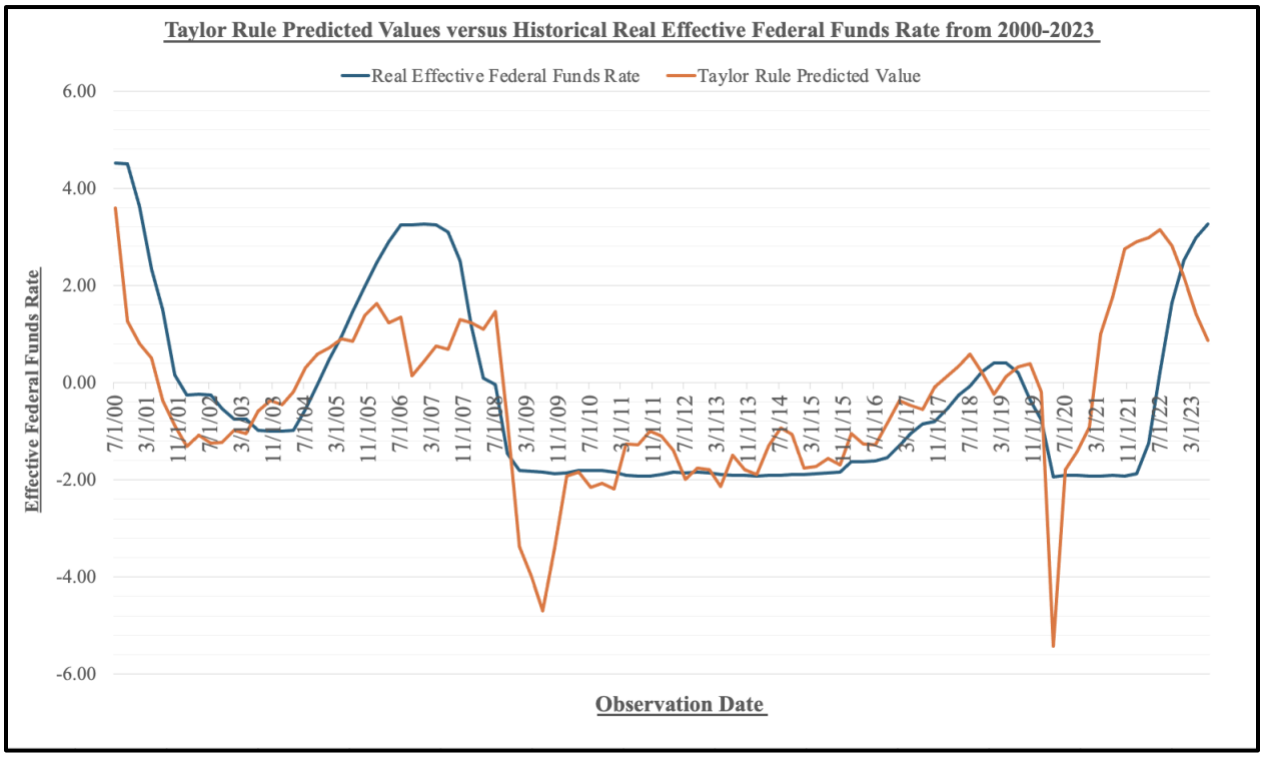
When the Taylor Rule was originally devised, it aimed to ensure that both inflation and output had an equal weightage in calculating the real EFFR. This balanced approach led to the assumption that the real EFFR would be influenced by half a percentage point of both the *Inflation Gap* and the *Output Gap*. Thus, we adopt the coefficients $\beta = \gamma = 0.5$ within Equation 1 (Taylor, 1993). To analyze disparities between the Taylor Rule's predictions and the historical

real EFFR, I conducted preliminary calculations using macroeconomic data from 2000-2023 at a quarterly level. I obtained the *real EFFR,*[4] *Inflation Gap,*[5] and *Output Gap*[6] from the Federal Reserve of Economic Data (FRED). By substituting the values of $\beta = \gamma = 0.5$ within Equation 1, we get Equation 2:

$$r_t^* = 0.5[InflationGap_t] + 0.5[OutputGap_t] \quad \{2\}$$

Using Equation 2, I calculated the Taylor Rule's predicted values. To illustrate the significant deviations among values, I created a two-line graph depicting the predicted and historical real EFFR. This visual representation compares the Taylor Rule's projections and the actual historical data, highlighting any discrepancies.

Figure 1: Predicted EFFR From Taylor Rule and the Historical Real EFFR



[4]Federal Reserve Bank of New York, Effective Federal Funds Rate [EFFR], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/EFFR.

[5] U.S. Bureau of Labor Statistics, Consumer Price Index for All Urban Consumers: All Items in U.S. City Average [CPIAUCSL], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/CPIAUCSL.

[6] U.S. Congressional Budget Office, Real Potential Gross Domestic Product [GDPPOT], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/GDPPOT.

Figure 1 highlights a consistent discrepancy of around 1.5% between the Taylor Rule and the real EFFR, with both variables moving in the same direction, indicating a positive correlation. This suggests that the Taylor Rule can effectively represent the direction of the Fed's decisions. However, notable deviations occur during significant economic crises such as the Great Financial Crisis and the COVID-19 pandemic, where the real EFFR experienced drastic negative dips due to the implementation of the zero-lower bound policy to stimulate the economy. The Taylor Rule fails to account for such extreme measures, indicating its limitations.

Furthermore, there are instances where the Taylor Rule overestimates the real EFFR, particularly evident during the gradual increase in rates in 2021 amid the pandemic recovery. Former Fed Chair Ben Bernanke acknowledged the central bank's delay in addressing inflation during COVID-19, contributing to the complexity of determining the appropriate timing for policy actions.[7] While policymakers initially perceived inflation as transitory, recent developments prompted a shift towards tighter policy through forward guidance.

Despite these challenges, Figure 1 suggests that incorporating additional key variables into the Taylor Rule could potentially reduce deviations. Specifically, variables such as *Bank Runs, Stock Price Change,* and *FOMC Meeting Analysis* could better capture events like financial crises and policy responses. Thus, Figure 1 underscores the importance of refining the Taylor Rule to ensure its effectiveness in guiding monetary policy.

[7] Ben S. Bernanke: *21st-Century Monetary Policy: The Federal Reserve from the Great Inflation to COVID-19*: W.W. Norton & Company, 2023.

3. Literature Review

The literature review reveals a comprehensive understanding of the Taylor Rule's evolution and its limitations. Clarida, Gali, and Gertler (2000) illustrate significant differences in estimated rules across different decades, emphasizing the need for additional variables like oil prices to enhance the Taylor Rule's predictive accuracy. Svensson's (2003) exploration of different time structures informs the decision to use time structure t in the analysis, while Orphanides' (2007) critique highlights the rule's shortcomings in real-time applications, suggesting potential improvements by replacing or supplementing existing variables.

Carvalho, Nechio, and Tristao (2021) provide valuable insights into the statistical significance of econometric models, favoring OLS regression over IV methods. Drawing from these findings, the consensus among authors suggests the necessity of immediate adjustments to the Taylor Rule, advocating for the inclusion of additional macroeconomic variables such as *Oil Price Change* and *FOMC Meeting Analysis*. By utilizing OLS regression with minimal endogeneity, the aim is to gain valuable insights into the dynamic driving changes in the real EFFR and enhance the predictive accuracy of the model.

In summary, existing literature suggests an urgent need to update the Taylor Rule to incorporate additional macroeconomic variables, such as oil prices and the confidence of the FOMC, to enhance its predictive accuracy for the Effective Federal Funds Rate. Building on this consensus, my approach integrates five key variables: *Oil Price Change, Stock Market Change, FOMC Meeting Analysis, Bank Runs,* and *Inversion of the Yield Curve*. I also include *Inflation Expectations* as this variable offers a more "forward-looking" approach as mentioned by Orphanides and Bernanke. These variables capture essential dynamics influencing EFFR

adjustments, including market friction prompted by oil price fluctuations, the Fed's response to financial market instability, and the impact of events like bank runs and yield curve inversions.

4. Data and Summary Statistics[8]

As mentioned, the dataset includes nine key variables: *real EFFR, Inflation Gap, Inflation Expectations Gap, Output Gap, FOMC Meeting Analysis, Oil Price Change, Stock Price Change, Bank Runs,* and *Yield Curve Inversion.* This research paper uses U.S. data at a quarterly level from 2000-2023, comprising 93 observations. This timeframe aligns with the Taylor Rule and contains significant economic events like recessions, booms, pandemics, and financial crises. Utilizing data from 2000 to 2023 ensures an adequate variation in inflation and interest rates, facilitating the identification of slope coefficients in the regression analysis. The datasets have been meticulously sourced from several reputable sources, listed below:

4.1 Dependent Variable

1. *Real Effective Federal Funds Rate (EFFR)*[9] – the interest rate that U.S. banks pay one another to borrow an overnight loan. The real EFFR holds significant importance as an indicator of the U.S. economy's health and stability. EFFR adjustments by the Federal Reserve are contingent upon factors such as inflation, GDP levels, and prevailing economic conditions. The real EFFR is a percentage calculated as a volume-weighted median of Overnight Federal Funds transactions. The dataset for real EFFR was obtained from the Federal Reserve Economic Data (FRED).

[8] Dataset Available Upon Request

[9] Federal Reserve Bank of New York, Effective Federal Funds Rate [EFFR], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/EFFR.

4.2 Independent Variable

1. Inflation Gap - Consumer Price Index (CPI) for All Urban Consumers: All Items in the U.S. City Average (2000-2023) at a Quarterly Basis[10] – as a price basket for goods and services paid by urban consumers. To obtain inflation rates, CPI data points were utilized and then compared against the long-term inflation rate, typically set at 2%. This comparison allows for the calculation of the *Inflation Gap*, representing the disparity between the current inflation rate and the target of 2%. Monetary policy is structured to utilize the Effective Federal Funds Rate to maintain a balance within inflation rates around the 2% mark. The dataset concerning CPI Inflation was sourced from FRED.

2. Output Gap: 100(Real Gross Domestic Product-Real Potential Gross Domestic Product)/Real Potential Gross Domestic Product (Output Gap from 2000-2023)*[11] – inflation-adjusted value of the goods and services produced by labor and property located in the United States. The *Output Gap* is calculated using the formula below:

$$Output\ Gap = \frac{real\ GDP - \ real\ potential\ GDP}{real\ potential\ GDP} * 100$$

The formula defines the underutilization or overutilization of economic resources (employment) towards GDP and whether the economy is operating at capacity. This metric provides policymakers with valuable insights into economic imbalances and guides decisions aimed at optimizing economic performance. The dataset about the *Output Gap* was sourced from FRED.

[10] U.S. Bureau of Labor Statistics, Consumer Price Index for All Urban Consumers: All Items in U.S. City Average [CPIAUCSL], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/CPIAUCSL.

[11] U.S. Congressional Budget Office, Real Potential Gross Domestic Product [GDPPOT], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/GDPPOT.

3. Inflation Expectations at a Quarterly Basis[12] - the estimated expected rate of inflation over the next 30 years. This is calculated using the survey-based measure of inflation expectations among other variables. This approach offers a more forward-looking perspective compared to the *Inflation Gap* metric. Consequently, we explore the possibility of replacing the *Inflation Gap* with this variable. The dataset for the *Inflation Expectations Gap* was sourced from the Federal Reserve Bank of Cleveland.

4. Oil Price Change - Global Price of Brent Crude (Oil)[13] – benchmark prices of the global oil market imported into the U.S. in U.S. Dollars. I used the prices to calculate the percentage change using the formula below:

$$Oil\ Price\ Change = \frac{Price_t - Price_{t-1}}{Price_{t-1}} * 100$$

This formula provides the percentage change in oil prices between consecutive periods. The resulting data offers valuable insights for policymakers navigating economic conditions influenced by oil market dynamics. The dataset for Oil Prices was obtained from FRED.

5. Stock Price Change - S&P 500[14] – represents the daily index value at the U.S. market close. The S&P 500 is widely used as an indicator of the overall performance of the U.S. stock market. I used the dataset to calculate the percentage change using the formula below:

$$Stock\ Price\ Change = \frac{Price_t - Price_{t-1}}{Price_{t-1}} * 100$$

[12] Reserve of Cleveland, Federal. Federal Reserve Board – Indicators and Data – Inflation Expectations https://www.clevelandfed.org/indicators-and-data/inflation-expectations.

[13] International Monetary Fund, Global price of Brent Crude [POILBREUSDM], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/POILBREUSDM.

[14] S&P Dow Jones Indices LLC, S&P 500 [SP500], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/SP500.

This formula provides the percentage change in stock prices. An increase in stock price change may prompt central banks to reassess their monetary policy stance to ensure price stability and full employment. The dataset for Stock Prices was obtained from FRED.

6. Inversion of Yield Curve[15] - The Yield Curve represents a curve that plots interest rates across similar debt instruments. An inversion of the Yield Curve is when the curve slopes downwards, as it reflects bond investor's expectations for a decline in longer-term interest rates. This variable has been listed as a dummy variable with the following conditions below:

$$YieldCurve = \begin{cases} 1, & \text{if } Inverted \\ 0, & \text{otherwise} \end{cases}$$

An inverted yield curve, where short-term interest rates exceed long-term rates, often signals investor expectations of an economic downturn. In response, central banks may adjust the Effective Federal Funds Rate to stimulate economic activity, lowering short-term rates to counteract recessionary pressures. The dataset for Yield Curves is obtained from YCharts.

7. FOMC Meeting Analysis[16] – The FOMC Meeting is held eight times a year, where the FOMC regulates and discusses changes to interest rates. On the Federal Reserve website, there are meeting minutes of each meeting which indicate the level of optimism within the FOMC towards the future of the U.S. economy. Hence, I have prepared a rubric[17] to qualitatively assess the meeting minutes to learn whether the Fed is confident in the next quarter of the year or not. From here, I have created a dummy variable to be included in the model:

$$FOMCMeeting = \begin{cases} 1, & \text{Not Confident} \\ 0, & \text{Confident} \end{cases}$$

[15] Kleven, Joe. "The Inverted Yield Curve: What It Means and How to Navigate It." YCharts, get.ycharts.com/resources/blog/inverted-yield-curve-what-it-means-and-how-to-navigate-it/.

[16] Reserve, Federal. "Press Releases." Federal Reserve Board - Press Releases, www.federalreserve.gov/newsevents/pressreleases.htm.

[17] *Appendix A: Rubric for Assessing FOMC Meeting Minutes*

If the FOMC is confident in the global outlook of the U.S. Economy, they might lower EFFR to boost the economy. Similarly, if they're worried about the future, they can raise EFFR. The FOMC meeting minutes dataset has been obtained from the Federal Reserve website alongside my rubric.

8. *Bank Runs*[18] - Bank Runs are when consumers of banks or financial institutions withdraw their cash deposits in unison over skepticism about the bank's solvency. Bank runs are often associated with financial crises and subsequently lower interest rates. I used economic data from the Federal Deposit Insurance Corporation and created a dummy variable to represent bank runs. If the quarterly period had more than 4 bank runs, it would be valued at 1 and 0 otherwise. Hence, the dummy variable can be represented as:

$$BankRuns = \begin{cases} 1, & \text{if } BankRuns > 4 \\ 0, & \text{otherwise} \end{cases}$$

If the bank runs are high, then the Fed might lower interest rates to help soothe consumer borrowing again. Similarly, if bank runs are low, the Fed might be able to raise interest rates since individuals are borrowing from banks already.

4.3 Descriptive Statistics for all Variables

[18] Federal Deposit Insurance Corporation. "Bank Failures." https://www.fdic.gov/resources/resolutions/bank-failures/in-brief/index.html.

Table 1: Descriptive Statistics of Independent and Dependent Variables

Variable	N	Mean	SE Mean	StDev	Minimum	Median	Maximum
Output_Gap	93	-1.340	0.199	1.916	-9.153	-1.238	1.469
Inflation_Gap	93	0.544	0.191	1.845	-4.100	0.200	6.500
Yield Curve (Binary)	93	0.4086	0.0513	0.4942	0.0000	0.0000	1.0000
Bank Runs (Binary)	93	0.2796	0.0468	0.4512	0.0000	0.0000	1.0000
FOMC (Binary)	93	0.4731	0.0521	0.5020	0.0000	0.0000	1.0000
Stock Price Change	93	1.415	0.695	6.699	-30.136	2.389	14.979
Oil Price Changes	93	2.26	1.53	14.73	-52.28	2.83	34.81
Inflation Expectations Gap	93	-0.0061	0.0658	0.6346	-1.9188	-0.0496	1.7514
Real Effective Federal Funds Ra	93	-0.341	0.191	1.845	-1.941	-0.987	4.511
Taylor Rule Predicted Value	93	-0.376	0.173	1.665	-5.427	-0.468	3.585

Table 1 displays the Descriptive Statistics for the variables included in the dataset. The real EFFR exhibits a range from -1.941 to 4.511, while the Taylor Rule spans from -5.43 to 3.59, indicating considerable variability. Notably, *Stock Price Change* and *Oil Price Change* demonstrate high volatility, as evidenced by their wide ranges, attributed to their percentage-based measurements. No significant outliers are observed in Table 1; however, it is essential to acknowledge that non-dummy variables may assume negative values. The *Inflation Gap*, calculated as 'Inflation Rate - 2%,' contributes to the relatively steep standard deviation, considering the mean's lower magnitude. This underscores the importance of interpreting the statistics within the context of each variable's formulation and significance.

5. Methodology

5.1 OLS Regression

I constructed an Ordinary-Least Squares Model regression, as supported by Carvalho, Nechio, and Tristao (2021). The regression incorporates the five variables individually and combinatorically. The base equation (original Taylor Rule) can be written as an OLS below:

$$r_t^* = \beta_0 + \beta_1(\pi_t^*) + \beta_2(y_t^*) + \varepsilon_t \quad \{3\}$$

Here, r_t^* represents the target rate for the real EFFR given a time t. π_t^* is the *Inflation Gap* of the U.S. economy assuming a 2% long-run inflation rate at the time t. y_t^* is the *Output Gap* of the U.S. economy at the time t. ε_t is the error term in the regression.

