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CAN GOVERNMENT SPENDING GET AMERICA WORKING AGAIN? AN EMPIRICAL INVESTIGATION

Abstract: In this POLICY BULLETIN, we examine the effectiveness of government spending on private-sector job growth. Rather than contemplate the average or typical effect of government stimulus on private-sector jobs, we divide the past fifty years of U.S. economic history into low-growth and high-growth periods. We then apply a non-linear, two-regime model to study whether the stimulus effects of government and private investment differ between recessionary and expansionary periods. During periods of economic sluggishness, we find that government spending has zero effect on private-sector job creation. This result is consistent with the apparent impotence of huge federal government spending increases aimed at reducing unemployment. In contrast, when it comes to job growth, expansions in private investment are effective in both regimes, but its efficacy is greatest during economic stagnation. By implication, policies that discourage private investment may have severe job-killing effects during economic downturns, since it is during the low growth periods that private investment is most effective at creating jobs. In light of these results and the evident failure of government stimulus to restore economic growth, job creation appears best served, under present economic conditions, by policies that encourage efficient private-sector investment such as tax and regulatory relief.

I. Introduction

The U.S. economy is presently in a prolonged economic slump. While officials date the end of the latest recession to June of 2009, the sting of the downturn is still felt by many Americans.

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Unemployment for full-time workers exceeded 10%, and for all workers 9%, for most of 2009 and 2010.¹ In September 2011 (the last date available as of publication), the unemployment rate reached 9.8% for full-time workers, threatening to breach double digits once again.² In certain segments of the population, the situation is even more dire. For example, for blacks who are 20-years old or older, the latest unemployment rate was estimated to be 15.8%.³ Most Americans believe that unemployment is the biggest problem facing the country and its leaders.⁴ Today, optimism for a rapid recovery has vanished and the ailing labor market has led to riots in U.S. streets.⁵ Worse, many economists are predicting a second recession and a prolonged period of high unemployment.⁶

Solutions to the country's economic woes remain elusive and contested. Some government officials propose increased government spending, an alleged elixir for the "animal spirits" that are choking aggregate demand.⁷ In contrast, others are calling for policies aimed at curbing

¹ Federal Reserve Economic Data, Federal Reserve Bank of St. Louis: Unemployment Rate—Full-Time Workers (LNS14100000) (available at: <http://research.stlouisfed.org/fred2/series/LNS14100000?cid=32447>) and Civilian Unemployment Rate (UNRATE) (available at <http://research.stlouisfed.org/fred2/data/UNRATE.txt>).

² <http://www.bls.gov/news.release/empsit.t12.htm>.

³ <http://research.stlouisfed.org/fred2/series/LNU04000031?cid=32447>.

⁴ <http://www.gallup.com/poll/150056/Satisfaction-Remains-Low-Economic-Concerns-High.aspx>;
<http://www.gallup.com/poll/5392/trust-government.aspx>.

⁵ A. Klein, *Wall Street Targeted for Britain-style Riots*, WORLDNETDAILY (August 16, 2011) (available at: <http://www.wnd.com/?pageId=334433>); *Occupy Wall Street*, NEW YORK TIMES (October 12, 2011) (available at: http://topics.nytimes.com/top/reference/timestopics/organizations/o/occupy_wall_street/index.html).

⁶ Davidson and B. Hansen, *Economists' Outlook Darkens: See 30% Change of Recession*, USA TODAY (August 15, 2011) (available at: http://www.usatoday.com/money/economy/2011-08-14-economists-survey_n.htm?loc=interstitialskip); S. Lanman, *Bernanke Says Federal Reserve Ready to Boost 'Close to Faltering' Growth*, BLOOMBERG (October 4, 2011) (available at: <http://www.bloomberg.com/news/2011-10-04/bernanke-says-federal-reserve-ready-to-take-further-action-to-spur-growth.html>); L. McCormick, *Bonds Show 60% Odds of Recession*, BLOOMBERG (October 11, 2011) (available at: <http://www.bloomberg.com/news/2011-10-11/bonds-showing-60-chance-of-recession-with-bernanke-behind-curve-for-bofa.html>).

⁷ C. Bohan, *Obama to Push for Stimulus Package on Capitol Hill*, REUTERS (January 27, 2009) (available at: <http://www.reuters.com/article/2009/01/27/us-obama-economy-idUSTRE50Q13E20090127>); Address by the President to a Joint Session of Congress, Office of the Press Secretary, The White House (September 8, 2011) (available at: <http://www.whitehouse.gov/the-press-office/2011/09/08/address-president-joint-session-congress>); *Waters Calls for \$1 Trillion Jobs Program*, UPI.COM (September 4, 2011) (available at: http://www.upi.com/Top_News/US/2011/09/04/Waters-calls-for-1-trillion-jobs-program/UPI-98371315166410); D. White, *Liberals Pleased with Obama's Jobs Bill, New Obama Boldness*, ABOUT.COM (September 12, 2011) (available at: <http://usliberals.about.com/b/2011/09/12/liberals-pleased-with-obamas-jobs-bill-new-obama-boldness.htm>); P. Krugman, *No, We Can't? Or Won't?*, NEW YORK TIMES (July 10, 2011) (available at: http://www.nytimes.com/2011/07/11/opinion/11krugman.html?_r=1) ("creating jobs in a depressed economy is something government could and should be doing"); A. Blinder, *The GOP Myth of "Job Killing" Spending*, WALL

(Footnote Continued...)

