

UNCLE SAM BLEEDS RED: HOW GOVERNMENT BUDGET DEFICITS  
AFFECT THE MACROECONOMY

by

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AFFECT THE MACROECONOMY

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## ABSTRACT

There is, perhaps, no greater point of contention among macroeconomists than the topic of government budget deficits – are they harmful, helpful, or does the answer depend on the conditions of the economy at the time of the deficit? Additionally, political attitudes toward fiscal policy oscillate frequently, from “deficits don’t matter,” to “deficits will bankrupt our children.” This paper investigates the assumptions underpinning both views, finding that, at least in a country with the sole authority to create its own currency (like the United States), deficits often have positive economic outcomes, leading to higher employment, GDP, and standards of living.

## **I. Hello, Nation: An Introduction**

There is an article famous among economists for its lack. In 2013, Stephen Colbert interviewed Thomas Herndon, a graduate student from the University of Massachusetts, on *The Colbert Report*. Graduate students rarely capture the attention of popular culture, but Herndon gained (however temporary) acclaim for exposing an egregious error in the data set of Harvard economists Carmen Reinhart and Kenneth Rogoff (Reinhart & Rogoff 2010). Reinhart and Rogoff's article, "Growth in a Time of Debt", argued that a country with a ninety percent national debt-to-GDP ratio was in danger of stifling economic growth and could even enter the previously uncharted territory of a permanent recession – where a shrinking economy is the norm, not the exception. In the interview<sup>1</sup>, Herndon explained how Reinhart and Rogoff's error was a function of an incomplete data set housed on a spreadsheet riddled with errors, which ultimately led the authors to draw inaccurate conclusions concerning the relationship between the national debt, government budget deficits, and economic growth.

Herndon's discovery of Reinhart and Rogoff's series of mistakes would have never emerged into the cultural mainstream if it weren't for the American politicians who were basing policy recommendations on Reinhart and Rogoff's flawed article. A who's who of Republicans – Paul Ryan, then chair of the House Ways and Means Committee, chief among them – used Reinhart and Rogoff's research to make arguments for budget cuts during the 2011 budget cycle.<sup>2</sup>

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<sup>1</sup> <http://www.cc.com/video-clips/dcyvro/the-colbert-report-austerity-s-spreadsheet-error>

<sup>2</sup> <http://documents.latimes.com/rep-paul-ryans-path-prosperity-2013/>

This is not to say that concerns about the national debt, last recorded at an eye-popping 21.3 trillion dollars, are baseless. Some fear that the United States will end up like Greece – mired in austerity, foreign creditors breathing down Uncle Sam’s neck, et cetera. They view our large national debt as tantamount to a tax on future Americans; one day our accumulation of debt will hit the metaphorical fan, resulting in high interest rates, high taxes, low spending, and an altogether weak economy for our children and our children’s children.<sup>3</sup> Of course, this is not the only view.

Ultimately, there is no debt without deficits. This paper will focus mostly on the latter and ask whether government budget deficits are a net boon or drag on the economy. Do they, for example, raise interest rates and slow down the economy, or are they an injection of cash that boosts employment and creates wealth? While the consequences of a large national debt are long-run and mostly theoretical concerns, deficits have an immediate and observable effect on the macroeconomy<sup>4</sup>.

This exercise is not merely academic, as the government accounts for thirty-eight percent of total spending in the economy. A thorough understanding of the relationship between the government’s budget and the health of the economy is paramount, as it can allow policymakers to find an optimal level of government spending, one which encourages the maximum amount of economic growth. This translates to more jobs and larger paychecks for ordinary workers, which then has positive social and economic spillover effects.

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<sup>3</sup> For arguments of this ilk, see the frightening and somewhat dogmatic *Full Faith and Credit: The National Debt, Taxes, Spending, and the Bankrupting of America* by Alan Axelrod.

<sup>4</sup> Though it’s a pretty flippant attitude, John Maynard Keynes said, “In the long run, we’re all dead.” While he’s technically correct, there are other considerations when crafting economic policy. Barring an apocalypse, societies and economies will continue on, even if they look drastically different from ours.

The paper proceeds as follows: Section 2 is an interlude written primarily for noneconomists in order to introduce such concepts as the components of GDP, what generates economic growth, and how economic growth is financed. Section 3 introduces and explains the Loanable Funds model and Keynes' Z-D diagram, which are then combined into a hybrid macroeconomic model. Section 4 uses the hybrid model to explain how government deficits affect economic growth. Section 5 discusses the cogency of some of the assumptions underlying the model, and Section 6 concludes the paper.