From Equation 3, the chosen statistical software analyzes the five variables we are investigating to determine the most optimal combination. From a regression perspective:

$$Single\ New\ Variable: r_t^* = \beta_0 + \beta_1(\pi_t^*) + \beta_2(y_t^*) + \beta_3(New\ Variable_t^*) + \varepsilon_t \quad \{4\}$$

$$Multi - New\ Variable: r_t^* = \beta_0 + \beta_1(\pi_t^*) + \beta_2(y_t^*) + \beta_3(NewVariable_t^*) + \beta_4(NewVariable_t^*) \ldots + \varepsilon_t \quad \{5\}$$

$$(New\ Variable_t^*) = \{OilPriceChange, StockPriceChange, FOMCMeetingAnalysis, YieldCurve, BankRuns\}.$$

From this pool of variables, I can determine which regression model best fits the data. By examining various combinations of the explanatory variables, I can identify the model that provides the most accurate predictions of the real EFFR. Additionally, I can explore replacing the *Inflation Gap* with the *Inflation Expectations Gap* to assess its correlation with the real EFFR.

Within Equation 5, several econometric assumptions underpin the analysis. Firstly, we assume that both inflation and interest rates are stationary, aligning with the approach used by Clarida, Gali, and Gertler (2000). This assumption is grounded in theoretical models within monetary policy and facilitates reliable estimation of the model coefficients. Secondly, we assume that the Federal Reserve swiftly adjusts its target real EFFR in response to new

information. This assumption implies that the Fed maintains precise control over the EFFR, making immediate adjustments to achieve its policy objectives.

It's important to acknowledge potential biases inherent in the Ordinary Least Squares (OLS) regression. The error term, ε_t, in the regression equation, may be influenced by various factors beyond those explicitly included in the model. For instance, government deficits could be correlated with both the *Output Gap* and *FOMC Meeting Analysis*, introducing bias into the estimated coefficients. In interpreting the results of the OLS regression, it's essential to consider and account for these potential biases. Robustness checks and sensitivity analyses can help assess the robustness of the regression results and mitigate the impact of omitted variable bias.

5.2 Theoretical Relationships

The coefficients in Equation 3 provide a theoretical framework for understanding the relationships between the variables and the real EFFR. Firstly, the *Inflation Gap* and *Inflation Expectations Gap* are anticipated to exhibit a positive correlation with the EFFR. When inflation is on the rise, the Federal Reserve typically responds by increasing the EFFR to curb economic activity and mitigate inflationary pressures. Similarly, the *Output Gap* is expected to demonstrate a positive relationship with the EFFR. A positive *Output Gap* suggests that the economy is operating above its potential capacity, prompting the Fed to raise interest rates to moderate economic growth and inflationary pressures. Conversely, a negative *Output Gap* signals underperformance in the economy, prompting the Fed to lower rates to stimulate investment and economic activity.

Among the new variables, significant changes in stock or oil prices are anticipated to have a negative relationship with the EFFR. In response to volatility in these markets, the Fed

may lower interest rates to support liquidity and encourage investment. *Bank Runs* are expected to lead to a reduction in the EFFR, as the Fed seeks to address liquidity concerns and stabilize the financial system. An inverted yield curve, signaling a potential recession, is likely to prompt the Fed to lower the EFFR to stimulate economic activity and mitigate the downturn. Lastly, if the FOMC expresses a lack of confidence in the future outlook, it is expected that the EFFR rises as a precautionary measure to address potential economic challenges. Overall, these predicted relationships are assessed empirically in Equation 5 to determine the statistical significance of each variable in explaining EFFR variations.

5.3 Preliminary Proposed Regressions

Table 2 presents four regression models, each employing different combinations of variables to assess their impact on the real EFFR. The first column utilizes the original Taylor Rule with *Inflation Gap* and *Output Gap* variables. In the second column, the *Inflation Expectations Gap* and *Yield Curve* variables are added to explore forward-looking factors. The third column introduces stock and oil price changes for a broader analysis, demonstrating the highest R-squared value. Finally, the fourth column combines all variables for a comprehensive outlook. Policymakers can compare coefficients and statistical significance across models to make an informed decision on which model to adopt for calculating the real EFFR.

Table 2: Regression Table with 4 Regressions

	Dependent Variable: *Real Effective Federal Funds Rate*			
	Original Taylor Rule (1)	Yield Curve Only (2)	Highest Adjusted R^2 (3)	All Variables Included (4)
Output Gap	0.6224***	0.4351***	0.4541***	0.4507***
	(0.0871)	(0.0813)	(0.0805)	(0.0885)
Inflation Gap	0.0384	–	–	–
	(0.0904)	–	–	–
Inflation Expectations Gap	–	0.727***	0.834***	0.819***
	–	(0.252)	(0.25)	(0.265)
Yield Curve Inversion	–	1.394***	1.210***	1.144***
	–	(0.244)	(0.251)	(0.276)
FOMC Meeting Analysis	–	–	–	0.16*
	–	–	–	(0.288)
Stock Price Change	–	–	−0.0346*	−0.0336*
	–	–	(0.0174)	(0.0176)
Oil Price Change	–	–	-0.01434*	-0.01529*
	–	–	(0.00839)	(0.00869)
Bank Runs	–	–	–	0.027
	–	–	–	(0.294)
Constant	0.472***	-0.323*	−0.140	−0.200
	(0.206)	(0.184)	(0.193)	(0.219)
Observations	93	93	93	93
R^2	44.36%	64.69%	67.18%	67.32%
Adjusted R^2	43.12%	63.50%	65.30%	64.63%
Note:				*p<0.1; **p<0.05; ***p<0.01

Firstly, we can see in Column 1 that the coefficient of the *Output Gap* is 0.6224, similar to the historical coefficient issued by Taylor (1993). However, the coefficient of the *Inflation*

Gap is 0.0384 and doesn't accurately depict the effect of inflation within the equation. This discrepancy underscores the importance of accurately capturing the role of inflation in monetary policy modeling. As noted by Lawrence Summers,[19] managing inflation expectations is critical for effective policy implementation. Expectations of future inflation strongly influence economic behavior and investment decisions across the private sector. Therefore, the central bank's ability to communicate a clear and consistent stance on inflation is essential for stabilizing expectations and reducing uncertainty. By addressing and guiding inflation expectations, policymakers can better steer the economy.

Although not statistically significant and highly minimal, this relationship might indicate that inflation might not be the best variable affecting EFFR. Orphanides (2007) discusses potentially replacing or removing the *Inflation Gap*. From this idea, I believed that inflation was captured in the yield curve data, hence the switch to *Inflation Expectations*. Using inflation expectations instead of current inflation for predicting a model offers two significant advantages. Firstly, inflation expectations provide a forward-looking perspective which is important for monetary policy. The Fed reflects the collective anticipations of the economy enabling analysts to gauge the potential impact of policy actions and economic conditions. Secondly, incorporating inflation expectations into models benefits future economic forecasts.

In Column 2, the coefficient of *Inflation Expectations* has increased when using this new data to 0.693. This accurately shows that a rise in inflation expectations prompts the Fed to increase the real EFFR. This positive relationship is crucial in identifying that the data does support than theoretical relationship that a rise in inflation causes real EFFR to increase.

[19] Anstey, Chris. "Summers Says Fed Is 'Wrong' on Neutral, Warns on Rate-Cut Bets." *Bloomberg.Com*, Bloomberg, 8 Mar. 2024, www.bloomberg.com/news/articles/2024-03-08/summers-says-fed-is-wrong-on-neutral-warns-on-rate-cut-bets.

Here, we can see that the coefficients of the other variables have also fallen, which might signify less inflation captured in these variables. The *Output Gap* still has a relatively close coefficient of 0.5. The regression in Table 2 articulates the prescribed measures of John Taylor in his original equation as both coefficients resemble 0.5.

The *Yield Curve Inversion* has a coefficient of 1.305, which is the largest influence on the real EFFR. This coefficient might articulate the effects of a zero lower bound on the nominal EFFR. If the Fed doesn't want to implement a negative EFFR (which is impractical), they'll float the rate around 0%. Since the Yield Curve, among other periods, inverted during the Great Financial Crisis (2008) and the COVID-19 Pandemic (2019-20), it could explain how the equation wants to showcase that the EFFR will be around 0 during a recession.

In Column 3, the coefficients for *Stock Price Change* and *Oil Price Change* are -0.0346 and -0.01434. While statistically significant, these coefficients indicate a limited impact of stock and oil price changes on the real EFFR. The high volatility associated with these variables suggests that they may not serve as reliable indicators for interest rate movements. Additionally, the low coefficients imply that stock prices may not be particularly relevant in predicting changes in the EFFR. Despite this, the regression in Column 3 exhibits the highest $R^2 = 65.30\%$, indicating a relatively strong explanatory power compared to the other models. However, it's essential to interpret these results cautiously and consider the broader economic context when assessing the significance of stock and oil price changes.

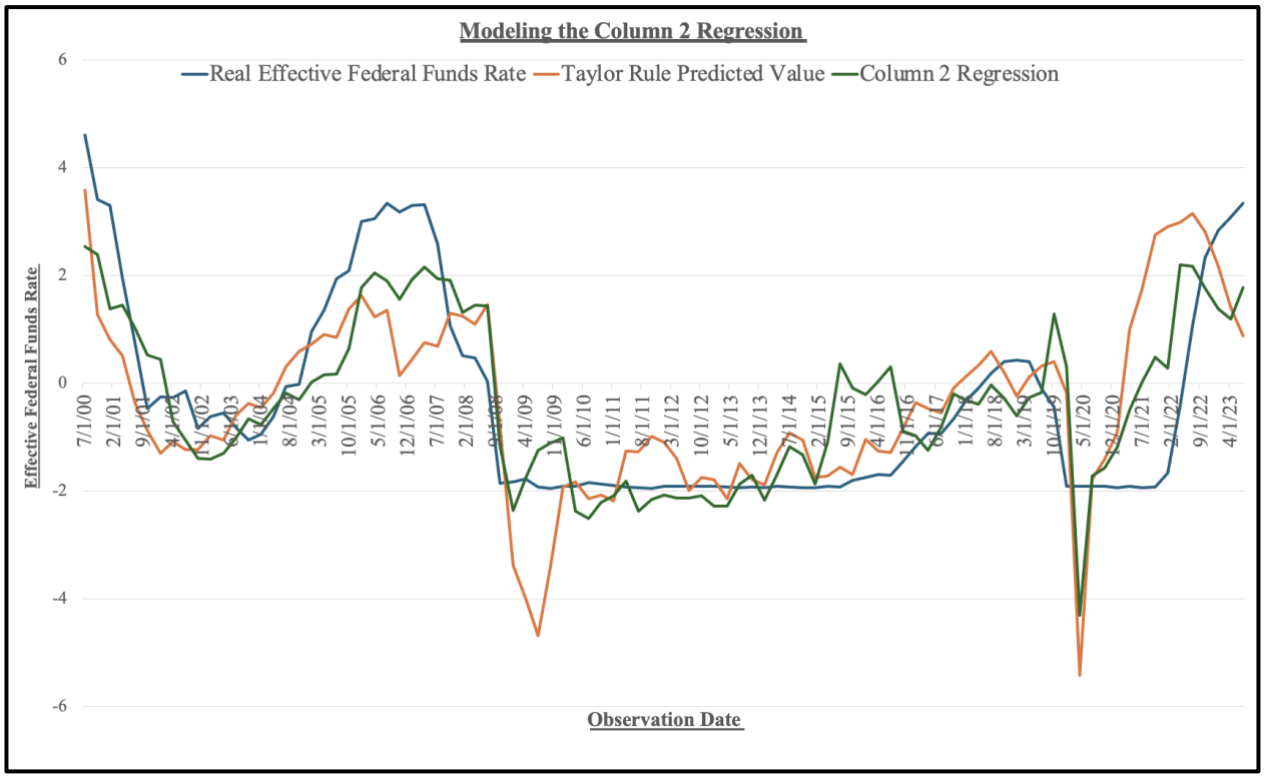
In Column 4, coefficients for all variables are included. However, variables such as *FOMC Meeting Analysis* and *Bank Runs* are not statistically significant in predicting the real EFFR. Consequently, for practical application, Columns 2 and 3 appear to be more suitable options. Column 2 includes all statistically significant variables, providing a comprehensive

analysis while maintaining relevance. Alternatively, Column 3, despite exhibiting high volatility in variables such as *Stock Price Change* and *Oil Price Change*, offers valuable insights due to its strong explanatory power, as indicated by the high R^2 value. Given the significance of forward-looking factors, particularly *Inflation Expectations*, in predicting the EFFR, it is recommended to incorporate these variables into the model. Therefore, a combination of Columns 2 and 3 would provide policymakers with a robust framework for calculating the real EFFR.

6. Conclusion & Discussion

Based on the econometric data presented in the OLS regression, Table 2 offers various regression models to estimate the real EFFR. Graphing the results from Column 2 would visually demonstrate the reduction in deviations in the data resulting from the incorporation of these new variables:

Figure 2: Modeling the Column 2 Regression



The regression in Column 2 demonstrates a notable improvement in capturing the historical real EFFR compared to the traditional Taylor Rule. All three coefficients exhibit a positive correlation with interest rates, aligning with the 2% benchmark. With fewer deviations between this regression and the real EFFR, one of the negative peaks has been mitigated. This model appears to be less behind the curve during the pandemic period. However, there might be a missed opportunity in predicting the negative peak before the pandemic, highlighting an area for further research.

Indeed, a notable limitation of the regression is the consideration of the zero lower bound, particularly evident before the pandemic. During this period, the Federal Reserve resorted to zero interest rates and implemented quantitative easing measures to maintain low bond yields and alleviate unemployment concerns. This approach was motivated by the Fed's apprehensions

about a potential downward spiral in inflation expectations. Consequently, it becomes apparent that the Federal Reserve should have been more forward-thinking in readjusting the EFFR faster than usual to address evolving economic conditions effectively. By doing so, the Fed could mitigate the risk of lagging behind the curve.

Expanding this study to include other countries, such as the United Kingdom, presents an intriguing avenue for further research. The UK, known for its significant volatility in the bond market, could provide valuable insights into the interplay between market dynamics and interest rate movements. By applying similar regression techniques to different countries, researchers can explore how various macroeconomic variables interact to influence interest rates globally. Additionally, conducting country-specific analyses allows for the identification of unique factors that may impact interest rate fluctuations in each region.

Ultimately, the regression models presented in Column 2 or Column 3 offer a more nuanced approach for the Federal Reserve in assessing the real Effective Federal Funds Rate in contemporary economic conditions. Policymakers can use these regressions as benchmarks and then tailor their decisions based on the specific parameters of the current economic environment. However, given the evolution of monetary policy tools such as quantitative easing and the zero lower bound on interest rates, it's crucial to view these regressions as part of a broader toolkit for policymaking. This approach allows for a more dynamic response to changing economic conditions, ensuring that monetary policy remains effective to the needs of the U.S. economy.

References

Literature

Bernanke, B. (2023). *21st Century Monetary Policy: The Federal Reserve from the great inflation to COVID-19.* W.W. Norton and Company.

Branch, William A. "Nowcasting and the Taylor Rule." *Journal of Money, Credit and Banking* 46, no. 5 (2014): 1035–55. https://doi.org/10.1111/jmcb.12128

Carlos Carvalho, Fernanda Nechio, and Tiago Tristao. 2021. "Taylor Rule Estimation by OLS," Federal Reserve Bank of San Francisco Working Paper 2018-11. https://doi.org/10.24148/wp2018-11

Clarida, Richard, Jordi Gali, and Mark Gertler. "Monetary Policy Rules and Macroeconomic Stability: Evidence and Some Theory." *The Quarterly Journal of Economics* 115, no. 1 (2000): 147–80. https://doi.org/10.1162/003355300554692

Molodtsova Tanya, Alex Nikolsko-Rzhevskyy, and David H. Papell. "Taylor Rules and the Euro." *Journal of Money, Credit, and Banking* 43, no. 2/3 (2011): 535–52. https://doi.org/10.1111/j.1538-4616.2011.00384.x

Rotemberg, J., & Woodford, M. (1998*). Interest-Rate Rules in an Estimated Sticky Price Model*. https://doi.org/10.3386/w6618

Svensson, Lars, E O. 2003. "What Is Wrong with Taylor Rules? Using Judgment in Monetary Policy through Targeting Rules." Journal of Economic Literature, 41 (2): 426-477. https://doi.org/10.1257/.41.2.426

Taylor, J. B. (1993). "Discretion versus Policy Rules in Practice." Carnegie-Rochester Conference Series on Public Policy, 39: 195-214. https://doi.org/10.1016/0167-2231(93)90009-l

Woodford, M. (2001). The Taylor Rule and Optimal Monetary Policy. American Economic Review, 91(2), 232–237. https://doi.org/10.1257/aer.91.2.232

Datasets

Federal Deposit Insurance Corporation. "Bank Failures," https://www.fdic.gov/resources/resolutions/bank-failures/in-brief/index.html

Federal Reserve Bank of New York, Effective Federal Funds Rate [EFFR], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/EFFR

"Inflation Expectations." Federal Reserve Bank of Cleveland, www.clevelandfed.org/indicators-and-data/inflation-expectations

International Monetary Fund, Global price of Brent Crude [POILBREUSDM], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/POILBREUSDM.

Kleven, Joe. "10 2-year Treasury Yield Spreads" YCharts, https://ycharts.com/indicators/10_2_year_treasury_yield_spread

Reserve, Federal. "Press Releases." Federal Reserve Board - Press Releases, www.federalreserve.gov/newsevents/pressreleases.htm

S&P Dow Jones Indices LLC, S&P 500 [SP500], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/SP500

U.S. Bureau of Labor Statistics, Consumer Price Index for All Urban Consumers: All Items in U.S. City Average [CPIAUCSL], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/CPIAUCSL

U.S. Congressional Budget Office, Real Potential Gross Domestic Product [GDPPOT], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/GDPPOT

Appendix

Rubric for Assessing FOMC Meeting Minutes

Interpretation of the FOMC Meeting Analysis from 2000-2023

- The entire FOMC meeting minutes must be read and interpreted before deciding the data input for the respective meeting.

Data Input of 1 = FOMC Committee is pessimistic about the future of the U.S. economy. The meeting minutes should reflect a sense of urgency or worry from the Fed in their monetary policy actions.

Typical words: uncertain, underconfident, unsure, and high-risk.

Data Input of 0 = FOMC Committee is optimistic about the future of the U.S. economy. The FOMC believes their predictions will be accurate and expect minimal risks involved with monetary policy.

Typical words: clear, reassured, confident, low-risk, and certain.