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government expenditure and stimulating private investment, perhaps through tax reform and trimming the burden of economic regulation faced by business.⁸ The effects on (various measures of) economic activity of government spending and private investment have been studied by economists for decades, and while the economic stimulus effects of private investment are unquestioned, the effects of government spending on labor markets remains an open empirical question. The layman sees the problem rather simply: the federal government has spent billions in the past few years in an effort to energize the economy, and many politicians assured their constituents that this increased spending, financed by record deficits, would reduce unemployment.⁹ It did not. Since the February signing of *The America Recovery and Reinvestment Act of 2009*, authorizing nearly \$800 billion in deficit-funded stimulus for “job preservation and creation,” unemployment by full-time workers has risen from 8.8% to 9.8% and for all workers has risen from 8.2% to 9.1% (as of September 2011).¹⁰

Why have these efforts failed? In an effort to provide answers, we consider in this POLICY BULLETIN the effectiveness of government spending on private-sector job growth. Rather than contemplate the average or typical effect of these factors on jobs, we divide the past fifty years of U.S. economy history into low-growth and high-growth periods.¹¹ We do so with a non-

STREET JOURNAL (June 21, 2011) (available at: <http://online.wsj.com/article/SB10001424052702303635604576392023187860688.html>).

⁸ Speaker Boehner to Host Private-Sector Job Creators in House Gallery for President Obama’s Address, Press Release, Speaker of the House John Boehner (September 8, 2011) (available at: <http://www.speaker.gov/News/DocumentSingle.aspx?DocumentID=258776>); E. Cantor, *Memo On Upcoming Jobs Agenda* (August 29, 2011) (available at: <http://majorityleader.gov/blog/2011/08/memo-on-upcoming-jobs-agenda.html>); *The House Republican Plan for America’s Job Creators* (<http://www.gop.gov/indepth/jobs>); Q. Bowman, *Romney’s Jobs Road Map: Cut Taxes and Decrease Regulation* (September 6, 2011) (available at: <http://www.pbs.org/newshour/rundown/2011/09/romneys-jobs-road-map-cut-taxes-and-decrease-regulation.html>); *Governor Rick Scott’s Budget Proposal will Grow Jobs by Streamlining Government, Reducing Burdensome Regulations and Return Government to Its Core Mission*, Office of Governor of Florida (January 31, 2011) (available at: <http://www.flgov.com/2011/01/31/governor-rick-scott-s-budget-proposal-will-grow-jobs-by-streamlining-government-reducing-burdensome-regulations-and-return-government-to-its-core-mission>).

⁹ A breakdown of stimulus funding is provided at: <http://www.recovery.gov/Transparency/fundingoverview/Pages/fundingbreakdown.aspx>.

¹⁰ *Supra* n. 1. The failure of the stimulus effort to reduce unemployment has been acknowledged by the White House. See, e.g., *The Economic Impact of the American Recovery and Reinvestment Act of 2009*, SEVENTH QUARTERLY REPORT (July 1, 2011) (available at: http://www.whitehouse.gov/sites/default/files/cea_7th_arra_report.pdf). The failure of one “Green Jobs” program is documented in a government study. See RECOVERY ACT: SLOW PACE PLACING WORKERS INTO JOBS JEOPARDIZES EMPLOYMENT GOALS OF THE GREEN JOBS PROGRAM, Department of Labor, Office of Inspector General—Office of Audit, Report No. 18-11-004-03-390 (September 30, 2011) (available at: http://www.eenews.net/assets/2011/10/04/document_gw_03.pdf). The *American Recovery and Reinvestment Act* is available at: <http://www.gpo.gov/fdsys/pkg/PLAW-111publ5/content-detail.html>.

¹¹ Categorizing the data into these two regimes is based on statistical analysis, explained below.

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linear, two-regime model, via a grid search method, to see whether the stimulus effects of federal government and private investment differ between recessionary and expansionary periods. *We find that during periods of economic sluggishness, government spending has zero effect on private-sector job creation.*¹² This result is consistent with the currently observed impotence of government efforts to reduce unemployment via spending increases. In contrast, private-sector investment has a positive effect on job creation in both low- and high-growth regimes. Interestingly, private-sector job growth is more strongly related to private investment when economic growth is slower. That is, when it comes to job growth, expansion in private investment is effective in both regimes, but its impact is greatest during economic recessions. This also provides an important policy implication. Government regulations and interventions that have a negative effect on private investment may result in substantially more harmful effects on private jobs if applied during low-growth regimes.¹³