## **II. The Economy under a Microscope: Background Issues**

If we are to determine the impact of government deficit spending, then we need a way to measure the state of the economy. Economists typically use Gross Domestic Product (GDP), which is the total dollar value of all newly produced goods and services in the economy over a given period.<sup>5</sup> When newspapers report that the economy grew, for example, 2.3 percent this quarter, the measurement they are referring to is GDP. As a rule, GDP growth is highly correlated with the level of employment in the economy; if unemployment is high, GDP growth is low, and vice versa. This is crucial when thinking of policy recommendations, as it suggests that the means by which we can raise employment is by boosting GDP.

GDP can be split into four different types of spending: *Consumption* (spending on consumer goods), *Investment* (business purchases to expand the capital stock), *Government Purchases* (government spending excluding transfer payments like Social Security and

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<sup>5</sup> It is important to note that GDP measures the final expenditure for a good/service, which avoids double or triplecounting the value of a good. For example, when I buy a pen at the store, GDP only records the act of me purchasing the pen. While this final measurement, the price, takes into account the underlying value of the ink and plastic required to make the pen and the labor to assemble it, the sale of plastic to the pen maker is not its own separate addition to GDP.

Medicare), and *Net Exports* (total value of imports minus the total value of exports). As Net Exports is such a small part of U.S. GDP (approximately 3%), for simplicity I will ignore it. Meanwhile, though Government Purchases will take center stage later, for now I will focus solely on the private sector, discussing the roles of Consumption and Investment in the macroeconomy.

Beginning with the former, it is, unsurprisingly, heavily influenced by income. When incomes rise, Consumption rises. Ergo, to analyze the role of Consumption in the macroeconomy, we need a measure of income. Fortunately, we already have one: GDP. Because GDP is total spending in the entire macroeconomy, it is also total income. In a closed system, income must equal spending because every individual transaction creates both an expenditure (for one party) and income (for the other). However, the dollar does not stop there. The party that received income from the previous transaction then goes on and spends a portion of that income, creating income for an additional party, who then spends part of that income, and so on. This self-perpetuating cycle is called the “income multiplier.”

Does Consumption or Income play the dominant role in this cycle? It has been shown both theoretically and empirically (Hall & Mishkin 1982, Carroll 2001, Crossley & Low 2014) that Income is in the driver’s seat, and Consumption follows. This is so because consumption patterns remain relatively stable over time. We rarely observe a fluctuation in GDP that centers around a change in household Consumption. However, changes in Consumption resulting from changes in GDP are common. That begs the question: what causes changes in Income? The answer, in our simplified model, is Investment.

When economists use the word Investment, they mean a purchase that expands the *physical* capital stock. If a business buys a new machine to help it make sneakers more

efficiently, this is Investment. If an entrepreneur decides to build a miniature golf course & arcade parlor, this is Investment. Continuing, for now, to exclude Government Purchases, this leaves Investment as the key driver of GDP (which measures Income), and therefore of Consumption.

Unsurprisingly, Investment is heavily influenced by entrepreneurs' expectations. When businesses see an opportunity to make a profit by expanding current operations, they are spurred to take a risk and invest. However, the opportunity to earn profits is not the only factor they consider. Since investment is expensive and most entrepreneurs are not independently wealthy – and even if they are, they are generally wary of draining their savings account in one fell swoop – they go to the bank and ask for a business loan. The cost of financing and the availability of credit are therefore paramount. This will turn out to be a critical consideration in discussing the impact of government deficits on economic growth.

In sum, economists use GDP as a tool to measure the income of a nation. It can be split into its components: Consumption, Investment, Government Purchases, and Net Exports. When GDP is increasing, the economy is in expansion; when it decreases, the economy is in recession. Changes in GDP are primarily due to fluctuations in the Investment variable, which itself is heavily influenced by the expectations of entrepreneurs and the ease with which they can obtain financing.

### **III. Let's Have Some Funds: Analytical Tools**

As hinted previously, concerns regarding deficit spending center around this allimportant variable: Investment. Roughly speaking, the core issue is whether government deficits replace or complement private Investment. To analyze the role of budget deficits on Investment,

I will build a hybrid model consisting of the Loanable Funds model – which explains Investment & Savings – and John Maynard Keynes’s Z-D diagram, which explains employment. I chose these models because the two are drawn from approaches which fundamentally disagree on the question at hand, and it also serves as an attempt to avoid biasing analysis towards one school of thought or the other. Once combined, they offer a useful perspective regarding the sequencing of our relevant variables – from Investment to GDP to employment.

First, the Loanable Funds model assumes:

1. Only households earn income, and they are willing to save a portion of that income if they are rewarded with interest.
2. Only firms borrow money (i.e., take out a loan from the bank), which they use to finance Investment.
3. The financial sector pays interest (abbreviated as  $r$ ) on household savings and earns interest on firms’ borrowing to invest.
4. Saving is a positive function of the interest rate:  $S = f(r) +$ .
5. Investment is a negative function of the interest rate:  $I = f(r) -$ .

