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THE GOVERNMENT SPENDING MULTIPLIER

A SURVEY OF EMPIRICAL LITERATURE

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ABSTRACT

This literature review examines the wide-ranging estimates of the fiscal multiplier—the effect of government spending on economic output. Despite extensive empirical exploration, estimates of the fiscal multiplier span from –3.00 to 3.00 and are influenced by model assumptions, theoretical innovations, state-dependent factors, and dataset choices. This review discusses methodological advancements, including state-dependent estimates, and explores how the multiplier varies under economic slack, at the zero lower bound (ZLB), and with large public debt burdens. The review finds that multipliers are generally within the range of 0.50 to 0.90, with higher estimates during economic slack and at the ZLB and lower estimates for regimes with high public-debt ratios. The degree of state dependence is more modest than suggested by earlier research. Robust evidence that ZLB multipliers are larger than 1.00 is scarce. The paper concludes by calling for more dynamic models and cross-country comparisons to lead to a better understanding of the nuanced effects of fiscal stimulus.

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The Government Spending Multiplier

A Survey of Empirical Literature

Each time an economic crisis emerges, the empirical question resurfaces: How does economic output respond to a positive government spending shock? In other words, how much bang for the buck does fiscal stimulus reap? Although we have decades of empirical exploration on this important topic, the literature remains elusive. Studies using various methodologies and datasets produce widely varying estimates of the multiplier, ranging from –3.00 to 3.00. Studies find that multipliers are highly sensitive to the model's underlying assumptions, such as the degree of crowding out, the responsiveness of consumer spending to changes in income, and the interest-rate environment. State-dependent estimates find values that vary on the basis of underlying economic conditions, including economic slack, labor market tightness, monetary policy, and fiscal position.

Since the global financial crisis (GFC) of 2007–08, an abundance of empirical literature has been published exploring the interplay between government spending and the induced change in economic output. Recent research has narrowed the range of fiscal multiplier estimates. Ramey (2019) finds that the bulk of estimates for average spending multipliers lies in a narrow range of 0.60 to 1.00. However, with the onset of the COVID-19 pandemic in 2020 and the passing of the $2.2 trillion Coronavirus Aid, Relief, and Economic Security (CARES) Act, economists could not come to consensus on the output effects that this legislation would have. Many economists argued that the fiscal multiplier on government spending was as high as 1.50 or 1.90 (Krugman 2020; Wilson 2020), whereas budget models (Arnon, He, and Huntley 2020) re-upped previous multiplier estimates used to analyze the 2009 American Reinvestment and Recovery Act (ARRA), with estimates ranging from 0.50 to 2.00. As policymakers increasingly turn to fiscal stimulus during periods of economic uncertainty, understanding the nuanced effects of government spending on economic output remains critical.

This literature survey revisits the question by examining recent evidence and methodological advancements, shedding light on the factors that drive variation in fiscal multiplier estimates and their implications for future policy design. The importance of understanding nuances in the estimates of fiscal multipliers first requires observing differences in impact, peak, and long-term multipliers. Methodological innovations include a growing emphasis on the state dependence of fiscal multipliers. To that end, this survey breaks down the estimates further by observing whether output effects differ in economic recession versus expansion, during periods of high unemployment, at the zero lower bound (ZLB), with high versus low public debt ratios, and with type of spending (investment vs. consumption).

Theory, Evolution, and Innovations in Modeling

Contrary to popular belief, the theory of the fiscal multiplier did not originate with John Maynard Keynes but with one of his students, Richard Khan, whose 1931 paper, "The Relation of Home Investment to Unemployment," first introduced the concept. Keynes later popularized and expanded upon the concept in his seminal work, *The General Theory of Employment, Interest, and Money,* published in 1936. The fiscal multiplier is a central Keynesian economic concept that explains how an initial change in spending can lead to a larger overall change in economic output. In simple terms, the fiscal multiplier is a method of measuring the effect of government spending

on the nation's economic output, or gross domestic product (GDP). A multiplier of 1.00 means that every additional $1 of government spending increases GDP by an equal amount ($1). A multiplier of 1.50 means that every additional $1 of government spending increases GDP by a larger amount ($1.50).

In the Keynesian tradition, the multiplier is closely tied to the concept of the marginal propensity to consume (MPC), which represents the fraction of each additional dollar of income that households will spend on consumption. The textbook formula is Multiplier = 1.00 / (1.00 – MPC). If MPC is 0.25, the multiplier is 1.00 / (1.00 – 0.25) = 1.00 / 0.75 = 1.33. Early estimates of the fiscal multiplier using this basic Keynesian method often resulted in spending multipliers of 3.00 or larger (Stone and Stone 1938). The basic multiplier effect is a simplified model and does not account for factors such as distortionary taxes, imports, or changes in interest rates. Including those additional variables in the model produces significantly smaller multiplier effects.