In light of these results, we conclude job creation is probably best served, under present economic conditions, by policies that encourage efficient private-sector investment, including, perhaps, responsible tax reform and regulatory relief.¹⁴ In our earlier work on the influence of regulation on job creation, titled *Regulatory Expenditures, Economic Growth and Jobs: An Empirical Study*, we found that even a small across the board 5% reduction in the operating budgets for all federal regulatory agencies (about \$2.8 billion) would result in an increase in employment by 1.2 million private-sector jobs annually, growing private-sector GDP by about \$75 billion each

¹² Ramey (2011) finds that shocks to government spending are unproductive at generating private sector investment and job growth. V. Ramey, *Does Government Spending Stimulate Private Activity?*, Working Paper (July 12, 2011) (“private spending falls significantly in response to an increase in government spending. ... [I]ncreases in government spending do lower unemployment. However, ... virtually of the effect is through an increase in government employment, not private employment.”) (available at: http://www.google.com/url?sa=t&rct=j&q=does%20government%20spending%20stimulate%20private%20activity%3F%2C&source=web&cd=1&ved=0CCUQFjAA&url=http%3A%2F%2Fecon.ucsd.edu%2F~vramey%2Fresearch%2FNBER_Fiscal.pdf&ei=EaKuTubbEM-3twe-tNXiDg&usg=AFQjCNGLued6OrCAapAxzNM2mPVttsy_zQ).

¹³ For commentary on the general idea, see, e.g., M. Mandel, *Reviving Jobs and Innovation: The Role of Countercyclical Regulatory Policy – Part I*, PPI POLICY MEMO (November 16, 2010) (“Under the circumstances, it may be time to try something new: Countercyclical regulatory policy. That means following a very simple rule: Don’t add new regulations on innovative and growing sectors during economic downturns.”) (available at: <http://innovationandgrowth.wordpress.com/tag/countercyclical-regulatory-policy/>); J. Hamilton, *What Could America be Good At?*, ECONBROWSER.COM (September 15, 2011) (“if new regulations cause someone to lose their job or kill a new project that would have been hiring, the regulations are making a direct contribution to our cyclical problems, and are significantly more costly than if the same regulations had been implemented when the economy was operating at full employment.”) (available at: http://www.econbrowser.com/archives/2011/09/what_could_amer.html).

¹⁴ On taxes, see, e.g., *Economic Stimulus: Evaluating Proposed Changes in Tax Policy*, Congressional Budget Office (January 2002).

year.¹⁵ Put differently, eliminating the job of a single regulator grows the American economy by \$6.2 million and creates nearly 100 private-sector jobs annually. And, we are by no means alone in concluding that regulation is hurting job growth. For example, Jeffrey Immelt, chief executive officer of General Electric and head of President Barack Obama's Council on Jobs and Competitiveness, recently concluded, "to create more jobs ... [t]here's got to be some simplification of regulations."¹⁶ This sentiment echoes that of President Obama, who recently expressed concern that an excess of federal regulations "have stifled innovation and have had a chilling effect on growth and jobs"¹⁷ and recently, by Executive Order, made efforts to improve the efficiency of regulatory agencies.¹⁸ In a recent Gallup poll, government regulation was listed as the top concern of small-business owners.¹⁹

II. Empirical Analysis

Deciphering the relationship between government spending and macroeconomic outcomes has received considerable attention in the academic literature, both from the empirical and theoretical perspectives.²⁰ Despite this volume of work, consensus has not emerged; researchers

¹⁵ See T.R. Beard, G.S. Ford, H. Kim, and L.J. Spiwak, *Regulatory Expenditures, Economic Growth and Jobs: An Empirical Study*, PHOENIX CENTER POLICY BULLETIN NO. 28 (April 2011) (available at: <http://www.phoenix-center.org/PolicyBulletin/PCPB28Final.pdf>).

¹⁶ S. Chandra, *US Must Trim Regulations to Increase Jobs: GE Head*, BLOOMBERG (September 17, 2011) (available at: <http://www.bloomberg.com/news/2011-09-17/ge-s-immelt-says-u-s-must-trim-regulations-to-spur-job-growth.html>). Google's Eric Schmidt, a strong supporter of the Obama Administration, recently observed that "regulation prohibits real innovation," see, e.g., L. Cunningham, *Google's Eric Schmidt Expounds on his Senate Testimony*, WASHINGTON POST (Oct. 1, 2011) (available at http://www.washingtonpost.com/national/on-leadership/googles-eric-schmidt-expounds-on-his-senate-testimony/2011/09/30/gIQAPyVgCL_print.html) and the late Steve Jobs of Apple warned of "excessive federal regulations and operating costs for businesses as harmful legacies of the Obama White House." R.R. Hartman, *Steve Jobs Predicted Obama would be a One-Term President*, THE TICKET (Oct. 21, 2011) (available at: <http://news.yahoo.com/blogs/ticket/steve-jobs-predicted-obama-one-term-president-144644675.html>).

¹⁷ B. Obama, *Toward a 21st-Century Regulatory System*, WALL STREET JOURNAL (January 18, 2011) (available at: <http://online.wsj.com/article/SB10001424052748703396604576088272112103698.html>).