Childcare Costs and Maternal Labor Market Outcomes

Zhexin Zhou

New York University

Abstract

This study investigates the relationship between childcare costs and maternal labor market outcomes including labor force participation, employment rate, and usual working hours. I use county-level childcare costs data collected by Women's Bureau and individual-level employment information from the American Community Survey and conduct logistic regressions. Negative as- sociations between childcare costs and maternal labor force participation, employment, and usual working hours are found. Through sub-group analyses, it is found that these negative associations are stronger among single mothers than married mothers.

1. Background Information

Childcare is an essential topic for every family. Due to traditional gender norms, women were expected to shoulder the responsibility of childcare which reduced their chances to work. Although with the development of society, childcare facilities are now available which may free mothers from childcare at home, such services are not free. In the United States, where a universal childcare program is not implemented, childcare costs are still a huge financial burden on many families. Childcare services per child can cost about 8 percent to 19.3 percent of family income, and the burden is even heavier for families with multiple children (Women's Bureau, 2023).

Government programs and subsidies can help with childcare, but they are not easily accessible to every family in need. For example, the Head Start program funded by the federal government provides various childcare services for children from birth to preschool age, but only families who meet the federal low-income guidelines are eligible to enroll (Office of Head Start, 2022). There are also Prekindergarten Programs that provide care for children between 3 and 5, but not all of them are state-funded, and even those funded by states are free or low-cost only to qualified families (Office of Child Care). Thus, childcare is still a big problem for most parents.

To better understand the influence of childcare costs on maternal labor market outcomes, I incorporated data on childcare costs from the Women's Bureau and data on employment behaviors from American Community Survey and used logistic regression to study the relationships between childcare costs and maternal labor force participation, employment status, and usual hours worked.

2. Literature Review

Kimmel (1998) found out that childcare costs are negatively related to maternal employment. More specifically, she compared the impacts of childcare costs on married and single mothers. She used data on childcare prices from the sixth interview of the 1987 panel of the Survey of Income and Program Participation (SIPP) and incorporated childcare regulation data from a re- lated corporation as the measurement of childcare quality. The sample was restricted to female

guardians of children and mothers aged between 18 and 55 and separated into two groups based on marital status. This paper adopted a behavioral model by Connelly (1992) and Ribar (1992) and two elasticities were calculated. Namely, the childcare price-employment elasticity and the wage-employment elasticity. Wages are predicted for non-working mothers based on the wages of working mothers. The main finding was that childcare prices have a negative impact on mater- nal labor force participation. In addition, both the childcare price elasticities and wage elasticities differ significantly across marital status, and the labor force participation of single mothers is less responsive to childcare prices than married mothers do. A limitation of this research is that only working mothers were asked about the childcare prices they paid, so childcare prices paid by non-working mothers were estimated. Inspired by this paper, I included labor force participation as one of the maternal labor market outcomes to observe, but I used more updated data from 2009 to 2018 to present the relationship between childcare prices and labor force participation that is more relevant today.

Han and Waldfogel (2001) also focused on the comparison of single and married mothers but on the issue of childcare costs and employment status. Their research adds to earlier literature by controlling for children's age groups, childcare quality, and childcare availability. They used data from March Current Population Surveys (CPS) from 1991 to 1994. Childcare costs recorded by SIPP from 1990 to 1993 were used to generate predicted childcare costs for the CPS sample since CPS did not have corresponding data. They used a probit model and had three estimations for all women, single mothers, and married mothers respectively. They controlled for wage, education, marital status (dropped for the latter two estimations), race, and family income. Since wage is not observed for non-working mothers, they predict a wage for each mother using the standard Heckman sample selection technique. The dependent variable was categorical which equals 1 when the woman is employed and equals 0 otherwise. They found that childcare costs have a negative association with the probability of mothers working. They also simulated childcare costs reduction of 25 percent, 0.50 dollar per hour, and 1 dollar per hour by using the marginal effects of childcare costs on women's employment found earlier. After the simulation, they concluded that

childcare subsidies can increase maternal employment, especially for single mothers. The lack of a direct measure of childcare costs is a limitation of this research. Therefore, I used childcare costs collected directly from each county to reinvestigate the relationship between childcare costs and maternal employment and conducted a sub-group analysis for single and married mothers.

Choudhary (2021) looked more closely at the relationship between childcare costs and women managers' employment decisions. Her data on childcare costs came from the Child Care Aware of America (CCAA) which provides four types of childcare: Infant Center, Infant FCC, 4-year- old Center, and 4-year-old FCC. Data on female managers came from Bloomberg from 2009 to 2018. She located firms' headquarters and incorporated them with local childcare data. A panel regression model was used and a negative relationship between childcare costs for children under 2 and the percent of female managers was found. Yet, a positive relationship was found between childcare costs for preschool-age children and the percent of female managers. The accuracy of the residency approximation is a limitation of this research because female managers may not bear children in the same state as firms' headquarters. To avoid this problem, I matched the county-level childcare costs with the residency of mothers and children.

Ruppanner et al. (2021) investigated the impacts of childcare costs on maternal employment as well, but they incorporated gender norms into the discussion. They approached maternal employ- ment from three aspects, namely individual educational attainment, cultural gender norms, and structural childcare costs. Three datasets were used for these three aspects. They used the 2017 American Community Survey (ACS) Public Use Microdata Series for individual demographic data, state factsheets from 2013 to 2017 from Child Care Aware of America for childcare costs data, and the General Social Survey (GSS) as the measurement of gender norms. More egalitarian gender norms are represented by higher scores from the survey. They employed linear probability models and focused on mothers with a high school diploma or less and mothers with a college degree or more. They found out that childcare costs are negatively associated with employment, especially for mothers with less education. At the same time, egalitarian gender norms are posi- tively associated with employment for both mothers and non-mothers.

Landivar et al. (2022) provided a state-level analysis of the relationship between childcare and mothers' employment. They no longer just focus on childcare costs but also on access to corresponding government programs and subsidies. Their primary data came from the 2016 American Community Survey Five-year Public Use Microdata Sample. It was combined with Child Care Aware State Factsheets from 2011 to 2015, Head Start Program Information Reports from 2009 to 2011, childcare subsidy prevalence from the U.S. Government Accountability Office, and pre-K enrollment from National Institute for Early Education Research. They used hierarchical logistic regression and found that more preschool-aged children in the family reduce mothers' likelihood to work, but access to government programs and subsidies mitigates this negative relationship.

Many studies have been done on the relationship between childcare costs and maternal labor market outcomes and validated that an increase in childcare costs is associated with lower rates of maternal employment (Women's Bureau, 2023). Due to a lack of direct measurement, previous literature had to estimate childcare costs, but I use data on childcare costs directly collected by the Women's Bureau of the U.S. Department of Labor. This data can better reflect the variation of childcare costs from county to county. Besides employment status, I also include labor force participation and usual hours worked as dependent variables which provides a more comprehensive observation of maternal labor market outcomes.

3. Hypotheses

There are two main hypotheses. Firstly, an increase in childcare costs is negatively associated with maternal labor force participation, employment, and usual hours worked. If childcare costs increase, mothers may want to quit their job or work fewer hours to take care of the children by themselves. Secondly, the negative association is more pronounced among single mothers than married mothers. Since married mothers can share the financial burden of childcare costs with their spouses, the negative association may be mitigated.

4. Data

I have two primary sources. Childcare costs data comes from The National Database of Child- care Prices (NDCP) of the Women's Bureau. It is county-level data assorted by children's age groups. Children are categorized as infants if aged between 0 and 23 months, toddlers if aged be- tween 24 and 35 months, and preschoolers if aged between 36 through 60 months. Childcare costs are collected for both center-based facilities and home-based facilities. One limitation is that I can- not distinguish which type of facilities is used by the individuals, so I only use center-based data because most U.S. families use center-based childcare facilities (Landivar et al., 2022). Center-based childcare costs are collected from regulated childcare centers which are usually located in commercial buildings. The childcare costs are reported as the weekly median price charged by full-time center-based facilities.

The other source is American Community Survey (ACS) conducted by the U.S. Bureau Census. The information is collected annually across 50 states and also the District of Columbia and Puerto Rico. Demographic information such as educational attainments and children's age is collected on the individual level. The 1-year estimate I access through IPUMS contains data collected from previous years for areas with a population of more than 65000 people, so my study is limited to counties of medium to large scales. My sample is restricted to mothers aged between 16 to 64 from 2009 to 2018 to avoid the impacts of COVID.

I merged two datasets by surveyed year and county codes and get a new dataset with informa- tion on 475 counties in 47 states. Children's ages are reported to the nearest whole number in ACS, so I defined infants as children aged between 0 and 2, toddlers as children aged between 2 and 3, and preschoolers as children aged between 3 and 6 according to the definition given by NDCP to merge these two datasets. Childcare costs are determined for each individual based on the county they lived in, the year they were surveyed, and the age of the youngest child in the household. To conduct a sub-group analysis by marital status, I define single mothers as the ones who are never married, divorced, or widowed, and married mothers as the ones who are married with or without

the presence of a spouse.

4.1. Descriptive Statistics

Table 1 shows the characteristics pertaining to the employment of the mothers by marital status. On average, 66 percent of all mothers are in the labor force, and 91 percent among those who are in the labor force are employed. All mothers, on average, usually work about 24 hours per week.

When we differentiate mothers by their marital status, we observe that the employment char- acteristics of single mothers differ from those of married ones. On average, 73 percent of single mothers are in the labor force while only 63 percent of married mothers are in the labor force. The 10-percent difference in average labor force participation may reflect the tendency that single mothers are more likely to look for a job. The difference in average employment rate between single and married mothers is also 10 percent, but married mothers are the ones with higher em- ployment rate. On average, about 85 percent of single mothers are employed and 94 percent of married mothers are employed among those who are in the labor force. With that being said, single mothers usually work 2 more hours per week than married mothers on average.

I also include employment characteristics of fathers aged between 16 and 64 as a comparison to mothers. Among all fathers, on average, almost 95 percent are in the labor force and 91 percent are employed. The gap in labor force participation between mothers and fathers is almost 30 percent. Yet, the difference in employment is very small. About 95 percent of all fathers in the labor force are employed. In addition, fathers work 41 hours per week on average which is 17 hours more than the usual working hours of mothers. Fathers are more engaged in the labor market by having a much higher labor force participation, employment rate, and longer hours of working than mothers.

The comparison between single fathers and married fathers yields different results to that of the mothers. On average, 90 percent of single fathers are in the labor force which is less than the 96 percent of married fathers. The difference between employment is about the same magnitude. About 90 percent of single fathers are employed, while 97 percent of married fathers are employed

on average. In addition, single fathers usually work 6 hours less than married fathers. While single mothers participate more actively in the labor market than married mothers, it is the opposite for single fathers and married fathers.

Table 1: Descriptive Statistics by Marital Status

	Labor Force Participation	Employment	Hours of Working	N
All Mothers	0.660	0.912	23.988	612459
	(0.0006)	(0.0004)	(0.0245)	
Single Mothers	0.731	0.849	25.210	156710
	(0.0011)	(0.0011)	(0.0457)	
Married Mothers	0.631	0.941	23.456	441115
	(0.0007)	(0.0004)	(0.0295)	
All Fathers	0.949	0.954	41.374	507632
	(0.0003)	(0.0003)	(0.0199)	
Single Fathers	0.901	0.891	35.989	70419
	(0.0011)	(0.0012)	(0.0621)	
Married Fathers	0.958	0.964	42.291	433542
	(0.0003)	(0.0003)	(0.0206)	

Note: All values are reported as Mean(SD)

Table 2 summarizes the employment statistics for the same group of people but categorized by the age of their youngest child in the household. Parents are defined as parents of infants if the youngest child in the household is aged between 0 and 2; parents of toddlers if the youngest child in the household is aged between 2 and 3; parents of preschoolers if the youngest child in the household is aged between 3 and 6. Again, mothers and fathers exhibit different patterns in the labor market.

Table 2: Descriptive Statistics by Children's Age Groups

	Labor Force Participation	Employment	Hours of Working	N
Mothers of Infants	0.637	0.908	23.458	285291
	(0.0009)	(0.0007)	(0.0359)	
Mothers of Toddlers	0.665	0.912	23.773	123032
	(0.0013)	(0.0010)	(0.0549)	
Mothers of Preschoolers	0.689	0.918	24.858	204136
	(0.0010)	(0.0007)	(0.0424)	
Fathers of Infants	0.950	0.956	41.491	240320
	(0.0004)	(0.0004)	(0.0287)	
Fathers of Toddlers	0.949	0.954	41.329	101565
	(0.0007)	(0.0007)	(0.0447)	
Fathers of Preschoolers	0.948	0.952	41.231	165747
	(0.0005)	(0.0005)	(0.0354)	

Note: All values are reported as Mean(SD)

The older the youngest child in the household is, the higher the labor force participation of mothers is. The average labor force participation for mothers of infants is about 64 percent and increases to 67 percent for mothers of toddlers and reaches 69 percent for mothers of preschoolers. Maternal employment stays stable around 91 percent. The difference in usual hours worked is small between each group. On average, mothers of infants work about the same hours as mothers of toddlers, and they work about 1 hour less than mothers of preschoolers per week.

Comparing to the slight increase in the labor force participation, employment, and usual hours worked observed from mothers of infants to toddlers to preschoolers, labor market outcomes of fathers are stable. Almost no difference was observed in labor force participation, employment,

or usual hours worked between fathers of infants, toddlers, and preschoolers. Their average labor force participation stays around 95 percent, which is much higher than those of the mothers in each group. About 95 percent of fathers are employed in each group, which is slight higher than the employment rate of mothers in each group. Fathers of children in all age groups tend to work around 41 hours per week, and they work about 17 more hours per week than mothers in each group.

5. Model

$$Y_{ict} = \beta_1 log(ChildcareCost_{ct}) + \beta_2 log(PreWageC_{ct}) * Col_i + \beta_3 log(PreWageN_{ct}) * NCol_i + \beta_4 Education_i + \beta_5 Age_i + \beta_6 Race_i + \sigma_c + \sigma_t + \epsilon$$

5.1. Subscripts

i: individual; indicates each survey respondent

c: county; indicates the county that the survey respondent lived

t: time; indicates the year the respondent was surveyed

5.2. Dependent Variables

i. Labor Force Participation: indicates whether the respondent was a part of the labor force – working or seeking work; equals 1 if the respondent was in the labor force; equals 0 if the respondent was not in the labor force.

ii. Employment: indicates whether the person was currently employed or unemployed if in the labor force; equals 1 if the respondent was employed; equals 0 if the respondent was not employed.

iii. Usual Hours Worked: reports the number of hours per week that the respondent usually worked, if the person worked during the previous year.

5.3. Independent Variables

i. Childcare Cost: reports the aggregated weekly, full-time median price charged for Center-based Care for infants, toddlers, and preschoolers in a county of the year.

ii. Predicted Wages for College Graduates: reports the average wage of college graduates in a county of the year.

iii. Predicted Wages for Non College Graduates: reports the average wage of non college graduates in a county of the year.

5.4. Control Variables

i. Age: reports the person's age in years as of the last birthday.

ii. Race: reports the person's race such as White, Black, and Asian.

iii. Education: indicates respondents' educational attainment, as measured by the highest year of school completed.

5.5. Dummy Variables

i. Col: equals 1 if the person has a college degree; equals 0 if the person does not have a college degree.

ii. NCol: equals 1 if the person does not have a college degree; equals 0 if the person has a college degree.

5.6. Fixed Effects

i. Year Fiexed Effect: captures the changes common to all counties in the year *t*

ii. County Fixed Effect: captures the changes common to all years in the county *c*

6. Results

6.1. The relationship between childcare costs and labor force participation

Table 3: Marginal Effects on Labor Force Participation

	(1) All Mothers	(2) Single Mothers	(3) Married Mothers
log Childcare Cost	−0.167***	−0.233***	−0.097***
	(0.005)	(0.008)	(0.005)
log PreWageC	0.024***	−0.005	0.031***
	(0.007)	(0.011)	(0.008)
log PreWageN	0.039***	−0.008	0.033***
	(0.008)	(0.020)	(0.009)
Education	0.054***	0.060***	0.056***
	(0.0005)	(0.0008)	(0.0006)
Intercept	0.442***	0.621***	−0.099
	(0.106)	(0.189)	(0.128)
N	612011	156262	440667
Multiple R-Squared	0.053	0.078	0.069
Adjusted R-Squared	0.052	0.075	0.068

Note: $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$

Table 3 shows the results of the model testing the association between childcare costs and maternal labor force participation. Considering all mothers, controlled for demographic character- istics such as age and race, an increase in childcare costs is associated with a decrease in maternal labor force participation. More specifically, a 1 percent increase in childcare costs is associated with a 0.17 percent decrease in maternal labor force participation. Mothers are then divided into

single mothers (including those who never married, divorced, or widowed) and married mothers (including those who are married with or without the presence of a spouse). A stronger negative association is observed between childcare costs and labor force participation for single mothers than for married mothers. A 1 percent increase in childcare costs is associated with a 0.23 percent decrease in the labor force participation of single mothers and only a 0.01 percent decrease in the labor force participation of married mothers.

6.2. The relationship between childcare costs and employment

Table 4: Marginal Effects on Employment

	(1) All Mothers	(2) Single Mothers	(3) Married Mothers
log Childcare Cost	−0.014***	−0.070***	−0.003
	(0.003)	(0.008)	(0.003)
log PreWageC	0.007	0.005	0.004
	(0.005)	(0.011)	(0.005)
log PreWageN	−0.018**	−0.031	0.0002
	(0.006)	(0.018)	(0.006)
Education	0.021***	0.027***	0.015***
	(0.0004)	(0.0008)	(0.0004)
Intercept	−0.260***	0.223	−0.079
	(0.078)	(0.181)	(0.081)
N	403856	114173	277993
Multiple R-Squared	0.056	0.052	0.037
Adjusted R-Squared	0.055	0.048	0.036

Note: $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$

Table 4 reports the association between childcare costs and maternal employment. An increase in childcare costs is associated with a decrease in employment for all mothers, and the effect is more pronounced for single mothers than for married mothers. A 1 percent increase in childcare costs is associated with a 0.014 percent decrease in employment of all mothers and a 0.07 percent decrease for single mothers. The marginal decrease in employment for married mothers is 0.003 units but it is not statistically significant. It is interesting that for single mothers who have a college degree, an increase in predicted wage associates with a slight increase in employment, but for single mothers who do not have a college degree, an increase in predicted wage associates with a decrease in employment. Yet, the effects of predicted wages on maternal employment for single mothers are not significant, so they should be interpreted with caution.