Mainline economists have long critiqued the simplicity of the Keynesian multiplier model. James M. Buchanan argued that government deficit spending was itself a form of taxation, albeit a deferred version (Buchanan 1958). In the 1970s, economist Robert Barro asserted that when the government finances its spending through borrowing, forward-looking economic agents will internalize these changes when making decisions about consumption, savings, and investment (Barro 1974). In measuring the impact of government spending on output, neoclassical models accounted for the impacts on savings, investment, and the capital stock (crowd out), as well as the impact of future distortionary taxes (Ricardian equivalence; see below).

One innovation in neoclassical models was the integration of rational expectations. This integration has often resulted in smaller fiscal multipliers that are typically below unity (1.00). The concept of crowding out highlights how increased government borrowing can raise interest rates, making investing more expensive for businesses. This reduction in private investment offsets some of the stimulative effects of government spending. Ricardian equivalence, another key concept in neoclassical economics, suggests that forward-looking households anticipate future tax increases necessary to repay government debt. Consequently, those households may reduce current consumption and increase savings to offset the expected future tax burden. This reduction in consumption dampens the initial impact of government spending on aggregate demand.

Another innovation in neoclassical models included the adoption of military spending data to estimate spending multipliers. The use of military spending data addresses the problem of reverse causation, in which economic conditions might influence government spending decisions by providing a more exogenous source of variation in government expenditure. A renewed focus on military spending allowed economists to better isolate the effects of government spending on economic output, reducing concerns about endogeneity in their estimates of fiscal multipliers. Military expenditures during wartime often involve substantial and rapid increases in government outlays. Such large-scale changes in spending provide economists with a clearer signal to analyze because the effects on the economy are more pronounced and easier to distinguish from economic background noise. These innovations in modeling were widely adopted in the 1980s and resulted in fiscal multiplier estimates below unity (Barro 1984; Hall 1986), typically around 0.60.

In addition to neoclassical models, the popular adoption of New Keynesian dynamic stochastic general equilibrium (DSGE) models in the early 2000s has provided a more rigorous framework, incorporating assumptions about household behavior, firm behavior, and market imperfections (Blanchard and Perotti 2002). However, the often-held assumption in these models—that contemporaneous relations between overall government spending and real GDP

entirely reflect the influence of the former on the latter—has been found to produce misleadingly high multipliers for nondefense purchases (Barro and Redlick 2011). In more recent years, and especially since the GFC, empirical explorations of the fiscal multiplier have emphasized the role of state dependence, recognizing how the magnitude and impact of multipliers can differ depending on factors such as the state of the economy (e.g., recession vs. expansion), unemployment levels, and other relevant economic conditions (Ramey and Zubairy 2018). Although the fiscal multiplier concept has evolved from its early Keynesian origins to the more nuanced models employed in contemporary macroeconomics, ongoing research continues to refine our knowledge of its dynamics and explore its implications for economic policy.

A Survey of Empirical Literature

Much of the literature published in the pre-GFC years offers a broad range of multiplier estimates, ranging from 0.2 to 2.0. Using a mixed structural vector autoregression (VAR) approach, Blanchard and Perotti (2002) estimated an impact multiplier of 0.80 to 0.90 and peak multipliers of 0.90 to 1.30. However, their approach does not demonstrate the dynamic measure of fiscal multipliers as we understand them today.[1] Many empirical efforts subsequently adopted the approach of Blanchard and Perotti and found peak multipliers close to or above unity (Canzoneri, Cumby, and Diba 2002; Galí, López-Salido, and Vallés 2007). The model adopted by Galí and his colleagues (2007) assumes that economic agents simply consume their current income and challenges the notion of rational forward-looking agents who optimize their consumption over time. The model's results, particularly the increase in consumption following government spending shocks, also contradict the Ricardian equivalence principle.

Other economists, who adopted neoclassical approaches such as the Ramey-Shapiro identification strategy, found spending multipliers around 0.60 (Eichenbaum and Fisher 2005). Examining fiscal spending multipliers using a structural macroeconomic model, Al-Eyd and Barrel (2005) analyzed output effects in both open and closed economy contexts and found estimates around 0.50 to 0.60. Similar to the neoclassical models, their study finds that greater openness reduces multipliers because demand leaks out via imports or capital flows. Applying a structural VAR approach to study the effects of fiscal policy on GDP, inflation, and interest rates in five Organisation for Economic Co-operation and Development (OECD) countries, Perotti (2005) finds that cumulative multipliers in the United States have been around 1.10 since the 1970s. However, running the same model for the post-1980 years significantly reduces the cumulative response to around 0.40. The author finds that after 1980, positive spending shocks have had an increasingly negative impact on private consumption and investment and resulted in fiscal multipliers notably lower than 1.00. Consistent with much of the empirical literature, many studies published in the lead-up to the GFC find impact multipliers of 0.40 to 0.50 and peak multipliers of 0.70 to 0.90 (Caldara and Kamps 2008; Ilzetzki and Végh 2008).