¹⁸ B. Feller, *Obama Takes More Steps on Own to Help Businesses*, THE ASSOCIATED PRESS (October 28, 2011) (available at: <http://www.google.com/hostednews/ap/article/ALeqM5huov2C6G1i-qoF1rEedh11jffmVw?docId=42d5880e2cb644439401f31748793768>).

¹⁹ D. Jacobs, *Government Regulations at Top of Small-Business Owners' Problem List*, GALLUP.COM (October 24, 2011) (available at: <http://www.gallup.com/poll/150287/gov-regulations-top-small-business-owners-problem-list.aspx>).

²⁰ A. Mountford and H. Uhlig, *What are the Effects of Fiscal Policy Shocks?*, 24 JOURNAL OF APPLIED ECONOMETRICS 960-992 (2009); R. Barro and C. Redlick, *Macroeconomic Effects from Government Purchases and Taxes*, Unpublished Working Paper (2010) (available at: http://www.economics.harvard.edu/faculty/barro/files/Barro%2BRedlick%2Bpaper%2B2_2.pdf); O. Blanchard

(Footnote Continued...)

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remain divided on this important question. In some models, increases in government spending (shocks) raise GDP and improve labor conditions (by, for example, increasing hours worked and/or the real wage).²¹ Other approaches, however, find the consequences of government spending to be less favorable, particularly when the spending is financed by government deficits. There does seem to be agreement on one important issue, however: real world macroeconomic data often does not conform very well to established economic models of the macroeconomy.

Recent time series econometric research focuses on how the effects of various stimuli may differ under disparate economic conditions.²² Following this line of research, we will investigate here the effects of total government spending on final goods and services (i.e., consumption and investment only by state, local and federal governments) and private-sector investment, on the number of private-sector jobs. Using quarterly data on these variables over the years 1960 through mid-year 2011, we use a grid search method to divide the sample observations into two states: (1) low growth and (2) high growth. Thus, whether any given observation is regarded as arising during a high growth or low growth regime is endogenous. We then estimate the short-run response of private-sector employment growth to changes in government spending growth and private-sector investment growth. Using this two-regime

and R. Perotti, *An Empirical Characterization of the Dynamic Effects of Changes in Government Spending and Taxes on Output*, 117 QUARTERLY JOURNAL OF ECONOMICS 1329-1368 (2002); V. Ramey, *Identifying Government Spending Shocks: It's All in the Timing*, NBER WORKING PAPER NO. 15464 (2010) (available at: <http://www.nber.org/papers/w15464>); A. Fatas and Ilian Mihov, *The Effects of Fiscal Policy on Consumption and Employment: Theory and Evidence*, Working Paper (2001) (available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=267281); C. Burnside, M. Eichenbaum, J. Fisher, *Assessing the Effects of Fiscal Shocks*, FEDERAL RESERVE BANK OF CHICAGO, WORKING PAPER WP-99-18 (1999) (available at: http://www.chicagofed.org/digital_assets/publications/working_papers/1999/wp99_18.pdf); J. Rotemberg and M. Woodford, *Oligopolistic Pricing and the Effects of Aggregate Demand on Economic Activity*, 100 JOURNAL OF POLITICAL ECONOMY 1153-1207 (1992); R. Perotti, *Estimating the Effects of Fiscal Policy in OECD Countries*, PROCEEDINGS, Federal Reserve Bank of San Francisco (2005); R. Clarida, J. Galí, and M. Gertler, *Monetary Policy Rules and Macroeconomic Stability: Evidence and Some Theory*, 115 QUARTERLY JOURNAL OF ECONOMICS 147-180 (2000); W. Edelberg, M. Eichenbaum, and J. Fisher, *Understanding the Effects of a Shock to Government Purchases*, NBER WORKING PAPER NO. 6737 (1998); C. Burnside, M. Eichenbaum and J. Fisher, *Fiscal Shocks and their Consequences*, 115 JOURNAL OF ECONOMIC THEORY 89-117 (2004); M. Cavallo, *Government Employment Expenditure and the Effects of Fiscal Policy Shocks*, FEDERAL RESERVE BANK OF SAN FRANCISCO WORKING PAPER 2005-16 (2005).

²¹ In studies that do consider employment effects, most consider total employment, whereas we focus our attention on private-sector employment. See Ramey (2011), *supra* n. 12, for an analysis on both types of jobs.

²² J. Galbraith, *Credit Rationing and Threshold Effects in the Relation Between Money and Output*, 11 JOURNAL OF APPLIED ECONOMETRICS 419-29 (1996); C. Shen and D. Hakes, *Monetary Policy as a Decision-Making Hierarchy: The Case of Taiwan*, 17 JOURNAL OF MACROECONOMICS 357-68 (1995); A. Afonso, J. Baxa, and M. Slavik, *Fiscal Developments and Financial Stress: A Threshold VAR Analysis*, EUROPEAN CENTRAL BANK, WORKING PAPER NO. 1329 (2011) (available at: <http://www.ecb.int/pub/pdf/scpwps/ecbwp1319.pdf>).

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threshold model, we can examine whether these effects differ between the low- and high-growth regimes. Such differences, if they exist, are relevant for evaluating the proper response of government to economic conditions.