6.3. The relationship between childcare costs and usual hours worked

Table 5 presents the association between childcare costs and usual hours worked. It is observed that an increase in childcare costs predicts a decrease in usual hours worked. Considering all mothers regardless of their marital status, a 1 percent increase in childcare costs is associates with a 4-hour decrease in usual hours worked per week. The reduction of working time doubles to 8 hours if we only consider single mothers. Yet, married mothers only reduce 1 hour of working time on average per week if there is a 1 percent increase in childcare costs. In addition, a 1 percent increase in predicted wage predicts a 1-hour increase in usual hours worked for married mothers who have a college degree and an almost a 2-hour increase in usual hours worked for married mothers who do not have a college degree. Therefore, the effect of an increase in wage may counterbalance that of the increase in childcare costs on usual hours worked by married mothers.

Table 5: Marginal Effects on usual hours worked

	(1) All Mothers	(2) Single Mothers	(3) Married Mothers
log Childcare Cost	−4.025***	−8.018***	−1.153***
	(0.182)	(0.331)	(0.219)
log WageC	0.817**	−0.222	1.136***
	(0.265)	(0.445)	(0.331)
log WageN	1.375***	−0.590	1.711***
	(0.329)	(0.817)	(0.375)
Education	2.132***	2.430***	2.150***
	(0.018)	(0.031)	(0.023)
Intercept	−23.003***	−4.021	−38.916***
	(4.258)	(7.593)	(5.189)
N	612011	156262	440667
Multiple R-Squared	0.067	0.105	0.078
Adjusted R-Squared	0.066	0.103	0.077

Note: $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$

7. Discussion and Conclusion

In conclusion, this study explores the associations between childcare costs and maternal labor force participation, employment, and usual hours worked by mothers by using direct measure- ment of childcare costs in each county from the Women's Bureau. Both hypotheses are confirmed. Firstly, an increase in childcare costs is associated with a decrease in maternal labor force partici- pation, employment, and usual hours worked by mothers. Secondly, the negative associations are stronger for single mothers compared to married mothers, confirming Han and Waldfogel's results

(2001).

This study contributes to the research on maternal labor market outcomes in several ways. Firstly, the updated data from 2009 to 2018 provides a context that is more relevant today. Secondly, the direct measurements of childcare costs from each county allow us to capture variations more precisely. Thirdly, by including the usual hours worked per week, it provides a new dimension to look at maternal employment. It has been shown that a 1 percent increase in childcare costs is associated with a 4-hour decrease in working time per week for mothers on average. Therefore, we know that when facing the dilemma between childcare and work, mothers not only have the option to quit their job but also reduce working hours.

Childcare costs are certainly not the only factor to explain maternal labor market outcomes. Childcare subsidies such as Pre-K and Head Start and policies about maternal leave can influence maternal employment too. Including measurements of these social factors in future studies may better explain mothers' decisions in the labor market. In addition, the association is identified in this study, but causality needs further research.

References

Choudhary, A. (2021). Is childcare cost a barrier to women managers' retention and progress at large firms? *Equality, Diversity and Inclusion: An International Journal, 41(2)*, 241–253. https://doi.org/10.1108/EDI-12-2020-0371

Han, W., Waldfogel, J. (2001). Child Care Costs and Women's Employment: A Comparison of Single and Married Mothers With Pre-School-Aged Children. *Social Science Quarterly, 82(3)*, 552–568. https://doi.org/10.1111/0038-4941.00042

Kimmel, J. (1998). Child Care Costs as a Barrier to Employment for Single and Married Mothers. *The Review of Economics and Statistics, 80(2)*, 287–299.

Landivar, L. C., Scarborough, W. J., Collins, C., Ruppanner, L. (2022). Do high childcare costs and low access to Head Start and childcare subsidies limit moth-

ers' employment? A state-level analysis. *Social Science Research, 102*, 102627. https://doi.org/10.1016/j.ssresearch.2021.102627

McConnon, A., Midgette, A. J., Conry-Murray, C. (2022). Mother Like Moth- ers and Work Like Fathers: U.S. Heterosexual College Students' Assumptions About Who Should Meet Childcare and Housework Demands. *Sex Roles, 86(1/2)*, 49–66. https://doi.org/10.1007/s11199-021-01252- 3

Ruppanner, L., Collins, C., Landivar, L. C., Scarborough, W. J. (2021). How do Gender Norms and Childcare Costs Affect Maternal Employment Across US States? *Gender Society, 35(6)*, 910– 939. https://doi.org/10.1177/08912432211046988

(2023, January). *Fact Sheet.* https://www.dol.gov/sites/dolgov/files/WB/NDCP/Fact-sheet-English- 508-compliant.pdf

(2022, October) *Office of Head Start.* https://www.acf.hhs.gov/ohs/about/head-start

(n.d.) *PreKindergarten Programs.* https://childcare.gov/consumer-education/prekindergarten-programs

Communalism and the Economy in India

Nayna Puri

New York University

Abstract

India exhibits two equilibria: divisive agendas are less prevalent when the economy is doing well, and religion-based riots decrease, enhancing economic development. Conversely, in times of low growth, communal violence escalates, which exacerbates the downturn. This phenomenon stems from India's first-past-the-post electoral system and the shared history between different communities, which political parties are incentivized to exploit. In this paper, rainfall and the world economy are used as instrumental variables for the Indian economy and regressed with communal violence from 1960 to 1995 in India. The findings show that religious based riots can be forecasted based on economic performance. Additionally, they reveal that communal riots are not invariably spontaneous; frequently, they are instigated to serve political agendas.

1. Introduction

The 15th of August 1947 — the first day of the rest of India's history — was globally celebrated as two South Asian countries attained sovereignty after two centuries of colonial rule. These jubilations, however, drowned out the violence ensuing between Hindus and Muslims— taking place at that very moment— marking the world's deadliest riots.

Seventy-five years later, communal violence remains a recurring theme in Indian societies. I define communal violence as an instance where people sustain killings and injuries based on religious identity. While most instances documented are between Hindus and Muslims, I include other minorities like Sikhs and Christians in my data. I argue there are two steady states in India — in times of economic prosperity, political parties no longer need to restrict themselves to community-based votes, emphasizing issues around nation-building like security and education. In periods of low growth, there is an increase in communal violence which exacerbates the economic downturn leading to more violence and worsening economic prospects.

2. The Economy and Communalism

The intermixing between the Hindu and Muslim communities has remained elusive for several reasons. First, since the partition happened along religious lines, with Pakistan identifying itself as a Muslim state, many Hindus still view India as *Hindu Rashtra* — even though the constitution categorically classifies it as a secular state.

This perception led some Hindus in India to label Indian Muslims as outsiders or "Pakistanis," and "invaders." This otherizing has enormous repercussions during economic downturns.

Billiet (2014), under dynamic group conflict theory, suggests that groups adversely react to other ethnic groups when their relative economic stature decreases, as they believe they are competing for "scarce material". To corroborate the theory, Billiet later collects data on sentiments towards immigrants from 23 EU countries between 2008-2011. The results of their study confirm both a highly significant and large impact of unemployment on perceived immigrant threats across education levels and a higher perceived threat from immigrants in countries witnessing a decline in economic growth[1].

Applying this to the Indian context, in phases of waning economic growth, some Hindus may perceive Indian Muslims as competitors (Bohlken, Sergenti, 2010) for employment and wages, increasing resentment among the communities and leading to riots.

Second, the electoral system and the caste structure of the Hindu society in India create a robust political incentive that propels radicalization. The multiparty electoral system has a first-past-the-post structure in which the party with the highest vote share bags the seat. Regional parties often take advantage of this arithmetic, propelling either minority or majority appeasement policies. Consolidating the minority religious votes and a few targeted castes, for example, can help parties secure and break up the Hindu vote, giving them a relative majority in the constituency. Other parties attempt to consolidate Hindu votes— a more challenging task because of caste divisions and the lack of shared history— by uniting Hindus under anti-Muslim rhetoric.

More prominent political parties, however, ideally aim for manifestos and policies that cross-cut these identity lines to get a larger vote bank and undercut regional powers, who tend to deploy the former strategy. While these two tactics are not substitutes, large political parties usually lean towards one, depending on their positioning.

When the countries are in economic distress, measured by lower GDP growth per capita, the population's income per capita increase falls short of their expectations. This adversely affects voters' lifestyles and, more importantly, their perception of their well-being and prospects. This was especially true for India between 1960-1990, with 63%[20] of the population living below the poverty line till 1977, when a small economic shock would push the country to starvation resulting in crippling poverty for millions.

At these junctions, incumbent parties find it challenging to secure votes by cutting across community lines since incumbent governments, both in the center and state, are held responsible for economic performance. They thus choose to polarize the electorate, sharpening their religious identity to both bank votes along community lines and "distract" (Bohlken, Sergenti, 2010) the population from more pressing matters like the economy.

Polarizing communities embolden fringe elements in the incumbent party's vote bank to instigate members of the other community. The dataset[21] documents instances like playing music during prayers, breaking idols, allegations of cow slaughter, pork consumption, and sacrilege of holy books, which eventually spiral into violence. This communal violence, in turn, has serious economic ramifications.

A small-scale study (Das et al. 2022), which assesses the impact of the Delhi riots which happened in 2020 using the difference in differences methods with the control group as people unaffected by riots and the treatment as riot victims in the same region, finds that before the riots, the unemployment rates of both groups were hovering around 8%, however, two years

[20] Our World in Data Team et al., "Our World in Data," Our World in Data, accessed April 27, 2023, https://ourworldindata.org/.

[21] Varshney, Ashutosh, and Steven Wilkinson. "Varshney-Wilkinson Dataset on Hindu-Muslim Violence in India, the 1950-1995, Version 2. 1950-1995" . Inter-university Consortium for Political and Social Research [distributor], February 17, 2006. https://www.icpsr.umich.edu/web/ICPSR/studies/4342.

after the riots the control group had an unemployment rate of 10%, while the treatment group's unemployment rate shot up to 16%. The mechanism behind this, they observe, is the phenomenon of economic outcasting by both communities whereby Hindu and Muslim traders, who were affected by the riots, refuse to buy from each other, increasing friction in the supply chain by buying more expensive alternatives and eating their margins and leaving many suppliers in the region without a running income. The study also reported that during the riots, there was substantial damage to assets belonging to members of the riot-hit community—a lot of businesses were unable to replace these assets because of a paucity of funds, and presumably, a lot of them didn't want to invest all their savings in assets, which were susceptible to damage in the future.

While it is difficult to quantify these costs, the Institute for Economics and Peace formally classifies costs associated with violence under three headers headers (Institute for Economics and Peace) —direct, indirect, and multiplier costs. Direct costs are expenses immediately linked with violence borne by the government, including loss of infrastructure, hospital bills, judiciary hours, and policing. Indirect cost measures the secondary damage caused by the violence—the impact violence has on the perception of the region and its impact on foreign capital flows.

Multiplier costs calculate the returns resources deployed during violence would have generated had they been used alternatively. The Institute for Economics and Peace calibrated this to be 6% (Sethi, 2022) of India's GDP in 2021 or $646 billion dollars, which translates into a loss of $461 for every Indian annually. This figure, however, includes other forms of violence besides communal violence, and we don't have enough data to cross-check these numbers or segregate them under categories.

In times of economic prosperity, political parties no longer need to restrict themselves to community-based votes, emphasizing issues around nation-building like security and education instead. It could be argued that opposition leaders are incentivized to break up this consolidation by trying to win votes along community lines. However, it's important to note that fringe elements of society are less likely to indulge in violence without the backing of the state machinery, where there is a higher probability of prosecution. The relatively peaceful conditions and strong law order are conducive to economic activity, leading to more economic growth and reducing the government's payoff from polarization.

3. Results

To empirically study the impact of economic growth on communal riots, I use a dataset (Varshney, Wilkinson, 2006) that has aggregated information on killings, injuries, arrests, and duration of religious strife from 1950 to 1995. While the dataset includes entries from 1950 onwards, during this decade, India, a newly formed state, faced institutional challenges like a weak policing system.

Waves of migrations also took place at the time when people who couldn't immigrate in 1947 left their homes, belongings, and properties and crossed to either side of the border. Both these variables, unique to the 50s, these variables would have strongly affected communalism trends in that decade and would be unlinked to the following decades, making the data noisy. Considering this, I use data points from 1960 onwards; however, this leaves us with a smaller sample, 34 data points, which may make results look insignificant.

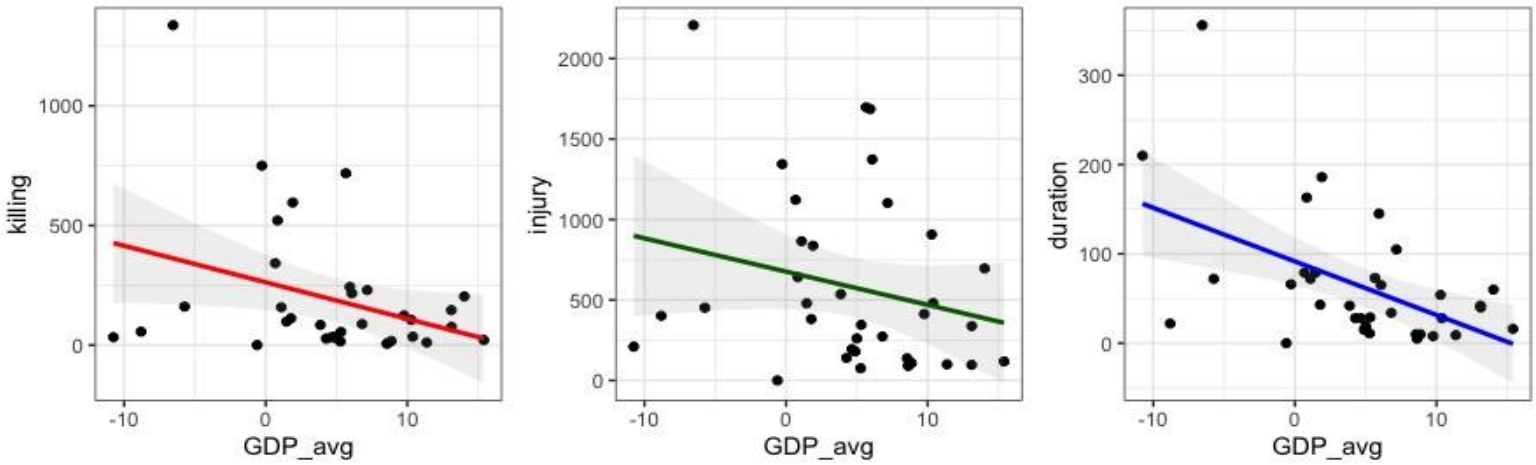
Since the fiscal year in India ends in the first quarter of the following year, I use average GDP per capita growth (India GDP per Capita 1960-2023), which is the mean of the current and lag-year GDP growth.

The equation for this regression would be $Y = B_0 + B_1X_1$, where Y is taken on the values of killings, injuries, and duration of riots while X_1 = average GDP per capita. If my hypothesis is correct, then B_1 should be negative as a one percentage point increase in GDP per capita should reduce all forms of communal violence in that given year.

At first glance, average GDP growth per capita and killings and durations during communal violence seem highly correlated and have the predicted negative relationship.

Table 1:

	Dependent variable:		
	killing	injury	duration
	(1)	(2)	(3)
GDP_avg	−15.541**	−21.264	−6.088***
	(7.499)	(15.076)	(1.760)
Constant	267.271***	686.647***	93.080***
	(58.664)	(117.938)	(13.765)
Observations	34	34	34
R^2	0.118	0.059	0.272
Adjusted R^2	0.091	0.029	0.249
Residual Std. Error (df = 32)	271.706	546.234	63.754
F Statistic (df = 1; 32)	4.295**	1.989	11.970***
Note:			*p<0.1; **p<0.05; ***p<0.01



4. Instrumental variables

However, since GDP growth per capita and communal riots display reverse causality—communal riots also impact GDP per capita growth, I use average world GDP (World GDP per Capita 1960-2023) —mean of current and lag year world GDP per capita growth— and average annual rainfall (All India Monthly Rainfall Series) as an instrumental variable.

Both rainfall and world GDP growth per capita are exogenous variables in this model. While world GDP growth per capita contains Indian GDP growth per capita, for the years I am covering, India had an insignificant portion of the total world GDP making its impact negligible on the world variable. Second-world GDP growth per capita and average annual rainfall are strong determinants of Indian GDP growth per capita. Rainfall is essential in determining India's GDP per capita growth because agriculture had the highest sectoral share in the Indian economy from the 60s to the 80s. It also remained a highly volatile sector—the lack of irrigation left farmers dependent on rainfall, leading to severe food shortages in years of drought. While some studies use rainfall variance as a metric, above-average rainfall will likely benefit crops in a drought-prone region like India.

Further, in the 60s, HYV seeds were brought to India, which require high water levels, which is why I model rainfall to have a positive relationship with GDP.

Similarly, even though most data points come from pre-liberalized India, before 1991, where protectionist policies were in place, import, aid, and select sectors remained open, through which the world economy impacted the Indian economy.

Without deep diving into these mechanisms, I test average world GDP per capita growth and average annual rainfall on average Indian GDP. The results show that world GDP was significant at a 1% level, while rainfall was significant at a 10% level, and both the independent variables explained up to 34.5% variation in the dependent variable.