The onset of the GFC in 2008 led to renewed interest in measuring the multiplier effects of government stimulus spending. Moving away from measuring the impulse response of output to measuring the initial jump in government spending, Mountford and Uhlig (2009) shift to calculating the ratio of the present value of the cumulative impulse response of output to the then-current value of the cumulative impulse response of government spending. Contrary to New Keynesian theory, the authors find that private consumption does not increase, and wages do not rise, in response to positive spending shocks. The study reveals an impact multiplier of 0.65,

[1] Blanchard and Perotti (2002) measured the relative change in output per unit of spending shock at the designated time frame.

which declines over time, turning negative in the long term (–2.07). Ramey (2009) also explores the question of whether government spending raises or lowers consumption and wages. Ramey noted that many VAR approaches are missing the anticipatory effects of the standard neoclassical model. Her study finds that most components of consumption fall after a positive shock to government spending, and spending multipliers range from 0.60 to 1.10. These results are also similar to those by European Central Bank analyses that find fiscal multiplier estimates in the range of 0.60 to 0.80 for a large panel of countries (Afonso, Gruner, and Kolerus 2010). Interestingly, Afonso et al. also find no statistically significant difference between crisis spending and regular spending.

Using a dataset of public investment spending in Japan, Tuladhar and Brückner (2010) find impact multipliers around 0.30 and cumulative multipliers around 0.70. The authors find evidence of public spending crowding out private consumption. The study also finds that decentralized governance may be more effective, with multipliers of city-government spending being three times greater than those of central-government spending (0.78 vs. 0.26). Multiplier models published in support of government stimulus programs in 2009 failed to include explicit assumptions about how households and firms react given their future fiscal expectations.[2] Cogan et al. (2010) adopt a New Keynesian model that includes the assumption that deficit spending will have to be offset with future taxes that will lower the future after-tax earnings and wealth of economic agents. Although impact multipliers are found to be around unity (1.00), the impact of government spending becomes increasingly diminished over time and falls to 0.40 after 15 quarters. Cogan et al. (2010) also correct for the assumption that stimulus spending is expected to be permanent rather than a one-time, phased-in, positive spending shock. With that correction, the authors find that government stimulus multipliers typically fall within a range of 0.60 to 0.80 upon impact and diminish over time.

Whereas Perotti (2005) finds that government multipliers larger than 1.00 can only be identified in the pre-1980 period, Kircher, Cimadomo, and Hauptmeier (2010) find that these effects have diminished further since the 1980s. Specifically, the authors find an impact multiplier of 0.55, but the effect is around 0.70 in the 1980s and falls to about 0.40 in the late 2000s. The study also finds that the impact of stimulus spending has lost persistence over time, with positive output effects lasting up to seven quarters in the 1980s, five quarters in the 1990s, and only four quarters by the late 2000s. These dynamics are driven by a weaker private consumption response over time; growing access to credit, which enhances Ricardian equivalence effects; and growing public debt ratios, which raise expectations for future fiscal consolidation. Following the approach of Mountford and Uhlig (2009), many subsequent studies found multipliers ranging from 0.40 to 0.80, but when debt impact and eventual distortionary taxes are accounted for, the multiplier turns sharply negative (Barro and Redlick 2011; Uhlig 2010).

Reviewing more than a decade of empirical literature on the fiscal multiplier in the United States, Ramey (2011) finds that the range of plausible estimates in the case of a temporary increase in deficit-financed government spending is probably 0.80 to 1.50. The wide divergence in estimates seems to largely stem from assumptions built into the respective models—for example, how economic agents anticipate fiscal shocks, whether negative wealth effects are considered, and the measure of crowd out effects. Within this range of estimates, Baum, Poplawski-Ribeiro, and Weber (2012) find peak multipliers around 0.70 to 0.80 for G7

[2] See Romer and Bernstein (2009). "The Job Impact of the American Recovery and Reinvestment Plan." The authors estimated long-term cumulative multipliers in excess of 1.50.

economies. However, the impact was found to be larger—around 1.20—when spending occurs during a negative output gap.

Many studies using a standard new-Keynesian framework observed spending shocks that are effectively windfall financed (Serrato and Wingender 2016; Shoag 2013), which results in significantly upward-biased multipliers that can be as high as 2.00. Accounting for the effect of deficit-financed spending on future debt or taxation on current consumption and investment and using state-level data, Clemens and Miran (2012) find an impact multiplier of 0.77. After adjusting for income changes unrelated to fiscal policy, the authors find the impact multiplier is closer to 0.30. A common critique of standard VARs is their simplistic linear form, which is inadequate for capturing the nuanced and conditional nature of fiscal policy transmission. Corsetti, Meier, and Müller (2012) attempt to correct for this limitation by adopting a two-stage estimation strategy that traces the impact of government spending on key macroeconomic variables. Their study finds a range of spending multipliers between 0.50 and 0.70, which is broadly consistent with many other empirical observations (Crafts and Mills 2013; Furceri and Zdzienicka 2012; Iltzetzki, Mendoza, and Végh 2013).