A. Data

Time series data covering the period 1960 through the second quarter of 2011 is collected on (real) GDP, private-sector employment, private-sector investment, and government consumption and investment.²³ All estimates are based on growth rates computed for each series which we label *GDP*, *JOBS*, *INV*, and *GOV*. Augmented Dickey Fuller tests indicate that all four series are I(1). Keynesian theories suggesting an important role for government spending traditionally assume there are unproductive resources in the economy, so we also implement augmented regression analysis controlling for the “slack” of the economy using two measures of unemployment gaps, two measures of output gaps, and a capacity utilization rate (the latter of which is available only since 1967).²⁴ We obtain quite robust results.

B. The Linear Model

We first consider the “average” influence of investment and spending on private-sector employment over the sample period. The linear regression model is,

$$JOBS_t = \alpha + \beta_K INV_t + \beta_G GOV_t + \varepsilon_t \quad (1)$$

where, as noted above, $JOBS_t$ is the private-sector job growth rate, INV_t is the private-sector real investment growth rate, and GOV_t denotes the real government consumption and investment spending growth rate. Conventional *linear* least squares estimates are reported in Table 1.²⁵ The coefficient on the private investment growth ($\beta_K = 0.086$) is positive and statistically significant at the 1% level ($t = 10.88$). The coefficient on the government expenditure growth ($\beta_G = 0.070$) is positive and statistically significant but only at the 10% level ($t = 1.91$).

It is possible to compute a simple jobs multiplier using the estimates from Equation (1). A \$1 million increase in private investment is associated with an increase of 5.3 private-sector jobs, whereas a \$1 million increase in government spending is associated with 3.0 private-sector jobs. On average, then, private investment appears to have a stronger effect on private-sector

²³ All data is publicly available at: <http://research.stlouisfed.org/fred2>. The series are: GCEC1, GDPC96, GPDIC96, and USPRIV.

²⁴ All data is publicly available at: <http://research.stlouisfed.org/fred2>. The series are: GDPPOT, NROU, UNRATE, and TCU.

²⁵ Detailed results are available upon request.

employment than does government spending. Thus, if private-sector employment is the goal of government policy, such policy should focus primarily on private-sector investment. It could be, however, that these results from the simple linear model are misleading, and we explain why in the next section.

C. Two-Regime Threshold Model

Equation (1) assumes that the relationship between the spending measures and jobs is unrelated to the overall state of the economy. This assumption need not be true. In fact, it appears fairly implausible. To test this assumption, we assume instead that the coefficients in Equation (1) are state-dependent, where the current state of the economy is characterized by the real GDP growth rate. That is,

$$\text{High Growth Regime } (GDP_t > \tau): JOB_t = \alpha^H + \beta_K^H INV_t + \beta_G^H GOV_t + \varepsilon_t, \quad (2)$$

$$\text{Low Growth Regime } (GDP_t < \tau): JOB_t = \alpha^L + \beta_K^L INV_t + \beta_G^L GOV_t + \varepsilon_t, \quad (3)$$

where GDP_t denotes the real GDP growth rate and τ is an unknown threshold growth rate.²⁶ The value of τ can be estimated by a grid search method. For estimations, we use the following regression equation:

$$JOB_t = I[GDP_t < \tau]\{\alpha^L + \beta_K^L INV_t + \beta_G^L GOV_t\} + I[GDP_t \geq \tau]\{\alpha^H + \beta_K^H INV_t + \beta_G^H GOV_t\} + \varepsilon_t, \quad (4)$$

where $I[\cdot]$ is an indicator function that assumes a value of 1 when the event described in the bracket is true, and has value 0 otherwise. Because τ is not directly observable, we estimate it using a grid-search method that minimizes the sum of squared residuals over the support $[GDP_{0.15}, GDP_{0.85}]$, where GDP_p is the p^{th} percentile of the historical values of the real growth rate.²⁷ Using this approach, the estimated threshold growth rate is 1.934, so we assume that the economy is in the low growth regime when $GDP_t < 1.934\%$, while in the high growth regime otherwise.²⁸ About 25% of the historical data is assigned to the low growth regime. Scatter plots of the data with a regression line are provided in Appendix B.

²⁶ We use percent changes of the real GDP from previous year.

²⁷ W. Enders, *APPLIED ECONOMETRICS TIME SERIES* (2010) at pp. 444-451.

²⁸ There are 11 episodes of low growth, with eight of these episodes nearly coincident with the eight official recessions over this period. For recession dates, see <http://www.nber.org/cycles.html>.