Table 2:

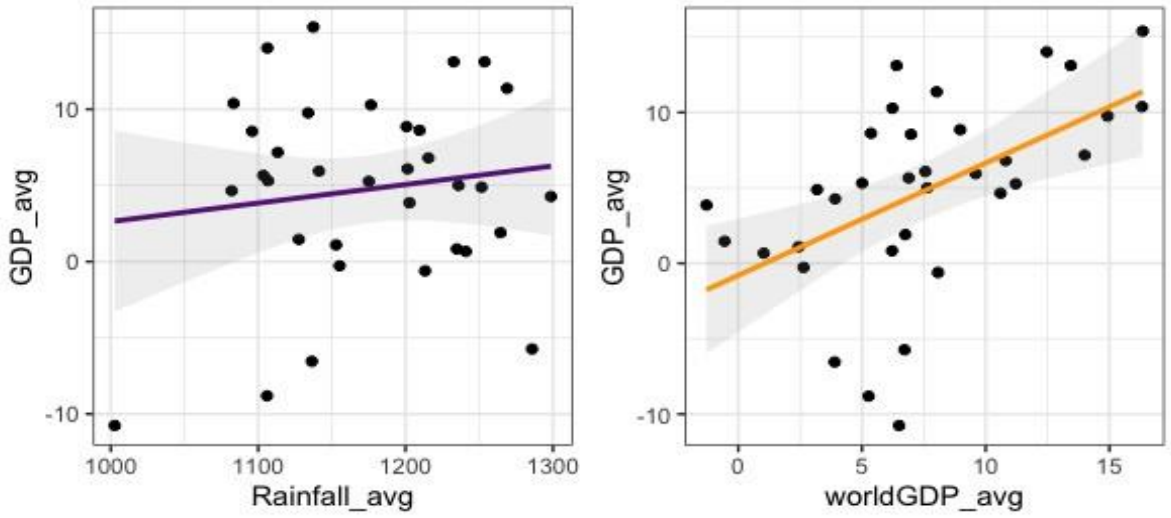
	Dependent variable:
	(GDP_avg)
Rainfall_avg	0.024*
	(0.013)
worldGDP_avg	0.830***
	(0.211)
Constant	−29.701*
	(16.201)
Observations	34
R^2	0.345
Adjusted R^2	0.303
Residual Std. Error	5.267 (df = 31)
F Statistic	8.163*** (df = 2; 31)
Note:	*p<0.1; **p<0.05; ***p<0.01

Third, world GDP and rainfall also meet the exclusionary restriction, which states that the instruments should impact the dependent variable only through the independent variable. There

exists no conceivable channel besides Indian GDP growth per capita through which world GDP per capita growth can impact religious harmony in India.

Similarly, rainfall cannot impact religious disharmony in any other way besides its impact on GDP growth satisfying this condition.

Fourth, it is evident that there is no overlap between both instrumental variables—the complier groups of both average annual rainfall in India and average world GDP per capita growth are both highly unrelated and don't overlap with each other in their prediction of Indian GDP—while rainfall is likely to have compilers in the agricultural sectors, world economic growth is more likely to have compilers in the manufacturing and services sector.



Results

To test the impact of GDP on killings, injuries, and durations of riots (days) on GDP, I use the duration of riots (days), the number of people killed and injured grouped by year and regress it on the GDP per capita growth using world GDP per capita and average annual rainfall as instruments.

I use one control in the coalition governments at the center, which refers to central governments where the largest party doesn't have a majority in parliament, thus striking a post-election coalition with other regional parties to form a government. Between the 70s and 90s, these governments in India were ideologically incompatible, leading to roadblocks in decision-making and making them notorious for their infighting, misgovernance, and short shelf life. These parties rapidly lost support for their indecisiveness and disunity, leading to political instability and worsening law enforcement, aggravating communalism. To control this variable and decrease the noisiness of the data at hand, I assign a dummy variable to the coalition where 0 are years with a majority government, and 1 are years with coalition governments.

There is a valid concern that coalition governments may be endogenous—voting patterns, which impact whether a coalition or majority government is formed, may be interlinked to the GDP per capita growth. To refute these claims, I study the emergence of coalition governments in India. The first coalition government at the center was formed in 1977 after the emergency was lifted. The emergency imposed by the then prime minister Indira Gandhi was so unpopular that not only did the Indian National Congress lose elections for the first time since Indian independence, but Mrs. Gandhi also lost her seat in Rae Bareli as well. This gave a new lease to smaller parties now competing at the national level, weakening the grand old party, leading to more vote splitting in elections and increasing anti-incumbency in the elections to come. From this point onwards, more coalition governments came to power, despite their poor track records, since voters at an individual level were not choosing between coalition and majority governments; they were voting for their preferred political party, hoping they would form the government—the coalition was just a consequence of political parties individually not being able to secure a majority.

The political landscape changed so drastically after the emergency that all governments succeeding until 1996 were coalition governments barring two. The first was the 1980 election when the coalition government dissolved parliament amidst incessant infighting just three years into their term, leading to re-elections, where Mrs. Gandhi swept back to power. The second was in 1984, after Mrs. Gandhi was shot dead, leading to elections where her son Rajiv Gandhi, riding on a sympathy wave, returned to power with a thumping majority winning 414 out of the 543 parliamentary seats. Thus, it was not GDP per capita but long-term changes in party structure and significant political events that determined the emergence of a majority or coalition government in those years, addressing the concern that the formation of majority and coalition governments are endogenous and dependent on GDP.

Table 1:

	Dependent variable:	
	killing	
	(1)	(2)
GDP_avg	−18.201	−25.617**
	(13.402)	(11.794)
coalation		205.994*
		(101.394)
Constant	279.914***	254.572***
	(78.973)	(81.430)
Observations	34	34
R^2	0.115	0.180
Adjusted R^2	0.087	0.127
Residual Std. Error	272.239 (df = 32)	266.162 (df = 31)
Note:		*p<0.1; **p<0.05; ***p<0.01

Table 2:

	Dependent variable:	
	duration	
	(1)	(2)
GDP_avg	−5.736*	−7.023**
	(2.998)	(2.808)
coalation		30.853
		(24.141)
Constant	91.407***	88.450***
	(17.963)	(19.388)
Observations	34	34
R^2	0.271	0.303
Adjusted R^2	0.249	0.258
Residual Std. Error	63.794 (df = 32)	63.371 (df = 31)
Note:	*p<0.1; **p<0.05; ***p<0.01	

Table 3:

	Dependent variable:	
	injury	
	(1)	(2)
GDP_avg	−39.487	−43.757*
	(26.247)	(25.411)
coalation		50.361
		(218.453)
Constant	773.258***	778.736***
	(157.282)	(175.440)
Observations	34	34
R^2	0.016	−0.005
Adjusted R^2	−0.015	−0.070
Residual Std. Error	558.565 (df = 32)	573.449 (df = 31)
Note:	*p<0.1; **p<0.05; ***p<0.01	

The results from the regressions with average rainfall and average world GDP as instrumental variables for average GDP show that without applying the control for coalitions are not robust, except for the duration of riots, which is significant at a 10% confidence interval. However, after controlling for coalitions, killings and duration become significant at 5%, while injury becomes significant at the 10% level. Despite the small sample size, these results are robust indicating that GDP per capita growth affects all measures of communal riots in India.

Conclusion

In conclusion, studying the dataset between 1960-1996, there are two multiple equilibria. First, in years of faster economic growth measured by GDP per capita, less communal violence leads to faster economic growth, further reducing communal violence, in years of slow growth, communalism increases, slowing growth down further exacerbating communalism. These findings show that an inherent incompatibility between communities does not cause inter-faith disharmony; rather, they are created opportunistically.

References

Billiet, Meuleman, Witte (2014) Relationship between Ethnic Threat and Economic Insecurity in Times of Economic Crisis: Analysis of European Social Survey Data *OUP Academic. Oxford University Press*. https://academic.oup.com/migration/article/2/2/135/973370.

Bohlken, Thomas, Sergenti (2010) Economic Growth and Ethnic Violence: An Empirical Investigation of Hindu—Muslim Riots in India. https://www.jstor.org/stable/pdf/20798928.pdf.

Our World in Data, https://ourworldindata.org/

"All India Monthly Rainfall Series (1901-2012)."
http://www.indiaenvironmentportal.org.in/media/iep/infographics/Rainfall%20in%20India/112%2 0years%20of%20rainfall.html.

Das, Mausumi, De, and Khan (2022). The Long Shadow of the 2020 Delhi Riots *The Indian Express*. https://indianexpress.com/article/opinion/columns/the-long-shadow-of-the-2020-northeast-delhi-r iots-7821523/.

"Global Peace Index 2022 Briefing - Measuring Peace in a Complex World." *Institute for Economics and Peace*. https://www.visionofhumanity.org/wp-content/uploads/2022/06/GPI-2022-Briefing-web.pdf.

"India GDP per Capita 1960-2023." *MacroTrends*.https://www.macrotrends.net/countries/IND/india/gdp-per-capita.

Sethi (2022) "$646 Billion - That's the Economic Cost of Violence in India." *Business Insider* https://www.businessinsider.in/thelife/news/646-billion-thats-the-economic-cost-of-violence-in-india/articleshow/92252398.cms#:~:text=With%20the%20money%20that%20the,as%206%25%20 of%20its%20GDP.

Varshney, Wilkinson (2006). "Varshney-Wilkinson Dataset on Hindu-Muslim Violence in India, 1950-1995" *Inter-university Consortium for Political and Social Research*. https://www.icpsr.umich.edu/web/ICPSR/studies/4342.

"World GDP per Capita 1960-2023." MacroTrends. Accessed May 6, 2023. https://www.macrotrends.net/countries/WLD/world/gdp-per-capita.

Normative Perspectives on Foreign Aid
An Instrumental Variable Approach

Juan Nicolas Pava

Abstract

This research paper's objective is two-fold. Firstly, it employs an instrumental variable based on legislative fragmentation to evaluate how effective is U.S. foreign aid in promoting positive social outcomes. To this aim, the paper disaggregates aid into its various purposes and measures their differential effect on competing measures of social welfare. Secondly, this paper argues against an all-too-common interpretation of disciplinary Wertfreiheit (value-freedom) in economics and provides an alternative methodology for formulating policy recommendations. The findings reveal that aid targeted at Economic Development has either insignificant or adverse effects on welfare metrics while strongly associated with rights deterioration in recipient countries. In contrast, the opposite holds true for Democratic and Educational aid. These results emphasize the need for aid reallocation, shifting away from Economic Development aid and prioritizing aid that fosters democratization and education in emerging economies.

1. Introduction

The aid-effectiveness debate has been anything but effective, with some recent contributors apologizing for adding to the already saturated literature (Dreher & Langlotz, 2020). Likewise, I begin by apologizing for discussing, once more, a very large and yet largely inconclusive project. That said, this paper recognizes the significance of this debate and takes the dynamics of official development assistance (ODA) as a valuable case study for the methodological approach pursued here. Unlike policymaking in democratic regimes, which is to some extent accountable to the will of the beneficiaries, aid policy hardly is. This characteristic presents a normative challenge for aid policy recommendations, given that their justification must often rely on what donor agencies or countries consider to be in the best interest of the recipients.

Most commonly, previous research and policymakers have used GDP per capita growth as the key metric to gauge the benefits of aid (Jia, 2019), with some exceptions that will be discussed later on. For all the advantages of this approach, it may have also resulted in extensive aid directed towards autocracies —a feature that seems to be on the rise (Easterly, 2021)— either because autocracies may be more in need of development or because some may expect them to be more conducive to growth. Yet, when we account for the fact that aid targeted at authoritarian regimes seems to prevent democratization (Niño-Zarazúa et al., 2020), it is also a source of important trade-offs. Similar issues plague other consequences of aid, particularly by the U.S., which has been shown to be positively associated with larger degrees of repression in recipient countries (Ahmed, 2019) and the prolongation of civil conflict (Nunn & Qian, 2014). An illustrative case of the lack of normative nuance in policy recommendation was appraised in the debates over the infamous 1991 *Summers memo* where Larry Summers (the then World Bank's Chief Economist) argued that less developed countries are under-

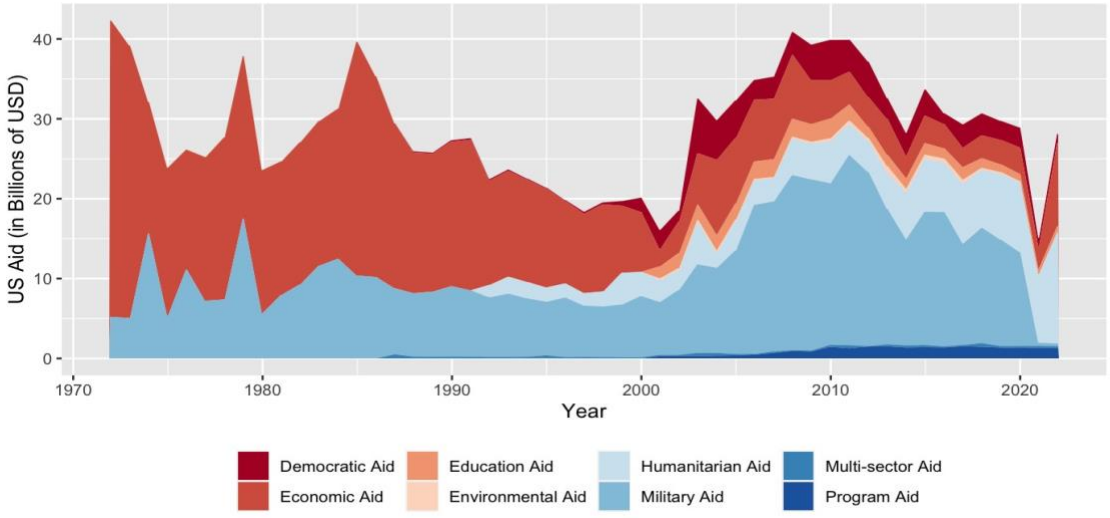
polluted claiming that “the economic logic behind dumping a load of toxic waste in the lowest-wage country is impeccable and we should face up to that.” ("Furor on Memo at World Bank," 1992).

In contrast and drawing inspiration from recent work in the philosophy of welfare economics (Hausman, McPherson, & Satz, 2019), this paper adopts a more rigorous methodology to, both, examine the normative implications of empirical findings and derive policy recommendations from them. This paper also leverages a novel instrumental variable, namely the fractionalization of the U.S. House of Representatives, known to be associated with increased government expenditures (Roubini & Sachs, 1989), including foreign aid (Round & Odedokun, 2004; Brech & Potrafke, 2014), to explore aid’s impact on a diverse range of welfare indicators. However, unlike the previous applications of this instrument, which evaluated the impact of *aggregated* aid on growth (Dreher & Langlotz, 2020), refugees (Dreher, Fuchs, & Langlotz, 2019), or political rights (Ahmed, 2016), this paper disaggregates aid by purpose.

In response to the converging consensus on aggregate aid’s lack of growth effects (Doucouliagos & Paldam, 2008, 2011), there has been a recent surge in papers evaluating the effect of aid through its specific dimensions. Bjørnskov (2019) breaks aid into aid for economic purposes, social purposes, reconstruction, and a residual category; and a similar apportionment is used by Asongu and Nwachukwu (2017). Clemens et al. (2012) specifically evaluate early-impact aid, and Rajan and Subramanian (2008) distinguish between multilateral and bilateral aid (Bjørnskov, 2019; Asongu & Nwachukwu, 2017; Clemens et al., 2012; Rajan & Subramanian, 2008). The novelty of this paper is in using legislative fragmentation as an instrument for this kind of typological analysis. Notably, the approach pursued here gains

relevance due to the availability of more granular data since 2001, which allows for a more comprehensive analysis of U.S. aid disaggregation, as depicted in Figure 1. Ultimately, this approach contributes significantly to understanding aid's multifaceted impact on recipient countries' welfare and informs evidence-based policy recommendations.

Figure 1 *U.S. Foreign Aid in the past 50 years*



After a brief discussion on the notion of *Wertfreiheit*, the rest of the paper is structured as follows. Section "Data and the Standard Welfare Model" clarifies the main model of welfare economics and discusses the instrumental variable (IV) approach that will be used to regress economic growth on aid. Section "Standard Model Results" evaluates these initial IV regression results and their policymaking implications. Section "Data and Extended Welfare Model" introduces three alternative measures of evaluation —HDI growth, Political Rights and Civil Liberties— and their respective specifications in order to test them. Section "Extended Model Results" discusses the empirical results of these additional instrumental

variable regressions and then their policymaking implications. Lastly, "Conclusion" concludes.

2. Wertfrei Economics

Policy recommendations fall into two general types: hypothetical judgments, which are concerned with the means to obtain a pre-established end (e.g., the government *should* cut regulations *if* it aims to promote free markets), and categorical ones, which directly advocate for an end (e.g., the government *should* promote free markets). This classification respectively corresponds to the dichotomy between positive and normative economics. While *positive* policy recommendations of the first kind are generally considered normatively uncontroversial, those falling into the second category, *normative* policy recommendations, pose significant challenges. These latter rely on substantive value judgments, which may seem arbitrary, unfounded, or biased, and may result in two potential risks: one from a theoretical standpoint and another from a practical one.

On a theoretical level, *normative* policy recommendations risk a lack of objectivity. Objectivity is a crucial theoretical virtue for any scientific endeavor; and for Economics, this is no exception. The quest for a *Wertfrei*, i.e., value-free, economics has been a long-searched and hotly debated topic (Drakopoulos, 1997), some even identify it as a core axiom of the discipline (Ostapiuk, 2020, 2021). And while some economists have called to rid the field of all normativity (Robbins, 1932), others have fully embraced a normative approach (Sen, 1987).

This challenge is particularly salient for welfare economics which must presuppose at least one normative premise by identifying well-being with some fact or property (preferences,

pleasure, happiness, etc.) (Wysocki, 2023). Even the Austrian School's programmatic *Wertfreiheit* is not exempt from this normative commitment. At their most robust, defenses of Austrian Welfare Economics explicitly rely on a normative framework by equating actual preference satisfaction with personal benefit (Hamlin & Sugden, 1992). However, at their weakest points, these arguments become contradictory in attempting to establish a purely positive account (Herbener, 2008; Rothbard, 1956) while inadvertently relying on a normative commitment to natural rights (Wysocki, 2023), undermining the kind of objectivity they seek to maintain.

This mistake often arises from assuming that the equivalence between value standards and mere subjective preferences, likes, or tastes is uncontroversial or scientific when, instead, it reflects a substantive ethical position (the meta-ethical one termed "subjectivism," to be more precise). This assumption is also one of the avenues through which *normative* policy recommendations pose a secondary and practical problem: paternalism. Justifying a certain end or policy based on a particular conception of well-being can lead to the coercive imposition of this view over others (Quong, 2010; Rawls, 1993).

Instead, this paper proposes an alternative interpretation of *Wertfrei*, where objectivity is understood as neutrality between value judgments rather than their absence. This approach closely follows Haybron & Tiberius' position of "pragmatic subjectivism" and contends that "policies aimed at bettering people's lives must do so according to the beneficiaries' own standards" (Haybron & Tiberius, 2015). Thus, it is not permissible for states to impose an external standard of well-being on their citizens and must be agnostic regarding the correct view of well-being. For example, given that Peter Singer is a hedonic utilitarian (de Lazari-Radek & Singer, 2014), the government is only justified to promote his well-being by

appealing to hedonic considerations. By only endorsing those policies which overlap with a variety of conceptions of well-being, we avoid imposing external standards on citizens and mitigate (though not enough to eliminate) state paternalism. Moreover, while Haybron & Tiberius' *pragmatic subjectivist* position originally aimed to address practical constraints on policy, we may extend its application to a theoretical level as well. By adopting a stance of agnosticism over the correct view of well-being and employing a diverse array of measures of social outcomes, we can craft policy recommendations that are neutral among competing moral frameworks. Now and to this end, let us first evaluate U.S. foreign aid from the most common moral framework used for policy recommendations: Gross Domestic Product.