During and after the GFC, studies emerged claiming that spending multipliers could be as high as 1.50 or 2.00 during times of economic slack, and Owyang, Ramey, and Zubairy (2013) attempted to test this hypothesis.[3] Using a local projection technique to calculate impulse responses, the authors find peak multipliers close to 0.90 and long-term (four-year) multipliers of around 0.80 for the United States, while multipliers above 1.00 during periods of high unemployment can be observed in Canadian data. Importantly, the authors note that their estimates are not equal to pure deficit-financed multipliers because they do not adjust for the impact of future tax increases, which could suggest slight upward biases in their estimates. Extending the benchmark New Keynesian model allowing for future distortionary taxation, Drautzburg and Uhlig (2015) tested whether the negative perspective of long-run multipliers under a neoclassical model survive when Keynesian underlying assumptions are included. The study reveals a short-run multiplier around 0.50 and a long-run multiplier that is modestly negative (–0.36). Although the negative long-run impact is notably more modest than previous neoclassical estimations (Mountford and Uhlig 2009; Uhlig 2010), the authors note that the model is heavily tilted toward the Keynesian perspective.

Using an augmented DSGE model, Leeper, Traum, and Walker (2017) estimated spending multipliers using Bayesian previous and posterior analysis of a monetary model with fiscal details and two distinct monetary-fiscal policy regimes (active money/passive fiscal and passive money/active fiscal). The estimation results revealed large impact multipliers of around 1.30 for both regime types. In the long run, only the passive money/active fiscal regime maintains large multiplier effects (1.50), whereas multipliers under the active money/passive fiscal regime decline to 0.40 or less. Perhaps these dynamics explain the findings of previous analyses, which find declining multipliers since 1980 (Kircher, Cimadomo, and Hauptmeier 2010; Perotti 2005) as the United States has shifted from a largely passive money/active fiscal regime during the Bretton Woods era to a largely active money/passive fiscal regime since Paul Volcker's tenure as Federal Reserve chair.

Extending the analysis of Owyang, Ramey, and Zubairy (2013), Ramey and Zubairy (2018) find a range of estimates for the spending multiplier between 0.30 and 0.80 using the local projection method. Measuring the impact of state dependence, the authors find that when data-

[3] For example, Auerbach and Gorodnichenko (2012) suggest multipliers between 1.50 and 2.00 during economic recessions. Fazzari et al. (2014) estimate similarly large multipliers during periods of economic slack.

consistent assumptions are used, the higher multipliers found in other studies during recessions disappear. The differences in these findings from those of other studies (i.e., Auerbach and Gorodnichenko 2012) are rooted in subtle assumptions underlying the impulse response functions—namely, linearized models resulting in misleadingly high estimates. Further summarizing the state of knowledge about government spending multipliers, Ramey (2019) concludes "that they are positive but less than or equal to unity, meaning that government purchases raise GDP but do not stimulate additional private activity and may actually crowd it out." Ramey notes that the bulk of estimates across different methods and samples lie within a narrow range of 0.60 to 1.00. Ramey further points out that state-level estimates that find multipliers as high as 2.00 (i.e., Chodorow-Reich 2019) overestimate national-level multipliers, and, once weighed by initial state population and total spending, the multiplier falls to less than 0.90.