Table 1. Summary of Estimates

	Linear	Low Growth	High Growth
α	0.311 (7.43)**	-0.209 (-3.01)**	0.568 (14.38)**
β_K	0.086 (10.88)**	0.079 (8.43)**	0.042 (4.71)**
β_G	0.069 (1.91)*	-0.001 (-0.01)	0.072 (2.41)**
<i>Implied Jobs Multipliers (Private-sector jobs per \$1 million)</i>			
Private Investment	5.3	4.8	2.6
Government Spending	3.0	0.0	3.1
<small>Statistically different from zero (**, 5%) (*, 10%)</small>			

We point to the following results as informative. First, the coefficient on government spending is negligible and statistically insignificant at any conventional level in the low growth regime ($\beta_G^L = -0.001$, $t = -0.01$). When the economy is in the high growth regime, the coefficient on government spending is positive and statistically significant ($\beta_G^H = 0.072$, $t = 2.41$). This implies that the linear model of Equation (1) may be misleading because the positive coefficient estimate for government expenditure obtained from Equation (1) is mainly due to its effects in the high growth regime, since there is no discernible effect of government spending in the low growth periods. More significantly, this result implies that expanding government spending during economic downturns (i.e., recessions) may not help in creating private-sector jobs.

Second, we note that the coefficient on private investment growth is much higher in the low growth regime ($\beta_K^L = 0.079$, $t = 8.43$) than in the high growth regime ($\beta_K^H = 0.042$, $t = 4.71$). It should be also noted that the private investment growth is negative more often in the low growth regime (see Appendix A for estimated kernel density functions), which means that a higher coefficient (elasticity) implies greater job losses in the low growth regime. However, this also implies that policies that help recover investor sentiments (e.g., tax incentive for investment) may help create private-sector jobs substantially.

Using these estimates, we can again compute the implied employment multipliers. In the low growth regime, each \$1 million in private investment creates 4.8 private-sector jobs. However, spending by the government creates no jobs (the multiplier is essentially zero).²⁹ In

²⁹ The point estimate of the multiplier is -0.04.

the high growth regime, the multiplier for private investment is 2.6 jobs per million in spending, and the multiplier for government spending is 3.1.³⁰

In Table 2, we summarize the employment effects of a hypothetical 5% increase in private investment (about \$90 billion in 2005 dollars) and the equivalent dollar increase in government spending.³¹ Based on the computed multipliers, an additional 432,000 jobs would accompany this 5% increase in private investment during the low-growth period. In contrast, an equivalent \$90 billion increase in spending by the government would produce no net jobs in the low-growth period. In the high-growth periods, the \$90 billion in government spending or private investment both would generate over 200,000 jobs. We note the significant increase in the potency of private investment in the low-growth regime relative to the high-growth regime. This differential effect is informally consistent with the idea that periods of higher growth are coincident with higher levels of resource utilization, so increases in demands may involve displacement and price rises to a greater degree. Other explanations are also possible.

\$90 Billion Increase in ...	Job Creation based on Estimated Multipliers		
	Low Growth Regime	High Growth Regime	Linear Model
Private Investment	432,000	207,000	477,000
Government Spending	0	279,000	270,000

The results from this two-regime non-linear model should be considered by policymakers. First, government spending does not appear to be an effective stimulant for private-sector job creation during periods of slow economic growth. As such, it does not appear possible for the federal government to spend the U.S. out of high private-sector unemployment. Second, private investment has a positive effect on job creation during low and high growth regimes, but the jobs effect is more potent effect during periods of low growth. Based on the historical data, *stimulating private investment appears to be the key to labor market recovery in the current economic environment.*

³⁰ We cannot reject the equality of the two multipliers in the high-growth regime ($\chi^2 = 1.3$, prob = 0.24). In the low-growth regime, the inaccuracy of the estimate of the coefficient on government spending precludes meaningful testing of the equality of the multipliers (the 90% confidence interval on the government multiplier in the low-growth regimes is approximately -7 to 7).

³¹ The mean of private investment is approximately equal across the low- and high-growth regimes, though the distributions are different (see Appendix A).

It is not the purpose of this study to explain why government spending has these strikingly differential effects between regimes. The finding that increases in such spending are ineffective in triggering private-sector hiring during downturns is not consistent with naïve applications of Keynesian policy reasoning. However, it seems likely that the sentiments of business people—those who do private hiring—probably play an important role. Increases in government spending, if they are regarded as transitory political acts, may fail to encourage private employers to expand their payrolls given the going-forward costs of such steps. Yet, it is perhaps much more probable that these spending increases are both transitory and political during low-growth periods.³² The irony implied by this conjecture is apparent: when one might most wish government action to be effective, the conditions for it to be so are lacking.

D. Robustness

Even in the naïve Keynesian tradition, the role of government stimulus during expansionary periods is minimal. Indeed, increased government spending during periods of full employment results in higher inflationary pressure, which is not desirable. It is when the economy slows down, so that there are unemployed resources in the economy, that Keynesian theories recommend expanded government spending to offset shortfalls in private demand. We can attempt to incorporate the role of such unused resources by including additional regressors in the model that measure such “slack.” We consider five measures of slack as described below. Our modified linear model is,

$$JOB_t = \alpha + \beta_K INV_t + \beta_G GOV_t + \beta_S S_t + \varepsilon_t, \quad (5)$$

where S_t measures “slack.” The modification of the model based on Equation (4) is made for the two-regime case.