Assumptions 4 & 5 are demonstrated using Figure 3.1. The positively sloped line,  $S$ , shows that as more interest is paid, so the quantity of savings will rise as households substitute current spending (i.e., Consumption) for future spending (Savings). The Investment curve,  $I$ , is negatively sloped since the total volume of Investment falls as firms find it necessary to pay more for borrowed funds. Note that at every point on the graph except  $r_0$ , the volume of Savings on which banks are paying interest is not equal to the volume of borrowed funds from which banks are receiving interest. Above  $r_0$ , banks have unused funds sitting in the vault which cost them more than they earn, so banks lower  $r$ . Below  $r_0$ , banks have a greater demand for borrowed

funds than they can satisfy, so they raise  $r$  to encourage additional Savings. Only at  $r_0$ , equilibrium, are all parties satisfied.

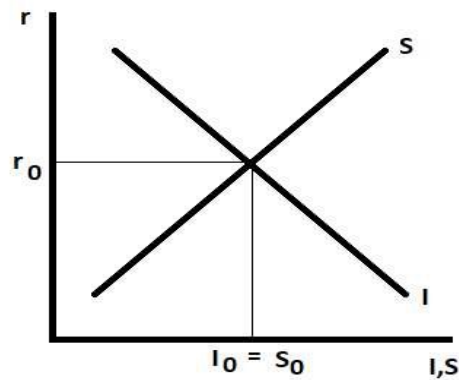


Figure 3.1: Basic Loanable Funds model.

If the system is knocked off of equilibrium, it will adjust and reach a new point. For example, if a popular doomsday prepper releases a viral video explaining why nobody should keep their savings in banks, then the supply of Savings will decrease, as demonstrated below by a leftward shift in the Savings curve to  $S_1$ . Without an adjustment, banks will have greater demand for Investment funds than they will have Savings to satiate that demand, so a higher interest rate,  $r_1$ , is required for people to ignore the hypothetically popular doomsday prepper and instead choose to keep their savings in bank accounts. The higher interest rate,  $r_1$ , restores the system to equilibrium, where Savings equals Investment.

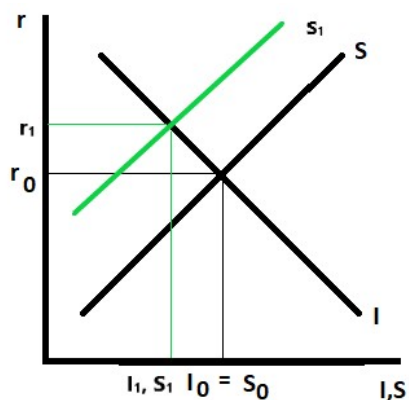


Figure 3.2: Loanable Funds with decrease in Savings.

Likewise, if there is a change in demand for Investment – say every citizen wants to channel their inner Martha Stewart or Guy Fieri and open a restaurant – then the I curve would shift outward to  $I_1$ , as shown in Figure 3.3. Banks would therefore have a greater demand for Investment funds than they would have in Savings to accommodate, so banks would raise interest rates to  $r_1$  to encourage people to save more, restoring equilibrium. Note that while both examples had the effect of raising the interest rate, the process can go in reverse (i.e., a giant increase in Savings leads to a lower interest rate, or a collapse in Investment leads to lower interest rates, and so on).

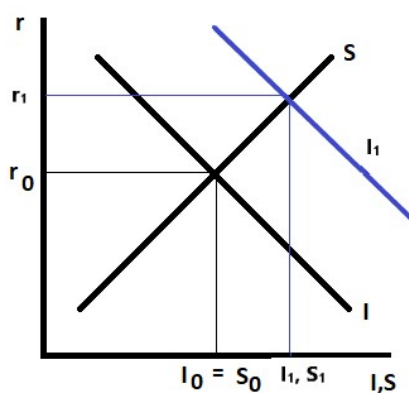


Figure 3.3: Loanable Funds with an increase in Investment demand.

While the Loanable Funds model shows how Investment is determined, it does not explain how Investment affects GDP and employment. This is where Keynes's Z-D diagram, Figure 3.4, is useful. The horizontal axis,  $N$ , measures the number of employed persons in the economy. For simplicity, Keynes assumed that all workers receive the same wage, so  $N$  measures both employment and worker income. The vertical axis,  $P_Y$ , measures the total nominal level of sales (i.e., GDP) for a particular level of employment. The Z curve indicates the number of workers firms would hire at an *expected* level of sales, so if firms expected to sell  $P_{Y0}$ , they

would hire  $N_0$  workers. The D curve indicates the *actual* sales level,  $P_Y$ , generated by a particular number of workers. At a level of  $N_0$  employed persons, they would yield  $P_{Y0}$  sales.