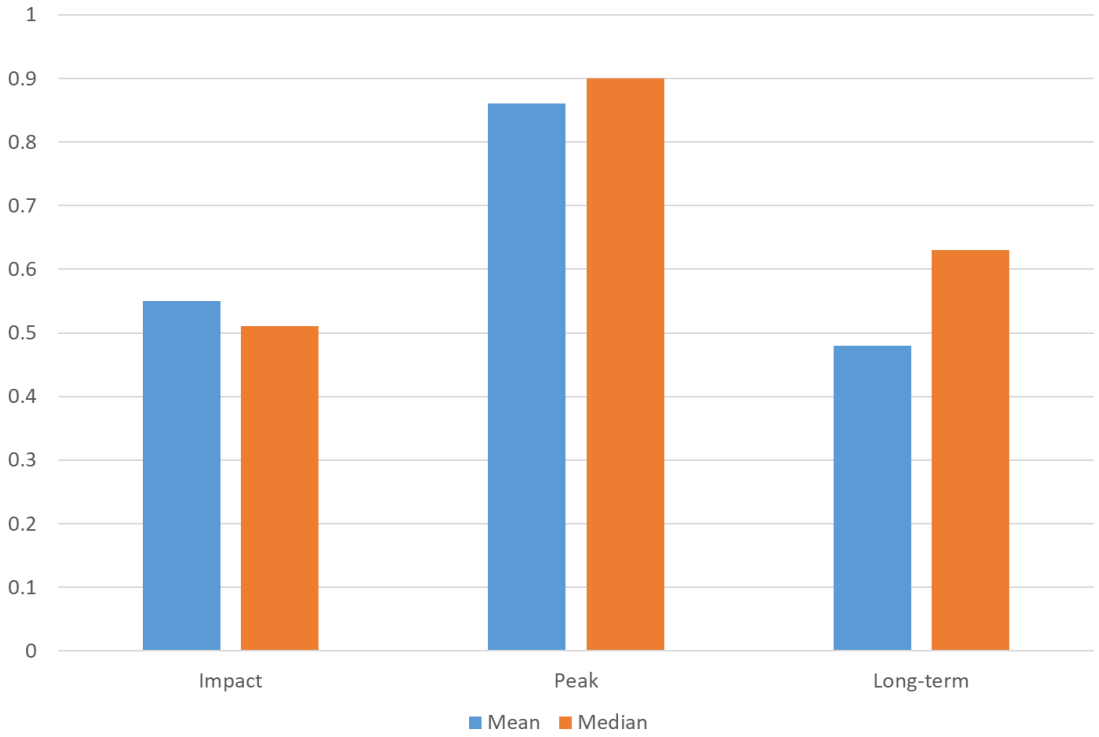
In recent years, much of the empirical literature has estimated impact multipliers within a range of 0.40 to 0.80 (Kass-Hanna, Raynaud, and Walker 2023; Petrović, Arsić, and Nojković 2021) and peak multipliers within a range of 0.70 to 1.00 (Berge, De Ridder, and Pfajfar 2021; Inoue, Rossi, and Wang 2024; Kinda, Lengyel, and Chahande 2022). This range of estimates is largely in line with multiplier model estimates used to measure the economic impact of fiscal stimulus spending during the COVID-19 pandemic. For example, the Penn Wharton Budget Model estimated a range of fiscal multipliers (0.10 to 0.80) when calculating the macroeconomic effects of the American Rescue Plan (Arnon et al. 2021). Other studies focused on specific stimulus programs, such as expanded unemployment insurance, used a range of output multipliers between 0.60 and 1.00 (Kekre 2022) to estimate the macroeconomic effects of stimulus.

Fiscal multipliers are highly context-dependent and influenced by assumptions regarding agent behavior, the state of the economy, and the financing of government spending. The divergence in empirical estimates highlights the importance of model specification and the conditional nature of fiscal policy effects.

Synthesizing Multiplier Estimates

Aggregating more than 150 baseline estimates from 67 empirical studies, the synthesis of multiplier estimates can be broken down by impact multipliers, peak multipliers, and long-term multipliers. Figure 1 shows both the mean and median temporal dynamics of fiscal multipliers. For impact multipliers, the aggregated mean estimate is 0.55, and the median is 0.51, with more than two-thirds of the impact multiplier estimates falling within a range of 0.30 to 0.70. For peak multipliers, the mean estimate is 0.86, and the median estimate is 0.90, with about two-thirds of estimates falling within a range of 0.70 to 1.20. Finally, the aggregated mean estimate for long-term multipliers is 0.48, with a median estimate of 0.63, and most of the long-term estimates fall within a range of 0.40 to 0.80.

FIGURE 1. Temporal dynamics of fiscal multipliers



Source: Author's calculations of mean and median estimates from findings sourced in 67 empirical studies.

This pattern of a gradual increase followed by a decline is characteristic of a hump-shaped dynamic. It suggests that the initial impact of fiscal stimulus may be relatively muted, but the effects can amplify over time due to various mechanisms, such as multiplier effects in the economy. However, these effects may eventually fade as the economy adjusts and other factors come into play. Over the longer term, crowding-out effects and Ricardian equivalence dynamics may become more prominent. For example, increased government borrowing leads to higher interest rates or higher distortionary taxes, which dampen private investment and offset some of the initial stimulus.

The synthesized range of estimates found in this analysis (0.50 to 0.90) is broadly in line with the narrow range of estimates offered by Ramey (2019). The aggregated mean estimates are also largely consistent with recent meta-analyses of large datasets. For example, Hlavacek and Ismayilov (2024) estimate a positive but moderate fiscal multiplier effect of around 0.70 using a database comprising 131 studies. Focusing only on cumulative and peak multipliers (which are typically larger than impact multipliers), the authors find a mean multiplier of 0.75 and a median estimate of 0.68. Bayesian model averaging reveals that studies with larger standard errors tend to produce larger estimates of the fiscal multiplier. In other words, studies with larger multiplier estimates tend to be less precise than those with smaller estimates.