For S_t , we consider two measures of the unemployment gap, two measures of the output gap, and the capacity utilization rate. Specifically, we use (i) 5-year backward moving average unemployment rate minus the current unemployment rate (U-Gap 1); (ii) the natural rate of unemployment from Congressional Budget Office estimates, minus the current unemployment rate (U-Gap 2); (iii) the current log of real GDP, minus the current potential real GDP from Congressional Budget Office estimates (Y-Gap 1); (iv) the quadratically-detrended log of real

³² See, e.g., M. Bandyk, *Finding the Pork in the Obama Stimulus Bill*, U.S. NEW & WORLD REPORT (February 19, 2009) (available at: <http://money.usnews.com/money/business-economy/articles/2009/02/19/finding-the-pork-in-the-obama-stimulus-bill>); *Bacon Hunt: Stimulus Bill Contains Many Items That May Not Boost Economy*, FOXNEWS.COM (February 12, 2009) (available at: <http://www.foxnews.com/politics/2009/02/12/bacon-hunt-stimulus-contains-items-boost-economy/#ixzz1cH7TV3hk>); D. Eggen and E. Nakashima, *Despite Pledges, Stimulus Has Some Pork*, WASHINGTON POST (February 13, 2009) (available at: <http://www.washingtonpost.com/wp-dyn/content/article/2009/02/12/AR2009021203502.html>).

GDP (Y-Gap 2); and (v) the log of the capacity utilization rate for the total industry (Cap Util).³³ Positive values for the measures of S_t indicate that the economy is “above the trend.”

Table 3. Summary of Coefficient Estimates with Slack Variables

Slack Variable		U-Gap 1	U-Gap 2	Y-Gap 1	Y-Gap 2	Cap Util
<i>Linear</i>						
α	0.311**	0.380**	0.376**	0.410**	0.319**	-5.55**
β_K	0.086**	0.079**	0.085**	0.077**	0.084**	0.081**
β_G	0.069*	0.011	0.051	0.022	0.057	0.056
β_S	...	0.233**	0.14**	0.094**	0.048**	0.073**
<i>Low Growth</i>						
α	-0.209**	0.187**	-0.081	-0.011	-0.156**	-4.248**
β_K	0.079**	0.071**	0.077**	0.074**	0.077**	0.074**
β_G	-0.001	-0.081	0.002	-0.035	-0.019	0.023
β_S	...	0.232**	0.100**	0.065**	0.030*	0.052**
<i>High Growth</i>						
α	0.568**	0.609**	0.568**	0.571**	0.559**	-2.808**
β_K	0.042**	0.037**	0.045**	0.044**	0.043**	0.049**
β_G	0.072**	0.062**	0.066**	0.058**	0.069**	0.065*
β_S	...	0.065**	0.044*	0.029**	0.014	0.041**

Statistically different from zero (**, 5%) (*, 10%)

As shown in Table 3, all slack variables are significant and have “correct” (positive) signs. Yet, our primary findings are not affected by adding the slack variables to the regression model. Despite the additional regressors, we obtain very similar threshold estimates from all models we consider. Our results thus appear quite robust to model specification. We do note that the addition of slack variables tends to increase the standard error of the coefficient on government spending in the linear model; the role of government spending becomes insignificant even at the 10% level in linear models. The impact of government spending appears to be important only when the economy is in the high-growth regime; it has no role in the low-growth regime and no effect “on average” over time. While there is a positive effect in the expansionary periods, Keynesian economics indicates that government stimulus during periods of full employment can be problematic and inflationary.³⁴

³³ J. Boivin, *Has US Monetary Policy Changed? Evidence from Drifting Coefficients and Real Time Data*, 38 JOURNAL OF MONEY, CREDIT, AND BANKING 1149-1173 (2006); H. Kim and M. Ogaki, *Purchasing Power Parity and the Taylor Rule*, AUBURN ECONOMICS WORKING PAPER NO. 2011-02 (2011) (available at: <http://ideas.repec.org/p/osu/osuewp/09-03.html>); Clarida, *et al.*, *supra* n. 20. Data on capacity utilization is only available from 1967.

³⁴ See, e.g., R. Carbaugh, CONTEMPORARY ECONOMICS (2006), Ch. 13.

III. Conclusion

When the Obama Administration passed the \$800 billion stimulus package at the height of the financial crisis in 2008, many people thought that such intervention was necessary because the private-sector looked so weak. Indeed, as the FINANCIAL TIMES reported, President Nixon's famous (mis)quotation that "We are all Keynesians now"³⁵ rings "truer today than at any time since, as governments seize on John Maynard Keynes's idea that fiscal stimulus ... can help dig their economies out of recession."³⁶ Some, like Princeton Professor and Nobel Prize winner Paul Krugman, argued that \$800 billion was insufficient and that far more government spending was required.³⁷