3. Data and the Standard Welfare Model

3.1. Standard Normative Model

In order to understand why the literature treats Gross Domestic Product (GDP) and GDP per capita as the key benchmark for policy evaluation, we can refer to the characterization of the default position of welfare economics by Haussman et al. (2019) in Table 1 (Hausman, McPherson, & Satz, 2019)

Table 1 The moral framework of welfare economics

1. What should economists appraise?
    a. *Outcomes*
    b. Processes
2. What method(s) of appraisal should economists use?
    a. *Single method of appraisal*
    b. Multiple ethical perspectives, depending on the problem
3. What matters about outcomes?
    a. *Consequences for individuals*
    b. Consequences for groups, or the environment
4. Which outcomes for individuals matter?
    a. *Welfare*
    b. Freedom
    c. Rights
    d. Justice
5. What is welfare?
    a. *The satisfaction of preferences*
    b. Some mental state (e.g., happiness, pleasure)
    c. "Objective" goods (e.g., achievements, personal relations, health)

Source: The table is taken verbatim from Haussman et al., "Economic Analysis, Moral Philosophy, and Public Policy" (2019), p.26

From this table, we may conclude that the default position of welfare economics holds the following premise.

(1) For any policy X, if X promotes/hinders the satisfaction of people's preferences, then X should be adopted/discarded.

If, additionally, we hold the reasonable empirical premise that income is a good proxy for preference satisfaction, we can see why governments ought to promote both GDP per capita,

representing the average income of citizens, and its growth (which displays structural rather than incidental changes). A similar reasoning often underlies the justification of free and efficient markets and their Pareto-superior consequences. And though simplified, this approach also sheds light on the potential rationale behind aid agencies' involvement in sponsoring authoritarian governments. Instead of uncritically accepting the potential economic benefits of autocracies, their justification hinges on a normative commitment to satisfy citizens' preferences. Consequently, if aiding an illiberal or undemocratic country demonstrates a positive impact on GDP per capita growth, supporting such a government promotes the well-being of its citizens, which is ultimately our primary concern. As a result, the following conclusion naturally emerges from this line of reasoning.

(2) Foreign aid should be allocated in a way that promotes GDP per capita growth.

For this purpose, we must first discern which types of aid foster economic growth. For instance, we may expect that whereas humanitarian assistance may not necessarily contribute to a country's long-term productive capacity, aid specifically targeted towards Economic Development stands a better chance. To this, we now turn.

3.2. Standard Empirical Model

I use data from 112 countries between 1972 and 2013. The summary statistics are reported in the appendix (Supplementary Table A1). To investigate which kinds of aid are most conducive for GDP per capita growth, while avoiding potentially biased OLS estimates, I consider the following two-stage IV system:

$$\widehat{Aid}_{i,t} = \alpha_1(FRAC_t \times P_i) + \alpha_2 \boldsymbol{X}_{i,t} + \eta_i + \tau_t + u_{i,t} \quad \text{(I)}$$

$$GrowthGDP_{i,t} = \beta_1 \widehat{Aid}_{i,t-m} + \beta_2 \boldsymbol{X}_{i,t} + \eta_i + \tau_t + \epsilon_{i,t} \quad \text{(II)}$$

That is, ultimately, I explain the growth of a given country's GDP per capita ($GrowthGDP_{i,t}$) by a set of (instrumented) categories of aid ($\widehat{Aid}_{i,t}$) received in a previous period *t*. I also consider country-fixed effects (η) and year-fixed effects (τ). The former accounts for time-invariant country-specific factors (e.g., geography), and the latter allows me to control for the influence of global phenomena (e.g., the end of the Cold War). Significantly, as I will discuss later, these fixed effects will solve the endogeneity that may arise from the instrumental variable. I also include a set of controls ($\mathbf{X_{i,t}}$) taken from Burnside and Dollar (2000), which has become standard in the literature (Burnside & Dollar, 2000; Jia, 2019; Dreher & Langlotz, 2020). I will describe these in more detail below. Finally, standard errors are clustered at the recipient country level.

In line with existing literature (Dreher & Langlotz, 2020; Park, Ryu, & Lee, 2019), $GrowthGDP_{i,t}$ is measured as the average annual real GDP per capita growth of recipient country *i* over a four-year period *t*. This approach enables us to capture long-term effects on growth while mitigating the impact of business-cycle volatility and random noise (Bjørnskov, 2019). Data to construct the Growth variable is sourced from the World Development Indicators at the World Bank's DataBank (2021). $\widehat{Aid}_{i,t}$ (measured in logarithmic units $log(1 + \widehat{Aid}_{i,t})$ to account for non-linearity) acts as a stand-in for different aid categories.

The categorization follows the U.S. Office of Foreign Assistance's Standardized Program Structure and Definitions (SPSD), which breaks down aid into the following

categories: “Peace and Security,” “Democracy, Human Rights, and Governance,” “Health,” “Education and Social Services,” “Economic Development,” “Environment,” “Humanitarian Assistance,” “Program Support,” and “Multi-sector.” For the purpose of this study, however, I only focus on analyzing the potential effects of Military Aid (i.e., Peace and Security), Democratic Aid (i.e., Democracy, Human Rights, and Governance), Humanitarian Aid (i.e., Humanitarian Assistance), Education Aid (i.e., Education and Social Services) and Health Aid. Data for these variables is obtained from The US Foreign Aid Explorer (FAE) at ForeignAssistance.gov.

Controls. I follow Dreher and Langlotz’s (2020) permutation of the controls originally introduced by Burnside and Dollar (2000). First, I control for *initial (logged) GDP per capita*, measured as the logarithm of GDP per capita in the first year of each four-year period. The data comes from the World Bank’s World Development Indicators (2023). Second, I control for the average number of *assassinations* in country *i* at period *t* which is found in the Cross-National Time Series Data Archive by Banks and Wilson (2023). Third, I control for the interaction between assassinations and *ethnolinguistic fractionalization*. The data come from The Historical Index of Ethnic Fractionalization Dataset by Drazanova (2019). Lastly, instead of using M2/GDP (lagged), as Dreher and Langlotz do, which would exclude most of my observations, I use broad money (as a percent of GDP) lagged by one period as a measure of the money supply in the recipient country. The data come from the World Bank’s DataBank (2023).

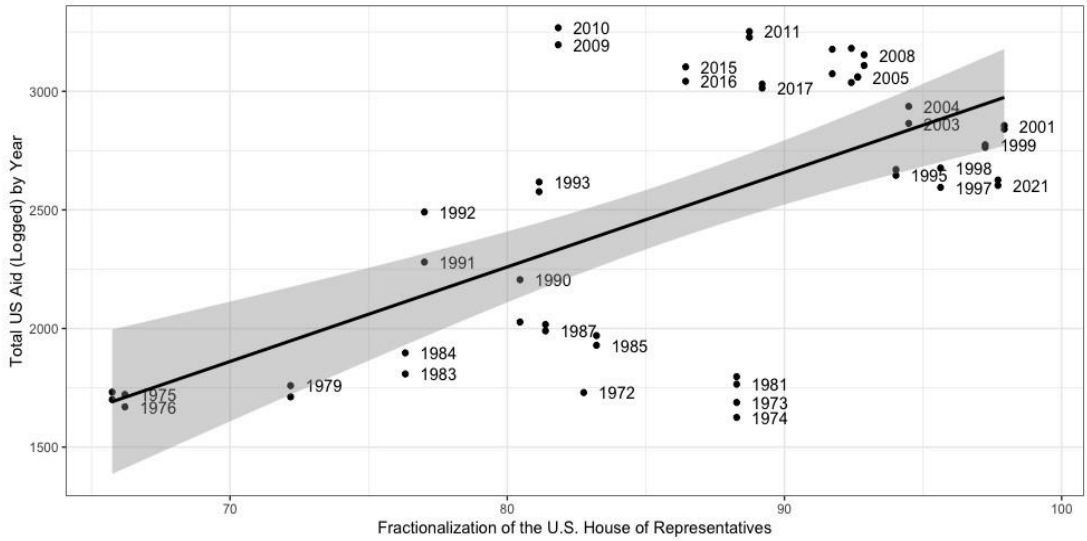
Instrument construction. The instrumental variable ($FRAC_t \times P_i$) is constructed as the interaction between the legislative fractionalization of the U.S. House of Representatives — $FRAC_t$— and a time-invariant variable for the probability of receiving aid from the U.S. — P_i— so that the resulting interaction varies across time and space. Following Ahmed (2019), $FRAC_t$ is given by $\left(1 - \frac{|DEMOCRAT_t - REPUBLICAN_t|}{435}\right) \times 100$ where the closer the value is to 100 the higher degree of fractionalization in the House of Representatives. P_i is given by $\frac{1}{41}\sum_{t=1972}^{2013} p_{i,t}$ where $p_{i,t}$ is equal to 1 if a country receives aid in a given year t and zero otherwise. Thus, the instrumental variable takes the following form: $IV = FRAC_t \times P_i$

Instrument Exogeneity. While it seems unlikely that the growth of an aid recipient country has any bearing on the fractionalization of the US legislature —which rather seems to be determined by domestic politics— one may worry that it might affect the probability of receiving aid. However, such potential exogeneity is controlled for by including country fixed effects given that the probability of receiving aid P_i is a time-invariant characteristic of each country. A similar reasoning holds of the legislative fractionalization —$FRAC_t$—of the House and time fixed effects. As a result, the interaction term becomes exogenous ((Nunn & Qian, 2014; Ahmed, Werker, et al., 2015; Nizalova & Murtazashvili, 2016; Bun & Harrison, 2019; Ahmed, 2019; Dreher & Langlotz, 2020).

Instrument Relevance. The relevance of the instrument relies on two mechanisms. First, it has been shown that the fractionalization of the legislature is associated with an increase of government's expenditures (Roubini & Sachs, 1989; Alesina & Tabellini, 1990; Alesina & Rosenthal, 1995; Scartascini & Crain, 2021). Second, greater expenditure is associated with a

greater level of foreign aid appropriations (Round & Odedokun, 2004; Brech & Potrafke, 2014). In sum, fractionalization affects expenditure and expenditure includes aid. The positive association between the two can observed in Figure 2.

Figure 2 *Fractionalization of the House and Aid*



4. Standard Model Results

4.1. Empirical Results

Table 2, displaying the results of the first-stage regression model (1), shows that the instrumental variable (*IV*) is a reliable determinant of U.S. aid for 112 recipient nations. Consistent with Ahmed (2019), the negative association between U.S. aid obligations and the interaction between $FRAC_i$ and P_i is explained by the fact that the more frequent aid recipients are "less likely to experience changes in their annual aid receipts" which empirically translates to negative coefficients (Ahmed, 2019, p. 194). Column 1 presents a specification with country-fixed effects and controls. As expected by the theory, the fractionalization of the U.S. House of Representatives remains positively associated (coefficient = 0.237) with aid receipts,

as observed in Figure 2. Significantly, the F-statistic (= 25.280) indicates that the instrument is "strong" —given that it exceeds the 9.6 threshold recommended by Stock et al. (2002)— allowing for the interpretation of the second-stage estimates as causal (Stock, Wright, & Yogo, 2002, pp. 518–529). Columns 2 and 3 demonstrate that the instrument is a powerful predictor of bilateral economic aid even after including period fixed effects and clustering standard errors by country, maintaining a high F-statistic (= 21.920). Fractionalization is excluded from these regressions as it is subsumed by the time-fixed effects. Lastly, in the first-stage regressions, the control variables seem to have their expected effects, given that poorer countries receive more aid (coefficient = −0.864). Having established robust significance for the instrumental variable, we turn to the second stage of the regression.

Table 2 The legislative determinants of US aid (first-stage regression)

	US total aid (log units $2000 US)		
	(1)	(2)	(3)
IV	–0.251***	–0.281***	–0.281***
	-0.034	–0.031	–0.058
Fractionalization	0.237***		
	–0.03		
Initial GDP pc	0.789***	-0.864***	–0.864***
	–0.131	–0.203	–0.245
Assassinations	0.298	0.394 ·	0.394 ·
	–0.242	–0.227	–0.209
Broad Money / GDP (t-1)	0.006	–0.003	–0.003
	–0.004	–0.004	–0.006
Assassinations*Ethnic-Frag	0.075	–0.118	–0.118
	–0.466	–0.435	–0.475
Country effects	Yes	Yes	Yes
Time effects	No	Yes	Yes
Clustered SE	No	No	Yes
Observations	945	945	945
F-Statistic	25.280***	21.920***	21.920***

Note: Estimation via OLS. Robust standard errors, clustered by country reported in parentheses. Significance Levels: '·'p<0.01, '*'p<0.05; '**'p<0.01; '***'p<0.001. Source: The data is taken from the World Bank DataBank, the Cross-National Time Series Data Archive and the Historical Index of Ethnic Fractionalization Dataset.

Table 3 shows the results from the second stage regressions. The results in Panel A are consistent with the increasing consensus that aggregated aid has no significant growth effects, as found by meta-studies on the literature (Doucouliagos & Paldam, 2008, p. 1-24). More specifically, the table reproduces the absence of robust significance found in Dreher and Langlotz (2020) when applying the same instrument and specifications for aggregated aid (Column 1 in Panel A) (Dreher & Langlotz, 2020). Likewise, most insignificant results in Columns 2 to 7 align with similar studies that break down aid by purpose, such as Bjørnskov's (2019) (Bjørnskov, 2019).

Table 3 The impact of aid on growth (second-stage regression)

	Growth of Gross Domestic Product per capita, 1972-2013						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Second stage (Aid lagged t - 1), n = 917							
Total Aid	–0.089						
	(0.217)						
Military Aid		10.150					
		(255.700)					
Democratic Aid			0.055				
			(0.127)				
Health Aid				0.056			
				(0.130)			
Education Aid					0.063		
					(0.145)		
Economic Aid						–0.089	
						(0.213)	
Humanitarian Aid							0.045
							(0.104)
Panel A: Second stage (Aid lagged t - 2), n = 850							
Total Aid	– 0.366						
	.						
	(0.204)						
Military Aid		–2.789					
		(5.175)					
Democratic Aid			0.304**				
			(0.113)				
Health Aid				0.284*			
				(0.112)			
Education Aid					0.317**		
					(0.121)		
Economic Aid						–0.361·	
						(0.191)	
Humanitarian Aid							0.241**
							(0.093)
Panel C: First stage							

IV	–0.28***	–0.04	0.37***	0.40***	0.37***	0.24***	0.44***
	(0.06)	(0.04)	(0.03)	(0.04)	(0.03)	(0.03)	(0.04)
IV F-statistic	21.92	3.20	36.47	28.01	31.15	13.49	41.01
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: Estimation via 2SLS. Aid is measured in log units ($2000 US). Controls follow the specifications in Drehrer and Langlotz (2020). Robust standard errors, clustered by country reported in parentheses. Significance Levels: '•'p<0.1;'*'p<0.05; '**'p<0.01; '***'p<0.001. Source: The data is taken from US government's Foreign Assistance Data, the World Bank DataBank, the Cross-National Time Series Data Archive and the Historical Index of Ethnic Fractionalization Dataset.

Moving to Panel B, we observe contrasting findings regarding the effects of different types of aid on GDP per capita growth after lagging aid for two periods. Firstly, Aggregated aid (Column 1) and Economic aid (Column 6) show negative marginal significance, aligning with previous studies such as Rajan and Subramanian (2008). Yet, they ultimately prove insignificant at conventional levels ($p > 0.05$), consistent with the prevailing literature on aid's ineffectiveness. Perhaps more intriguingly, the results from other components support the "conditionality" strand of literature, suggesting that aid is most effective when directed toward the underlying basis for growth, particularly those authors emphasizing institutional conditionality (Jia, 2019; Jia & Williamson, 2019; Svensson, 1999; Boone, 1994; Young & Sheehan, 2014). Notably, aid targeted at Democracy, Human Rights, and Governance exhibits highly significant positive growth effects —a unit increase in (logged) democratic aid results in a 0.3% rise in GDP per capita growth, holding all other factors constant— highlighting that political liberalization can act as a conduit for economic growth (Isham, Kaufmann, & Pritchett, 1997, pp. 219-242). This hypothesis is strengthened by the results in section 4.2, which demonstrate the positive effect of Democratic aid on political and civil rights. Moreover, we find similarly positive and conventionally significant effects in human capital accumulation via aid targeted at Health (Column 4) and Education and Social Services

(Column 5). These results support the intuitive idea that certain types of aid may require more time to manifest their impact (Clemens, Radelet, Bhavnani, & Bazzi, 2012, pp. 590-617). Furthermore, humanitarian aid also displays a robust positive association, likely reflecting the catch-up component of reconstruction aid, which has been linked to economic growth but is unlikely to reflect long-lasting structural changes (Bjørnskov, 2019). On the other hand, Military aid is not statistically significant and suffers from a weak instrument (F-statistic = 3.20). This is to be expected, given that Congress —and a fortiori its fractionalization— has less influence over the allocation of US military aid (Ahmed, 2016, pp. 183-217).

Ultimately, the results in Table 3 suggest an overall ineffectiveness of aid due to lack of significance or to overly long-time horizons for minimal effects. Yet, these findings are sufficient to lay the methodological groundwork for policy evaluations that will be used in this paper.[22]

4.2. Normative Results

As established in the "Standard Normative Model" section above, Table 3 leads to the conclusion that U.S. foreign aid *should* flow into Democracy, Human Rights and Governance, Health, Education and Social Services, and Humanitarian Assistance. Moreover, given that we have a higher confidence level in the positive impact of Democratic and Education Aid ($p <$

[22] A skeptical reader may question the validity of the results since most of the purpose-disaggregation happens in the first two decades of this century, and the observations only go until 2013. However, as a robustness check, we exclude the interaction term between *assassinations* and ethnolinguistic *fractionalization*, which is the reason for the 2013 limit. We find that the results do not depend on this choice. These findings are reported in the appendix Table A2

0.01) which also exhibit the highest expected returns, approximately 0.3% of GDP per capita growth for every log unit increase, more aid should be reallocated to these particular purposes.