Fiscal Multipliers and State Dependence

The wide range of fiscal multiplier estimates observed in the literature underscores the importance of understanding the conditions under which government spending is most effective. In particular, many studies suggest that the size and persistence of fiscal multipliers depend heavily on state-dependent factors such as the phase of the business cycle, the stance of monetary policy, the level of public debt, or the type of spending. Focusing on multipliers during periods of economic slack or high unemployment, at the zero lower bound, and in relation to the public debt burden, this section explores the empirical literature further to determine whether these state-dependent dynamics shape the effectiveness of fiscal policy

Multipliers during economic downturns

Following the GFC, economists took a renewed focus on fiscal multipliers to measure whether output effects of government stimulus were larger during periods of economic slack. Some studies confirmed this hypothesis and found that multipliers are around 0.60 to 0.70 during normal economic times and close to or larger than 1.00 during economic contractions (Baum, Poplawski-Ribeiro, and Weber 2012; Hernandez de Cos and Moral-Benito 2015). Other studies have also found that fiscal multipliers are larger during periods of economic slack but that the difference is minimal and the multiplier during recessionary periods is still below 1.00. For example, Carnot and Decastro (2015) find output multipliers of 0.76 and 0.58 during good economic times and multipliers of 0.90 and 0.78 during bad economic times, respectively. Similarly, Owyang, Ramey, and Zubairy (2013) use the unemployment rate as a proxy for the business cycle and find little to no difference in the size of fiscal multipliers.

Recent additions to this literature also find mixed evidence on the effectiveness of fiscal stimulus during downturns. Of note, Ghassible and Zanetti (2022) find multipliers at a two-year horizon to be 0.68 during an expansion and 0.54 during a recession and 0.76 and 0.65, respectively, at the four-year horizon, although the difference is not statistically significant. These findings are consistent with Ramey and Zubairy (2018), who find very limited state dependence relating to economic slack, with no significant differences at any horizon. Similarly, Inoue, Rossi, and Wang (2024) use a local projection estimator to determine if multipliers are larger during periods of high unemployment. The authors find that estimates are consistently around 0.60 at the two-year horizon regardless of labor market slack and around 0.70 at the four-year horizon. Using an unemployment threshold of 6.5 percent, Haug and Sznajderska (2024) find little to no difference in either government consumption or investment multipliers when comparing a state of low versus high unemployment. The authors note that the hypothesis that multipliers are the same across states of low and high unemployment cannot be rejected.

Finally, Ramey (2019, 90) concludes her summary of the empirical literature by noting that the evidence of higher multipliers during economic recessions "is fragile, and the most robust results suggest multipliers of one or below during these periods." Ramey also finds that ad hoc conversion facts bias estimated multipliers upward during recessionary periods. Correcting for these biases lowers the estimated spending multiplier from as high as 2.00 in some specifications to lower than 0.80.

Multipliers at the zero lower bound

A situation in which the short-term nominal interest rate is at or near zero, limiting the central bank's ability to stimulate economic growth, is commonly referred to as the zero lower bound.

Since the turn of the 21st century, interest rates have been at the ZLB roughly 30 percent of the time. Economists have attempted to explore whether fiscal policy becomes more effective at the ZLB because monetary policy cannot offset the effects of stimulus by raising interest rates. In the absence of the usual crowding-out effect of higher interest rates, government spending may have a more substantial impact on aggregate demand and output at the ZLB (Christiano, Eichenbaum, and Rebelo 2011).

With short-term interest rates averaging just 0.24 percent during World War II, Ramey (2011) estimated the government spending multiplier between the years 1939 and 1945 to shed light on the question of whether fiscal policy is more effective at the ZLB. Using a trivariate VAR approach, Ramey found an implied multiplier of 0.70, which is smaller than the estimate for the entire data sample (1939–2008). Ramey (680) concludes, "I find no evidence of larger multipliers during the extended period in which interest rates were held virtually constant at the zero lower bound." Taking a different approach, Drautzburg and Uhlig (2015) sought to determine whether the duration at which interest rates are at the ZLB dictates the effectiveness of fiscal policy. Short-term multipliers were found to be 0.20 away from the ZLB, almost 0.70 after three years at the ZLB, and 0.80 after five years at the ZLB. Long-run multipliers were found to be around -0.70 away from the ZLB, close to 0 after three years at the ZLB, and about 0.30 after five years at the ZLB.

A common limitation in the existing literature is that many studies account for the nonlinear effects caused by the ZLB on nominal interest rates but simplify the other equilibrium conditions by assuming a steady state with zero inflation. These linearized models produce misleadingly high multiplier estimates when observing periods with interest rates at the ZLB. Using a range of empirically relevant parameterizations, Boneva et al. (2016) solve the issue of linearization and finds fiscal multipliers around unity (1.00) at the ZLB. In a similar vein, Lindé and Trabandt (2018) find that linearized models have led to misleadingly high multiplier estimates of 2.00 or more at the ZLB. The authors amend the model with real rigidities to account for the macroeconomic evidence of a low Phillips curve slope and the microeconomic evidence of frequent price changes. After these amendments, the fiscal multiplier is found to be just 0.33 away from the ZLB and 0.65 at the ZLB.