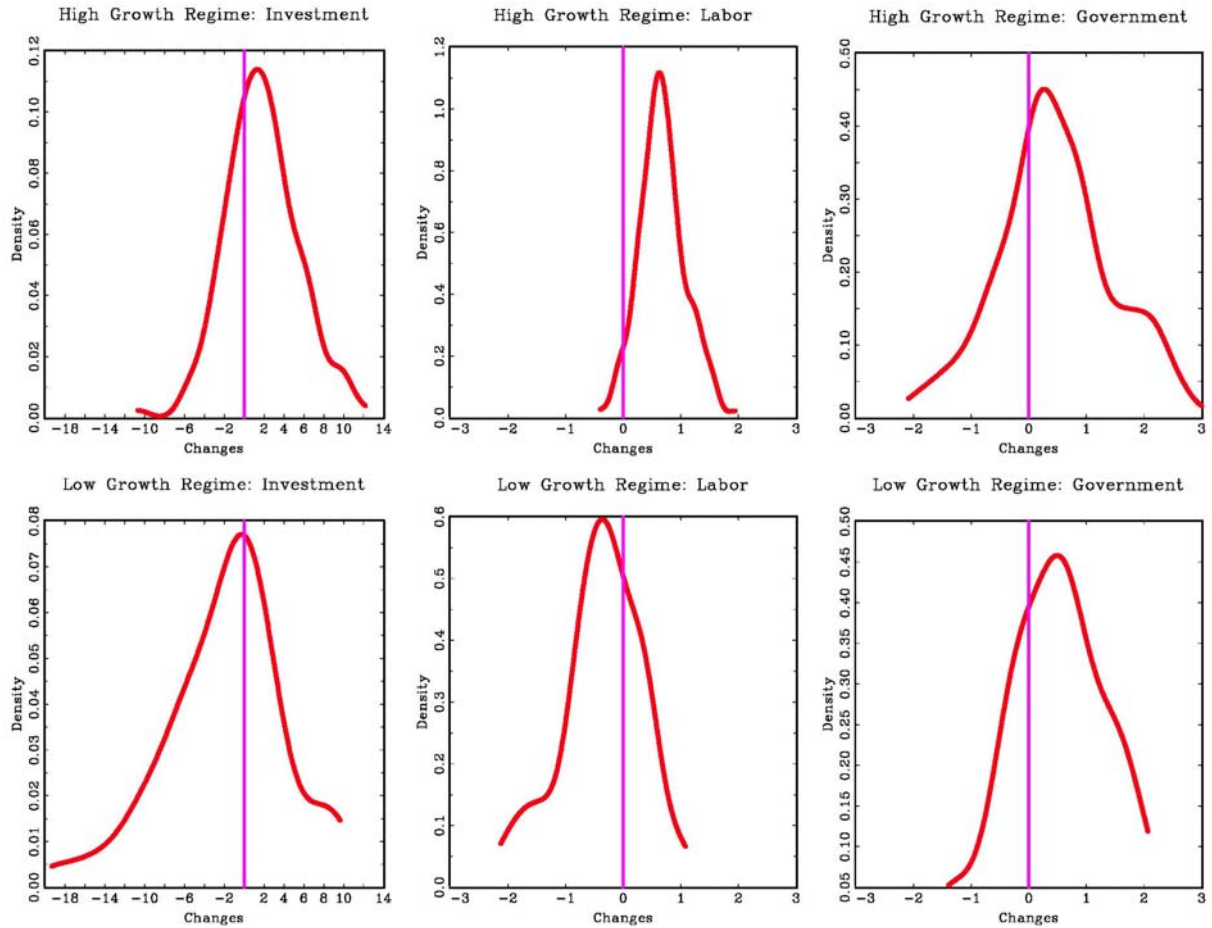
We are now several years on, and many economists and policymakers are beginning to doubt the ability of government spending and monetary policy to effectively correct our current employment problems. Lacking any exact counterfactual, assessing the effectiveness of the spending so far is difficult. It is discouraging that, after so much economic research, our understanding of the dynamics of the macroeconomy remains so limited. Be that as it may, in this BULLETIN we have attempted to look at the link between federal spending initiatives and private employment, allowing for the possibility that this link depends on the state of the macroeconomy. Our findings are discouraging, but perhaps not surprising to those who have begun to doubt our current course. Government spending appears likely to help when help is not needed. Less surprising is the finding that private investment is "always" effective, but its increased effectiveness during low-growth periods is a new result of significant policy relevance. These findings suggest, if only informally, that the expectations of private employers play a vital role, although our analysis is not designed to parse this issue. More research on this important issue is, as always, encouraged. Accordingly, we suggest that the United States consider a change of economic policy course: Regulatory relief, combined with policies that reduce the costs, and raise the returns, to domestic private investment, should be given a serious try, at least before any more additional deficit-funded "stimulus" is authorized.

³⁵ *We Are All Keynesians Now*, TIME (December 31, 1965) (available at: <http://www.time.com/time/magazine/article/0,9171,842353,00.html>).

³⁶ C. Giles and K. Guha, *The Undeniable Shift to Keynes*, FINANCIAL TIMES (December 29 2008) (available at: <http://www.ft.com/intl/cms/s/0/8a3d8122-d5da-11dd-a9cc-000077b07658.html#axzz1bzzg60Csh>).

³⁷ Krugman, *supra* n. 7.

Appendix A. Kernel Density Estimates



Appendix B. Scatter Plot Diagrams