The argument can be formalized as follows:

(P1) For any policy *x*, if *x* best promotes positive social outcomes, then *x* must be adopted.

(P2) Social outcomes are determined by the satisfaction of people's preferences.

(C1) Therefore, for any policy *x*, if *x* best promotes the satisfaction of people's preferences, then *x* must be adopted. (from P1-2 and Table 2)

(P3) Income is a good proxy for preference satisfaction. (Assumption)

(C2) Therefore, GDP per capita growth is a good proxy for social welfare (from P2 and P3)

(C3) Therefore, for any policy *x*, if *x* best promotes GDP per capita growth, *x* must be adopted. (from C1 and C2)

(P4) Increasing Democratic and Educational Aid best promotes GDP per capita growth. (Table 3)

(C4) Therefore, Democratic and Educational aid should be increased (from C3 and P4)

The conclusion is fairly intuitive and anything but surprising, given the results. Yet, it is this same reasoning that could have potentially justified the increased level of repression in recipient countries that is associated with higher US aid, as we shall observe in Section 4.1. The value of formalizing the argument above is two-fold. First, given its logical validity, any challenge must focus on the truth of the premises. Whereas rejecting the normative premises (P1) and (P2) amounts to making a moral argument, (P3) and (P4) are empirical premises that require to be challenged on this basis. Second, it introduces the method more fully employed in the next sections.

Returning to Table 1, even if economists hold that *outcomes* rather than processes should be the object of policymaking, ones that are appraised by a *single* method of appraisal rather than multiple and that what matters about outcomes are the consequences for *individuals* rather than groups or the environment, there is an important distinction when it comes to which kinds of outcomes for individuals matter. Following Haussman's description in Table 1, we can categorize these into four — (1) Welfare, (2) Freedom, (3) Rights, and (4) Justice — and if we additionally introduce an empirical premise identifying the best measurement for what determines each of these outcomes then we can deduce a set of *normative* policy recommendations.

5. Data and Extended Welfare Model

5.1. Extended Normative Model

There is an extensive literature exploring alternative outcome variables to assess foreign aid effectiveness beyond the conventional focus on economic growth. Some studies have used poverty as the optimal metric (Mosley, Hudson, & Verschoor, 2004; Cogneau & Naudet, 2007; Page & Shimeles, 2015; Briggs, 2017), while others have looked at inequality, usually through the GINI coefficient (Chong, Gradstein, & Calderon, 2009, pp. 59-84). Some researchers have advocated for Human Development as the proper gauge for evaluating aid's impact (Watkins, 2005; Williamson, 2008; Gillanders, 2016; Asongu & Nwachukwu, 2017). However, the novelty of the methodology employed in this paper lies in its quest to avoid arbitrariness by appealing to a comprehensive set of values that justify not only aid policy but all economic policy.

Though Haussman et al. (2019) introduces three additional evaluative measures alongside Welfare for economic policy, namely Freedom, Rights, and Justice, we will primarily focus on the first two: Freedom and Rights. To this point, it is crucial to distinguish between the two main interpretations of freedom. The concept of *positive* freedom refers to an individual's capacity and opportunities to act according to their own plans. In contrast, *negative* freedom pertains to the absence of constraints and barriers in decision-making. This essential distinction allows us to simplify the number of measures used. For instance, Rights can be effectively represented by the POLITICAL RIGHTS and CIVIL LIBERTIES indices from Freedom House, both aligning with the concept of *negative* freedom. On the other hand, Human Development, as quantified by the Human Development Index (HDI), serves as a representation of Welfare but also of *positive* freedom. The former reflects what was identified as "objective" goods in Table 1, the latter reflects Amartya Sen's capabilities approach. This new perspective on gauging aid's effectiveness provides a better framework by which we choose outcome variables.

Table 4 Alternative Social Outcomes

(A) Which outcomes matters?			**(B) What is it determined by?**	**(C) What is its best approximation?**
Welfare	*Freedom*	*Rights*		
Yes	No	No	Preference-satisfaction	GDP per capita
Yes	Yes (Positive)	No	Capabilities	Human Development Index
No	Yes (Negative)	Yes	Civil and Political Rights	Freedom House's indices

5.2. Extended Empirical Model

Having defined the measures to evaluate alternative positive outcomes in recipient countries, we will now consider the additional two-stage systems.

Firstly, to assess the Human Development Index (HDI), which serves as a measure for both welfare and positive freedom, we will employ the first-stage regression (I) as introduced in Section 1, and by the following second-stage regression:

$$\widehat{Aid}_{i,t} = \alpha_1(FRAC_t \times P_i) + \alpha_2 \boldsymbol{X}_{i,t} + \eta_i + \tau_t + u_{i,t} \quad \text{(I)}$$

$$GrowthHDI_{i,t} = \gamma_1 \widehat{Aid}_{i,t-1} + \gamma_2 \boldsymbol{X}_{i,t} + \eta_i + \tau_t + \epsilon_{2,i,t} \quad \text{(III)}$$

In this regression, $GrowthHDI_{i,t}$ represents the recipient country i's average annual HDI growth over a four-year period t, akin to the measurement used for $GrowthGDP_{i,t}$ in the original model. Data to construct the HDI Growth variable is sourced from the United Nations Development Program's Human Development Report (2022). The vector of controls $\mathbf{X_{i,t}}$ and the logarithmic measure of $\widehat{Aid}_{i,t-1}$, instrumented by the variable ($FRAC_t \times P_i$), remain unchanged from the original $GrowthGDP_{i,t}$ model. Moreover, η_i and τ_t represent country and period fixed effects, respectively. For the regression of Political Rights and Civil Liberties, however, we must substantially alter the model:

$$\widehat{Aid}_{i,t} = \delta_1(FRAC_t \times P_i) + \delta_2 \boldsymbol{Y}_{i,t} + \eta_i + \tau_t + u_{2i,t} \quad \text{(IV)}$$

$$RIGHTS_{i,t} = \lambda_1 \widehat{Aid}_{i,t-1} + \lambda_2 \boldsymbol{Y}_{i,t} + \eta_i + \tau_t + \epsilon_{3,i,t} \quad \text{(V)}$$

$$LIBERTIES_{i,t} = \mu_1 \widehat{Aid}_{i,t-1} + \mu_2 \boldsymbol{Y}_{i,t} + \eta_i + \tau_t + \epsilon_{4,i,t} \quad \text{(VI)}$$

Here, $RIGHTS_{i,t}$ and $LIBERTIES_{i,t}$ represet Freedom House's POLITICAL RIGHTS index and CIVIL LIBERTIES index, respectively. The POLITICAL RIGHTS index assesses the level of political rights within a country which refers to people's ability to participate freely in the political process. This index evaluates electoral processes, political pluralism, participation, and the government function for each country. On the other hand, the CIVIL LIBERTIES index gauges freedom and protection from the state apparatus, examining freedom of expression and belief, associational and organizational rights, the rule of law, personal autonomy, and individual rights. Both indices range on a seven-point (1–7) scale, where higher values of POLITICAL RIGHTS and CIVIL LIBERTIES (e.g., 6 or 7) indicate less freedom.

Controls. I follow the specifications from Ahmed (2016), who controls for *(logged) GDP per Capita*, *GDP per capita growth*, and population size via *(logged) population*, all sourced from the World Bank's DataBank (2021). Moreover, to account for aid allocation's geopolitical motives, we control for U.N. Security Council (UNSC) membership with a dummy variable and for the consumption of U.S. exports, measured as *(logged) U.S. exports*. Information about UNSC membership is publicly available from the United Nations, and U.S. Exports data is obtained from the International Monetary Fund. Significantly, this specification allows for a larger sample size, extending observations from 1985 until 2021 (for a total of 9 periods) across more than 150 countries. We will begin by looking at the latter model's first-stage regression.

6. Extended Model Results

6.1. Empirical Results

Table 5 The determinants of US aid with Ahmed (2016) specifications (first-stage regression)

	Type of U.S. aid (log units $2000 U.S.)						
	Total	*Military*	*Dem.*	*Health*	*Educ.*	*Econ.*	*Human*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
IV	–0.15***	0.02	0.14***	0.30***	0.29***	-0.19***	0.31***
	(0.04)	(0.04)	(0.03)	(0.05)	(0.04)	(0.04)	(0.05)
Log GDP pc	−0.53*	0.70 ·	0.42	0.78*	0.92*	−0.43	−1.60***
	(0.25)	(0.40)	(0.30)	(0.37)	(0.36)	(0.42)	(0.35)
GDP pc Growth	−0.01	0.04·	0.08***	0.13***	0.11***	−0.04 ·	0.02
	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)
Log population	2.34***	2.32**	4.18***	5.16***	2.66*	2.55***	1.33
	(0.64)	(0.78)	(0.98)	(1.22)	(1.12)	(0.76)	(0.96)
UNSC member	−0.14	−0.03	0.28	−0.23	0.22	−0.24	0.03
	(0.17)	(0.18)	(0.16)	(0.25)	(0.20)	(0.22)	(0.22)
Log US Exports	0.48	0.30	−1.53**	–1.24*	−0.08	1.55***	0.13
	(0.37)	(0.39)	(0.51)	(0.61)	(0.59)	(0.43)	(0.54)
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered SE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,390	1,390	1,390	1,390	1,390	1,390	1,390
F Statistic	13.75	7.24	25.69	31.47	19.11	12.83	14.90

Note: Estimation via OLS. Robust standard errors, clustered by country reported in parentheses. Significance Levels: '·'p<0.1;'*'p<0.05; '**'p<0.01; '***'p<0.001

Table 5, displaying the results of the first-stage regression model (IV), demonstrates that the instrumental variable ($FRAC_t \times P_i$) remains a robust determinant for most types of U.S. aid, even after employing Ahmed's specifications of controls (Ahmed, 2016). In Column 1, we observe that the instrument is valid with a strong F-statistic (= 13.75) for total aid receipts, aligning with previous literature (Ahmed, 2019, pp. 183-217). For all types of aid, except for military aid targeting *Peace and Security* (Column 2) —which is less influenced by Congress— the F-statistics exceed the 9.6. threshold, consistent with the findings in Table 2.

The control variables generally exhibit the expected effects. Poorer countries tend to receive more aggregated aid (Column 1), through the contrasting positive results of Health and Education aid receipts warrant further investigation. Additionally, countries experiencing growth tend to be 'rewarded' with more aid (Columns 3, 4, and 5). Population size is positively associated with the amount of aid in nearly every column. However, it is crucial to recognize that smaller countries are also expected to receive *disproportionally* more aid per capita (Alesina & Dollar, 2000, pp. 33-63). We also observe the well-documented positive relationship between U.S. aid and Exports (Column 6) (Fleck & Kilby, 2006, pp. 210-223), where a percentage increase in U.S. exports to a recipient country results in a 1.55% rise in economic aid, holding all other factors constant. More intriguingly, however, we also see a significant and negative association ($p<0.01$) that emerges between U.S. Exports and aid targeted at Democracy, Human Rights, and Governance (Column 3). Though this finding warrants further analysis, it may reflect the prioritization of economic policy over democratization in U.S. foreign policy. With the instrument's validity established for most aid categories, we can now proceed to the second-stage regressions of the extended model.

Table 6 The impact of aid on alternative outcomes

Social Outcomes	*Welfare*	*Rights*	
	(Positive Freedom)	*(Negative Freedom)*	
	HDI Growth	Political Rights	Civil Liberties
	(1)	(2)	(3)
Total Aid	−0.145	0.106**	0.119***
	(0.089)	(0.037)	(0.031)
Military Aid	23.780	0.493	0.553
	(882.700)	(0.354)	(0.378)
Democratic Aid	0.117*	−0.125**	−0.140***
	(0.060)	(0.044)	(0.036)
Health Aid	0.072·	−0.084**	−0.094***
	(0.037)	(0.028)	(0.022)
Education Aid	0.087*	−0.091**	−0.102***
	(0.043)	(0.031)	(0.024)
Economic Aid	−0.150·	0.087**	0.097***
	(0.079)	(0.030)	(0.024)
Humanitarian Aid	0.068*	−0.068**	−0.076***
	0.034	(0.023)	(0.018)
Lagged Aid (t-1)	Yes	Yes	Yes
Drehrer (2020) controls	Yes	No	No
Ahmed (2016) controls	No	Yes	Yes
Fixed effects	Yes	Yes	Yes
Observations	646	1,350	1,350

Note: Estimation via 2SLS. A different instrumental variable regression was conducted for every result. Robust standard errors, clustered by country reported in parentheses. Significance levels: ‘·’p<0.1;‘*’p<0.05; ‘**’p<0.01; ‘***’p<0.001

The results presented in Table 6 provide better insight into the multifaceted consequences of foreign aid. In Column 1, we observe that a unit increase in (logged) aid targeting Democracy, Human Rights, and Governance leads to a 0.117% growth in the Human Development Index (HDI) significant at conventional levels ($p < 0.05$). Similarly, Education aid positively affects HDI growth to an equally statistically significant extent, where a unit increase in (logged) U.S. aid targeting Education and Social Services corresponds to a 0.087% increase in HDI growth. Moreover, we also find a positive impact from health aid, albeit only marginally significant ($p < 0.1$), in contrast to the absence of results in Williamson (2008) and in support of the results in Asongu and Nwachukwu (2017). Given that HDI measures life expectancy, education, and income, it is expected that aid directed at health, education, and economic growth would yield a positive effect, and although the seemingly negative effect of economic aid may initially contradict this hypothesis, it aligns with the lack of significant results at conventional levels from the first 2SLS model (I) in Section 1.2. These results suggest that economic aid does not foster positive changes in income measures, reinforcing the findings in Table 3. Moreover, though the positive effects on Human Development of aid directed at social infrastructure are consistent with Asongu and Nwachukwu, the positive effect (coefficient = 0.068) of Humanitarian assistance contrasts with their own negative results. This difference may be explained by the fact that Asongu and Nwachukwu adjust the Human Development Index for inequality (IDHI), which may eliminate the positive effect on Human Development caused by the rises in income from Humanitarian assistance (Bjørnskov, 2019).

Moving on to Columns 2 and 3, we note a substantial increase in significance levels ($p < 0.01$ for Political Rights and $p < 0.001$ for Civil Liberties). Additionally, the effects of foreign aid on both dependent variables exhibit similar coefficients and signs. Remembering that higher ratings in the POLITICAL RIGHTS index and CIVIL LIBERTIES index represent lower political rights and civil liberties, the results indicate a concerning positive association between U.S. aid and repression in recipient countries. The effect is highly significant for both Political Rights ($p < 0.01$) and Civil Liberties ($p < 0.001$), indicating that U.S. aid is inadvertently supporting the curtailment of political freedom and human rights. Disaggregating foreign aid into its components reveals that the deterioration in both measures is primarily driven by aid targeted at economic development. And although Military Aid likely also plays a significant role, the instrument's weakness precludes a comprehensive evaluation of this relationship. These findings align with previous research by Ahmed (2019, 2016) and raise questions about the impact of aid on recipient countries' political landscapes.

Moreover, while Ahmed's analysis finds that a unit increase in log aid raises the POLITICAL RIGHTS index by 0.171, our results suggest a similar yet lower increase of 0.106 points (Column 2). This contrast implies that since 2008 (the latest observations in Ahmed's analysis), the relationship between U.S. aid and political freedom improved over the next decade. Furthermore, going beyond economic and military aid —Ahmed's sole focus— provides more reassuring results. The rest of the aid components, apart from economic aid, exhibit a significant negative association with repression. As would be expected, these results demonstrate that aid targeted at fostering Democracy, Human Rights, and Governance exerts the most substantial effect in mitigating repressive practices, where a unit increase in log

democratic aid corresponds to a substantial decline of 0.125 points in the POLITICAL RIGHTS index and 0.140 in the CIVIL LIBERTIES index.

These findings above align with the notion that aid directed toward social and institutional aspects can yield positive long-term effects and continue to support the strand in the literature conditioning economic growth on institutional quality. However, it is crucial to note that the positive effects are relatively modest, with aid contributing only small percentage increases to HDI growth, Political Rights, and Civil Liberties.

6.2. Normative Results

The original formalization from section 1.1, can be reproduced into the following structure, using the classification used in Table 4: Here, 'A' refers to a given social outcome, say Welfare, 'B' to a particular interpretation, such as preference satisfaction, and 'C' to its measurement, GDP growth for example.

(P1) For any policy *x*, if *x* promotes/hinders positive social outcome A, then *x* must be adopted/avoided. (Normative Premise)

(P2) Social outcome A should be interpreted as B. (Normative Premise)

(C1) **Therefore, for any policy *x*, if *x* promotes/hinders B, then *x* must be adopted/avoided. (from P1 and P2)**

(P3) B is best approximated by measure C. (Empirical Premise)

(C2) **Therefore, for any policy *x*, if *x* causes C to increase/decrease, *x* must be adopted/avoided. (from C1 and P3)**

The comprehensive analysis of the 2SLS model, combined with the findings in Tables 3 and 6, allows us to derive concrete *normative* policy recommendations concerning U.S. foreign aid allocation.

Welfare: Preference-satisfaction. Assuming the main goal of policy is to promote (A) welfare, interpreted as (B) the satisfaction of people's preferences, and is best measured by (C) GDP per capita growth, the U.S. should prioritize allocating aid towards 'Democracy, Human Rights and Governance,' and 'Education and Social Services' to optimize aid's impact. These two categories of aid exhibit the most substantial positive effects on economic growth and are highly statistically significant, bolstering our confidence in the results. Moreover, reallocating aid away from Economic aid seems equally necessary: either because Economic Aid has a negative impact (though only marginally significant) on the long-term economic growth of recipient countries; or because Economic aid has no robustly significant effects and the U.S. should use these resources to promote the GDP per capita growth of its own citizens (or of other countries' via alternative aid categories).

Welfare and Freedom: Human Development. A similar set of policy recommendations holds true when we consider (A) welfare as (B) a set "Objective" goods (or as Capabilities) as the key policy metric, measured by (C) HDI growth. In this context, the U.S. should also support aid allocation towards 'Democracy, Human Rights and Governance,' and 'Education and Social Services,' as they have the most substantial positive effects on HDI growth.

Furthermore, Economic aid should also be scaled back, given its insignificant or negative impact on HDI growth, allowing resources to be channeled more efficiently.