Related to the findings of Ramey (2011), Ramey and Zubairy (2014) use military news shocks, the Blanchard-Perotti shock, and a combination of the two at both two-year and four-year horizons. The authors note (27-28) that they "do not find robust results in support of the New Keynesian model prediction that multipliers are greater at the zero lower bound." Of note, the Blanchard-Perotti shock and combination approach does find multipliers that are larger at the ZLB, but the estimates at the ZLB are still notably under 1.00 (0.60 to 0.80). Breaking down government spending by consumption and investment, Boehm (2020) finds that government consumption multipliers rise from about 0.70 away from the ZLB to about 0.90 to 1.00 at the ZLB. For government investment expenditure, the multiplier increases from near 0 to around 1.00 at the ZLB. Finally, consistent with the research of Ramey (2011, 2014, 2018), authors Inoue, Rossi, and Wang (2024) do not find that fiscal multipliers differ significantly whether at the ZLB or away from the ZLB, with estimates of 0.76 and 0.63 at the two-year horizon and 0.75 and 0.78 at the four-year horizon, respectively.

Multipliers and public debt levels

High public debt can crowd out private investment, as government borrowing competes for limited capital, driving up long-term real interest rates. Freedman et al. (2009, 3) highlight this

tradeoff, noting that, "In the absence of such a perceived commitment (fiscal discipline), expansionary fiscal actions can lead to increases in long-term real interest rates, which tend to offset the stimulus effects on GDP of the fiscal actions." Under such conditions, the potential for fiscal policy to deliver robust economic growth diminishes, raising important questions about the sustainability and efficiency of using fiscal tools in heavily indebted economies.

One of the first studies to quantify the effect of public debt on fiscal multipliers was Kircher, Cimadomo, and Hauptmeier (2010). The authors found that a one-percentage-point increase in the debt-to-–GDP ratio caused, on average, a decline in the multiplier on output by 0.01 points in all regression specifications considered. Adopting a panel ordinary least squares regression for a sample dataset of 44 countries, Ilzetzki, Mendoza, and Végh (2013) find that fiscal multipliers are smaller in high-debt countries and turn negative at long-term horizons. The impact multiplier for countries with a debt ratio less than 60 percent is found to be 0.73, and the long-run multiplier is found to be 0.41 after six years. For countries with a debt ratio greater than 60 percent, the impact multiplier is found to be just 0.06, and the long-run multiplier is found to be –2.30 after six years. Focusing on threshold effects, Vranceanu and Besancenot (2013) find that fiscal multipliers diminish as the debt ratio increases, and the authors find a turning point at 148 percent of GDP, at which multipliers turn negative. Using a slightly different approach, Nickel and Tudyka (2014) measure the persistence of fiscal multipliers between low- and high-debt regimes. For low-debt countries (debt ratio up to 35 percent), the positive multiplier reverts back to zero over a long period (approximately 8 years), but for high-debt countries (debt ratio around 105 percent), the multiplier reverts back to zero and then turns negative (less than –1.00) after about two years.

Studies consistently find that multipliers in low-debt regimes have significantly higher fiscal multipliers than those of debt-burdened regimes. The bulk of these studies find that low-debt regimes have spending multipliers between 0.60 and 1.00, whereas high-debt regimes typically have multipliers between 0 and 0.40 (Afonso and Leal 2019; Chian Koh 2017; Deb at al. 2024; Iwata and Iiboshi 2023). Other studies measure the persistence of multiplier effects between low- and high-debt regimes. For example, Bi, Shen, and Yang (2016) find that the impact multiplier is larger in a low-debt regime, and in the long run, the multiplier of high-debt regimes turns negative. Similarly, Huidrom et al. (2020) find that multipliers are around 0.60 in low-debt regimes in both the two-year and the long-term horizon, whereas, for high-debt regimes, the estimates are 0 and –1.60, respectively. Augmenting the Blanchard-Perotti model to allow for the dynamic effects of debt levels on economic activity, Ouliaris and Rochon (2021) find that expenditure multipliers have fallen post-2008, mostly because of higher government debt, implying that the effectiveness of fiscal policy has declined.

Investment and infrastructure spending

Some economists have posited that while the fiscal multiplier of government consumption spending may be low, investment spending or infrastructure spending is likely to be higher (Gechert and Rannenberg 2018). This hypothesis rests on the theory that a short-run increase in government expenditure that concurrently augments the stock of public capital or enhances long-run total factor productivity could exhibit a dualistic benefit. In other words, this short-run increase in government expenditure functions as a Keynesian demand stimulus in the short term while simultaneously fostering a neoclassical supply-side stimulus through improved long-term growth potential.

Testing this theory, Boehm (2020) uses real-time forecasts of government consumption and investment for a panel of OECD countries. Contrary to the notion that investment multipliers are

larger, the results reveal that investment multipliers are close to zero, and consumption multipliers fall within the range 0.60 to 1.00. The author explains that the investment multiplier is small because it causes significant crowd-out of private investment. For every dollar in government investment spending, private investment is crowded out by 66 cents after eight quarters. This high degree of crowding out is driven by the sensitivity of businesses to changes in conditions, such as interest rates, when deciding how much to invest over time.

Exploring dependencies of the multiplier on states of the economy, Haug and Sznajderska (2024) calculate the government spending multiplier using US data from 1947 to 2022. Importantly, the methods applied include breaking out government spending by consumption and investment. Investment spending is found to have an impact multiplier of 0.86 that drops to about 0.30 after eight quarters, whereas the consumption multiplier is around 0.30 on impact and declines to zero after just six quarters. The authors conclude that government investment and consumption multipliers show no statistically significant differences at all horizons.

Highlighting the economic mechanisms that govern the strength of the short-run and long-run impacts, Ramey (2020) analyzed the effects of government investment in both a stylized neoclassical model and a medium-scale New Keynesian model. In the baseline neoclassical model, the first-year multiplier for consumption versus investment spending is found to be similar (0.50 and 0.40, respectively). In the baseline New Keynesian model, the first-year multiplier is again found to be similar, around 1.00, for both types of spending shock. The study also concludes that long-run multipliers on government investment depend on both the production function elasticity of output to public capital and where the economy begins relative to the socially optimal level of public capital. These results are similar to findings by Leeper, Walker, and Yang (2010), who found long-run investment multipliers close to unity with a production function of 0.10 and multipliers around 0.30 to 0.40, using a production function of 0.05.

In sum, the degree of state dependence tends to be much more modest than suggested by some previous studies (i.e., Auerbach and Gorodnichenko 2012, 2013). For multipliers during economic slack, the difference is small to none compared with periods of economic expansion. Regardless of minor differences, the multiplier is unlikely to be above unity during periods of economic slack. Although empirical exploration on the impact of interest rates on fiscal policy provides mixed results, multipliers at the ZLB are likely higher than those away from the ZLB if interest rates are at the ZLB long enough. However, the evidence that ZLB multipliers are larger than 1.00 is scarce. At the same time, a growing body of literature suggests that debt sustainability is a key determinant of fiscal policy effectiveness because higher debt levels exacerbate crowding-out effects and long-term economic constraints. Further research that focuses specifically on public debt and multipliers in the United States would be valuable because the preponderance of literature focuses on European countries.

Conclusion

From its origins in simplified theoretical frameworks to its incorporation into complex models, the debate over the effectiveness of fiscal stimulus has continually adapted to new empirical evidence and methodological advancements. Early Keynesian estimates of multipliers, often exceeding unity, have been tempered by neoclassical critiques emphasizing crowding out, Ricardian equivalence, and the dynamic impacts of taxation and government borrowing. Innovations such as the use of military spending data and the adoption of dynamic stochastic general equilibrium models have further refined our understanding of the fiscal multiplier,

producing estimates that vary on the basis of assumptions about economic behavior and conditions.

In recent decades, empirical literature has demonstrated both methodological advancements and persistent challenges in estimating multipliers. The ongoing refinement of vector autoregression and structural models has provided greater clarity but also has underscored significant heterogeneity in results. In the aggregate, government spending multipliers broadly fall within the range 0.50 to 0.90, in line with the range of estimates offered by Ramey (2019) and consistent with recent meta-analyses of large datasets.[4] Some studies find higher multipliers (close to or above 1.00) during periods of economic slack, but the evidence is mixed, with many results suggesting only modest differences compared with expansions. At the ZLB, where monetary policy is constrained, multipliers are often found to be slightly higher, but robust findings indicate that they remain below or near unity. High public debt generally reduces fiscal multipliers, with some studies showing negative long-term effects as debt levels rise significantly. Although some theoretical models predict higher fiscal multipliers for government investment spending compared with consumption, robust empirical data often show minimal differences, with investment multipliers frequently constrained by significant crowding out of private investment. Overall, the degree of state dependence is more modest than suggested by earlier research.

The literature also underscores the importance of recognizing distinct phases of multiplier effects—impact, peak, and long term. Although short-term impacts may boost output, long-term effects often diminish or turn negative due to reduced private investment and consumption, emphasizing the role of anticipatory effects and private-sector responses. Future research should focus on developing more dynamic models to capture the interplay between fiscal multipliers and state-dependent factors. Incorporating nonlinear and heterogeneous responses across varying economic states could yield more precise estimates. In addition, studies should investigate how real-world constraints such as implementation delays and political economy considerations influence fiscal multiplier effectiveness. Cross-country comparative analyses could further explore how institutional and structural differences shape fiscal responses, enhancing the generalizability of findings across economies.

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[4] Hlavacek and Ismayilov (2024) find a moderate fiscal multiplier effect of around 0.70 using a database comprising 131 studies.

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