Rights: Political Freedom and Civil Liberties. Lastly, when our focus is on (A) Rights, interpreted as (B) political freedom or human rights, and measured through (C) the FreedomHouse's indices, the evidence once more points towards the importance of prioritizing aid to 'Democracy, Human Rights and Governance' and 'Education and Social Services'. These categories exhibit the most significant positive effects on recipient countries' political freedom and human rights. Conversely, Economic aid should be eliminated, as it shows a highly significant and positive association with repression. By reallocating aid from Economic aid to Democracy and Education, the U.S. can align its aid allocation with its commitment to promote human rights, political freedom and institutional quality in in recipient nations.

In conclusion, regardless of the specific social outcomes we prioritize, our results consistently recommend reallocating aid away from Economic aid and towards 'Democracy, Human Rights and Governance,' and 'Education and Social Services.' These categories of foreign aid demonstrate the most promise in fostering economic growth, human development, and the protection of political freedom and human rights. By tailoring aid allocation to these areas, the U.S. can play a more positive role in shaping the development trajectory of recipient countries.

7. Conclusion

While previous studies have introduced various measures to assess aid's impact (Mosley, Hudson, & Verschoor, 2004; Cogneau & Naudet, 2008; Page & Shimeles, 2015; Briggs, 2017; Chong, Gradstein, & Calderon, 2009; Watkins, 2005; Williamson, 2008; Gillanders, 2016; Asongu & Nwachukwu, 2017), examined disaggregated aid categories (Bjørnskov, 2019; Asongu & Nwachukwu, 2017; Clemens et al., 2012; Rajan & Subramanian, 2008; Williamson, 2008; Kargbo & Sen, 2014), and used legislative fragmentation as an instrumental variable (Dreher & Langlotz, 2020; Dreher, Fuchs, & Langlotz, 2019; Ahmed, 2019; Ahmed, 2016; Nunn & Qian, 2014), this study stands out by combining these three elements, presenting a novel analysis.

By employing the fractionalization of the House of Representatives as an instrumental variable, this paper demonstrates the need to reallocate Economic Aid towards aid targeting democracy and education to maximize the positive impact of U.S. foreign aid. Moreover, the repressive consequences associated with Economic Aid raise concerns, urging policymakers to scrutinize and potentially reduce this kind of assistance. With that said, while this paper makes significant strides in understanding the multifaceted dynamics of aid, further studies must delve into the intricacies of aid delivery mechanisms and find other ways of exploring the relationship between U.S. Military Aid, welfare and rights. Although our instrumental variable served its purpose well, evaluating the impact of Military Aid requires alternative methodologies.

What is most significant, however, is that these policy recommendations are not driven by evaluating pre-existent American strategic interests or geopolitical motives. Which, as

discussed in the section of Wertfrei Economics, would amount to *positive* policy recommendations, i.e., hypothetical judgments of the form:

(1) *If* the U.S. foreign policy strategy aims to create potential markets for U.S. exports by increasing the development of emerging economies, *then* the U.S. should reallocate Economic aid towards Democratic and Education aid.

Instead, they are rooted in the overlapping consensus of contrasting evaluative frameworks. Leading to the following *normative* policy recommendation.

(2) The U.S. *should* reallocate its Economic aid towards aid targeting Democracy, Human Rights and Governance, and Education and Social Services.

This recommendation is appropriate because it is valid from multiple moral standpoints, ensuring a greater level of neutrality, and thus objectivity, and addressing some of the paternalistic concerns associated with foreign aid policy.

However, there are three significant limitations to this approach's generalizability. Firstly, further argumentation is required to demonstrate why the moral rubric used to evaluate domestic policies also applies to foreign aid. While it seems clear that ethical considerations should be applied equally to all people, regardless of residence, the difference in how each type of policy gains legitimacy needs to be taken into account. Secondly, a significant issue that failed to be addressed pertains to the negative consequences of foreign aid policy on the

tax-paying citizens of the donating country, in this case, the U.S. Lastly, regression analysis makes it necessary to focus policy's appraisal only to *outcomes* rather than *processes*. Thus, it is unable to account for other normative frameworks such as Robert Nozick's (1974) rights as side constraints. Unfortunately, each of these concerns requires an extensive and in-depth normative discussion that goes beyond this paper's scope and shall thus be left for another time.

In conclusion, it is crucial to recognize both the significant evaluative commitments that underlie policy recommendations and that these cannot be avoided. Making these commitments explicit and enhancing the transparency of our evaluative framework can lead to more informed and effective policymaking, both, domestically and internationally, enabling policymakers to develop aid strategies that drive positive social change in recipient nations. While Economics has often tried to be a purely positive discipline, this cannot be sustained, especially in development and welfare economics, where trade-offs may consist of highly normative matters such as forswearing civil liberties and political freedoms to satisfy citizens' preferences. The journey to enhance policy in general, and the effectiveness of foreign aid in particular, should encompass not only empirical analysis but also a clear understanding of our underlying evaluative judgments. Only by integrating both aspects can we contribute to advancing policies that foster meaningful development at home and abroad.

Appendix A

Table A1 Summary Statistics

	Obs.	Mean	St. Dev.	Min	Max
Panel A: Variables Table 2,3,5					
Log Total U.S. aid	2,821	7.62	5.07	0.00	17.03
Log U.S. Military aid	2,821	5.14	4.53	0.00	16.72
Log U.S. Democratic aid	2,821	3.17	4.11	0.00	15.27
Log U.S. Health aid	2,821	2.45	4.19	0.00	14.48
Log U.S. Education aid	2,821	2.16	3.83	0.00	13.28
Log U.S. Economic aid	2,821	5.79	5.08	0.00	16.98
Log U.S. Humanitarian aid	2,821	3.08	4.39	0.00	14.64
Fractionalization	2,821	86.24	8.04	67.47	96.90
Probability of receiving aid	2,821	0.71	0.30	0.04	1.00
Panel B: Variables Table 2,3					
GDP per capita Growth	1,939	1.68	4.10	−21.02	60.16
Log initial GDP pc	1,951	7.88	1.63	3.44	11.70
Assassinations	2,093	0.17	0.68	0.00	9.25
Ethno-linguistic fragmentation	1,439	0.45	0.26	0.005	0.89
Broad Money / GDP	1,589	49.25	45.05	6.33	642.70
Panel C: Variables Table 5, 6					
HDI Growth	1,327	0.66	0.92	−6.06	4.97
Political Rights index	2,181	3.75	2.16	1.00	7.00
Civil Liberties index	2,181	3.70	1.87	1.00	7.00
Log GDP per capita	2,003	7.94	1.61	4.41	11.74
Log population	2,297	15.12	2.18	8.71	21.06
UNSC membership	2,821	0.11	0.31	0	1
Log U.S. Exports	1,637	0.56	0.86	0.00	5.04

Table A2 The impact of aid on growth excluding etho-linguistic fragmentation

	Growth of GDP per capita, 1972-2021, 2SLS						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Second stage (Aid lagged t-1), n = 1,358							
Total Aid	−0.180						
	(0.15)						
Military Aid		−1.746					
		(3.63)					
Democratic Aid			0.135				
			(0.102)				
Health Aid				0.129			
				(0.100)			
Education Aid					0.147		
					(0.112)		
Economic Aid						−0.178	
						(0.147)	
Humanitarian Aid							0.114
							(0.088)
Panel B: First stage							
IV	−0.28***	−0.03	0.37***	0.42***	0.38***	−0.28***	0.44***
	(0.06)	(0.05)	(0.03)	(0.04)	(0.03)	(0.04)	(0.04)
IV F-statistic	41.32	3.98	53.87	47.79	45.48	20.62	66.81
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DL Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: Estimation via 2SLS. Aid is measured in log units ($2000 US). Controls follow the specifications in Dreher and Langlotz (2020) except for the interaction between assassinations and ethno-linguistic fractionalization. Their measure for M2/GDP is replaced by Broad Money/GDP. Robust standard errors, clustered by country reported in parentheses. Significance Levels: '·'p<0.1;'*'p<0.05; '**'p<0.01; '***'p<0.001. Source: The data is taken from US government's Foreign Assistance Data, the World Bank DataBank and the Cross-National Time Series Data Archive

References

Ahmed, Faisal Z, Eric D Werker, et al. "Aid and the Rise and Fall of Conflict in the Muslim World." *Quarterly Journal of Political Science* 10, no. 2 (2015): 155–186.

Ahmed, Faisal Z. "Does foreign aid harm political rights? Evidence from US aid." *Quarterly Journal of Political Science* 11, no. 2 (2016): 183–217.

"Foreign Aid and Repression." In *Lessons on Foreign Aid and Economic Development: Micro and Macro Perspectives*, edited by Nabamita Dutta and Claudia R. Williamson, 187–205. Springer International Publishing, 2019.

Alesina, Alberto, and David Dollar. "Who gives foreign aid to whom and why?" *Journal of Economic Growth* 5 (2000): 33–63.

Alesina, Alberto, and Howard Rosenthal. *Partisan politics, divided government, and the economy*. Cambridge University Press, 1995.

Alesina, Alberto, and Guido Tabellini. "A positive theory of fiscal deficits and government debt." *The Review of Economic Studies* 57, no. 3 (1990): 403–414.

Asongu, Simplice A, and Jacinta C Nwachukwu. "Foreign aid and inclusive development: Updated evidence from Africa, 2005–2012." *Social Science Quarterly* 98, no. 1 (2017): 282–298.

Bjørnskov, Christian. "Types of Foreign Aid." In *Lessons on Foreign Aid and Economic Development: Micro and Macro Perspectives*, edited by Nabamita Dutta and Claudia R. Williamson, 33–61. Springer International Publishing, 2019.

Boone, Peter. *The Impact of Foreign Aid on Savings and Growth*. London School of Economics / Political Science, Centre for Economic Performance., 1994.

Brech, Viktor, and Niklas Potrafke. “Donor ideology and types of foreign aid.” *Journal of Comparative Economics* 42, no. 1 (2014): 61–75.

Briggs, Ryan C. “Does foreign aid target the poorest?” *International Organization* 71, no. 1 (2017): 187–206.

Bun, Maurice JG, and Teresa D Harrison. “OLS and IV estimation of regression models including endogenous interaction terms.” *Econometric Reviews* 38, no. 7 (2019): 814–827.

Burnside, Craig, and David Dollar. “Aid, policies, and growth.” *American economic review* 90, no. 4 (2000): 847–868.

Chong, Alberto, Mark Gradstein, and Cecilia Calderon. “Can foreign aid reduce income inequality and poverty?” *Public choice* 140 (2009): 59–84.

Clemens, Michael A, Steven Radelet, Rikhil R Bhavnani, and Samuel Bazzi. “Counting chickens when they hatch: Timing and the effects of aid on growth.” *The Economic Journal* 122, no. 561 (2012): 590–617.

Cogneau, Denis, and Jean-David Naudet. “Who deserves aid? Equality of opportunity, international aid, and poverty reduction.” *World Development* 35, no. 1 (2007): 104– 120.

Doucouliagos, Hristos, and Martin Paldam. “Aid effectiveness on growth: A meta study.” *European journal of political economy* 24, no. 1 (2008): 1–24.

———. “The ineffectiveness of development aid on growth: An update.” *European journal of political economy* 27, no. 2 (2011): 399–404.

Drakopoulos, Stavros A. “Origins and development of the trend toward value-free economics.” *Journal of the History of Economic Thought* 19, no. 2 (1997): 286–300.

Dreher, Axel, Andreas Fuchs, and Sarah Langlotz. "The effects of foreign aid on refugee flows." *European Economic Review* 112 (2019): 127–147.

Dreher, Axel, and Sarah Langlotz. "Aid and growth: New evidence using an excludable instrument." *Canadian Journal of Economics/Revue Canadienne d'Économique* 53, no. 3 (2020): 1162–1198.

Easterly, William. *The Tyranny of Experts: Economists, Dictators, and the Forgotten Rights of the Poor*. New York: Basic Books, a member of the Perseus Books Group, 2021.

Fleck, Robert K, and Christopher Kilby. "How do political changes influence US bilateral aid allocations? Evidence from panel data." *Review of Development Economics* 10, no. 2 (2006): 210–223.

Gillanders, Robert. *The Effects of Foreign Aid in Sub-Saharan Africa*. Technical report 3, Autumn. 2016.

Hamlin, Alan P, and Robert Sugden. "On the possibility of Austrian welfare economics." In *Austrian economics: Tensions and new directions*, 193–214. Springer, 1992.

Hausman, Daniel, Michael McPherson, and Debra Satz. *Economic Analysis, Moral Philosophy, and Public Policy*. Cambridge University Press, 2019.

Haybron, Daniel M., and Valerie Tiberius. "Well-Being Policy: What Standard of Well-Being?" *Journal of the American Philosophical Association* 1, no. 4 (2015): 712–733.

Herbener, Jeffrey M. "In defense of Rothbardian welfare economics." *New Perspectives on Political Economy* 4, no. 1 (2008): 53–78.

Isham, Jonathan, Daniel Kaufmann, and Lant H Pritchett. "Civil liberties, democracy, and the performance of government projects." *The World Bank Economic Review* 11, no. 2 (1997): 219–242.

Jia, Shaomeng. “Foreign Aid Conditionality and Economic Growth.” In *Lessons on Foreign Aid and Economic Development: Micro and Macro Perspectives*, edited by Nabamita Dutta and Claudia R. Williamson, 13–32. Springer International Publishing, 2019.

Jia, Shaomeng, and Claudia R Williamson. “Aid, policies, and growth: why so much confusion?” *Contemporary Economic Policy* 37, no. 4 (2019): 577–599.

Kargbo, Philip Michael, and Kunal Sen. “Aid categories that foster pro-poor growth: The case of Sierra Leone.” *African Development Review* 26, no. 2 (2014): 416–429.

Lazari-Radek, Katarzyna de, and Peter Singer. *The Point of View of the Universe: Sidgwick and Contemporary Ethics*. Oxford University Press, May 2014. https://doi.org/10.1093/acprof:oso/9780199603695.001.0001.

Mosley, Paul, John Hudson, and Arjan Verschoor. “Aid, poverty reduction and the ‘new conditionality’.” *The Economic Journal* 114, no. 496 (2004): F217–F243.

Niño-Zarazúa, Miguel, Rachel M. Gisselquist, Ana Horigoshi, Melissa Samarin, and Kunal Sen. *Effects of Swedish and international democracy aid* [in English and Swedish]. Stockholm, Sweden, December 2020.

Nizalova, Olena Y, and Irina Murtazashvili. “Exogenous treatment and endogenous factors: Vanishing of omitted variable bias on the interaction term.” *Journal of Econometric Methods* 5, no. 1 (2016): 71–77.

Nozick, Robert. *Anarchy, State, and Utopia*. John Wiley & Sons, 1974.

Nunn, Nathan, and Nancy Qian. “US food aid and civil conflict.” *American Economic Review* 104, no. 6 (2014): 1630–1666.

Ostapiuk, Aleksander. *The Eclipse of Value-Free Economics. The concept of multiple self versus homo economicus*. Wydawnictwo Uniwersytetu Ekonomicznego we Wrocl awiu, 2021.

———. "Value-free paradise is lost. Economists could learn from artists." *Annales. Etyka w z˙yciu gospodarczym* 23, no. 4 (2020): 7–33.

Page, John, and Abebe Shimeles. "Aid, employment and poverty reduction in Africa." *African Development Review* 27, no. S1 (2015): 17–30.

Park, Jun-ki, Deockhyun Ryu, and Keun Lee. "What determines the economic size of a nation in the world: Determinants of a nation's share in world GDP vs. per capita GDP." *Structural Change and Economic Dynamics* 51 (2019): 203–214.

Quong, Jonathan. *Liberalism without Perfection*. Oxford University Press, 2010.

Rajan, Raghuram G, and Arvind Subramanian. "Aid and growth: What does the cross-country evidence really show?" *The Review of Economics and Statistics* 90, no. 4 (2008): 643–665.

Rawls, John. *Political Liberalism*. Columbia University Press, 1993.

Robbins, Lionel. "The nature and significance of economic science." *The philosophy of economics: An anthology* 1 (1932): 73–99.

Rothbard, Murray Newton. *Toward a reconstruction of utility and welfare economics*, 1956.

Roubini, Nouriel, and Jeffrey D Sachs. "Political and economic determinants of budget deficits in the industrial democracies." *European Economic Review* 33, no. 5 (1989): 903–933.

Round, Jeffery I, and Matthew Odedokun. "Aid effort and its determinants." *International Review of Economics & Finance* 13, no. 3 (2004): 293–309.

Scartascini, Carlos G, and W Mark Crain. *The size and composition of government spending in multi-party systems*. Springer, 2021.

Sen, Amartya. *On Ethics and Economics*. Oxford and New York: Basil Blackwell, 1987.

Stock, James H, Jonathan H Wright, and Motohiro Yogo. "A survey of weak instruments and weak identification in generalized method of moments." *Journal of Business & Economic Statistics* 20, no. 4 (2002): 518–529.

Svensson, Jakob. "Aid, growth and democracy." *Economics & Politics* 11, no. 3 (1999): 275–297.

"Furor on Memo At World Bank." *The New York Times*, February 1992. https://www.nytimes.com/1992/02/07/business/furor-on-memo-at-world-bank.html.

Watkins, Kevin. *International cooperation at a crossroads: Aid, Trade and Security in an Unequal World*. Human Development Report, 2005.

Williamson, Claudia R. "Foreign aid and human development: The impact of foreign aid to the health sector." *Southern Economic Journal* 75, no. 1 (2008): 188–207.

Wysocki, Igor. "Justice vis `a vis welfare: how Austrian welfare economics should fit in the Austro-libertarian framework." *Economia Politica* 40, no. 2 (2023): 445–467.

Young, Andrew T, and Kathleen M Sheehan. "Foreign aid, institutional quality, and growth." *European Journal of Political Economy* 36 (2014): 195–208.

The Economics Review Team

Executive Board:

Joseph Kwon, *Co-Editor-In-Chief*

Eugene Seong, *Co-Editor-In-Chief*

Stuti Saria, *Co-Managing Editor of the Print Publication*

Taran Agarwal, *Co-Managing Editor of the Print Publication*

Ellie Kim, *Co-Managing Editor of the Online Publication*

Anoushey Gajial, *Co-Managing Editor of the Online Publication*

Revan Aponso, *Marketing Analytics & Creative Director*

Abhinav Madamanchi, *Club Treasurer*

Augustin Langlet, *Webmaster*

Angle Cortes, *Club Secretary*

www.theeconreview.com

2023- 24