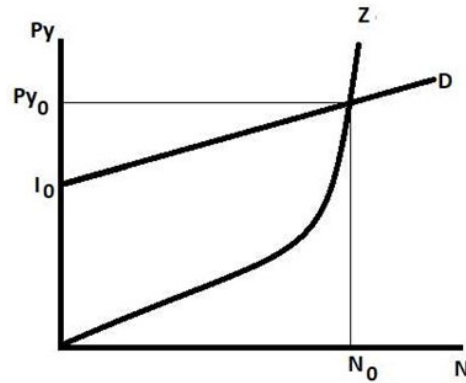


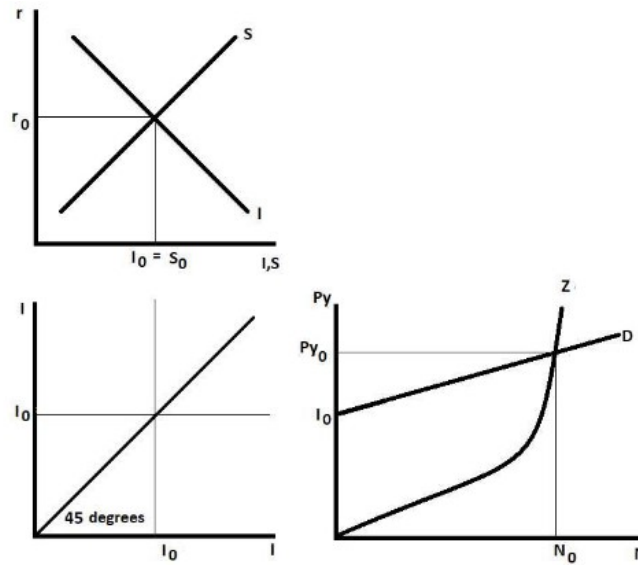
Figure 3.4: Keynes' Z-D diagram for the macroeconomy.

If the economy is to the left of  $N_0$ , then we observe firms facing more demand than they expected for the number of workers they hired because D would lie above Z. Firms will be pleasantly surprised by the sales generated and – seeking to maximize sales – will hire more workers, moving to the right along the N-axis. However, if the economy is to the right of  $N_0$ , then firms are disappointed by the sales generated with their comparatively large workforce and will fire workers, moving to the left along the N-axis. The equilibrium point is where the Z and D curves intersect, or where expected and actual sales are the same value,  $P_{Y0}$ , with  $N_0$  workers.

While business sales expectations – as modeled by the Z curve – are important, firms are typically not too far off from their estimates, and even if they are, they can adjust employment relatively quickly. The D curve, however, is more critical, as actual sales can change quickly and dramatically. The D curve is total demand for both Consumption and Investment goods, modeled by the equation,  $D = C + I$ . It is a positively sloped line because, as more workers are hired, Consumption rises.

The D curve has a positive vertical intercept,  $I_0$ , because it represents Investment, which is determined by factors other than  $N$ . Indeed, at the top of the business cycle – when  $N$  is highest – Investment tends to fall (Harvey 2014). As stated earlier, consumption behavior tends to be fairly stable and predictable, meaning that the slope of D is unlikely to change much. However, Investment is the most volatile component of total spending, such that D may shift up and down significantly, thereby causing large swings in employment. Note that the point of full employment – where everyone who wants a job has one – may be at the intersection of Z & D but is likely somewhere to the right. The intersection of Z & D simply shows a level of “equilibrium” employment, not necessarily the level desired by willing workers. Keynes’ Z-D diagram makes no assumption that there is an automatic tendency towards full employment.

It is possible to combine the insight of these two models, especially since they both have Investment on one axis. If we draw a 45-degree line that transposes the value of Investment from the Loanable Funds model and places it on the Z-D diagram, then we can manipulate both models together. This is accomplished with Figure 3.5. We start with the Loanable Funds graph, find the equilibrium Investment value,  $I_0$ , then drop down to our scaling 45-degree line, follow the value horizontally to Keynes’s Z-D diagram, and plot our  $I_0$  on the  $P_Y$  axis. The  $I_0$  that was determined on the Loanable Funds graph now appears on the Z-D diagram, giving us a model of the macroeconomy that includes the impact of the financial sector, relating Investment to total spending.



*Figure 3.5: Our hybrid macroeconomic model.*

In our hybrid model, the action starts in the top left quadrant with the Loanable Funds model. For example, if a really popular mommy blog started extolling the virtues of saving, then people would be much more willing to save, thereby increasing macroeconomic Savings and shifting the curve outward, as demonstrated by Figure 3.6. This would lead to both a lower interest rate,  $r_1$ , and a higher equilibrium level of Investment,  $I_1$ . If we use our scaling line to translate  $I_1$  to Keynes' Z-D diagram in the bottom right quadrant, we observe an upward shift in the D curve, a higher equilibrium level of employment, and an increase in GDP to  $P_{Y1}$ .

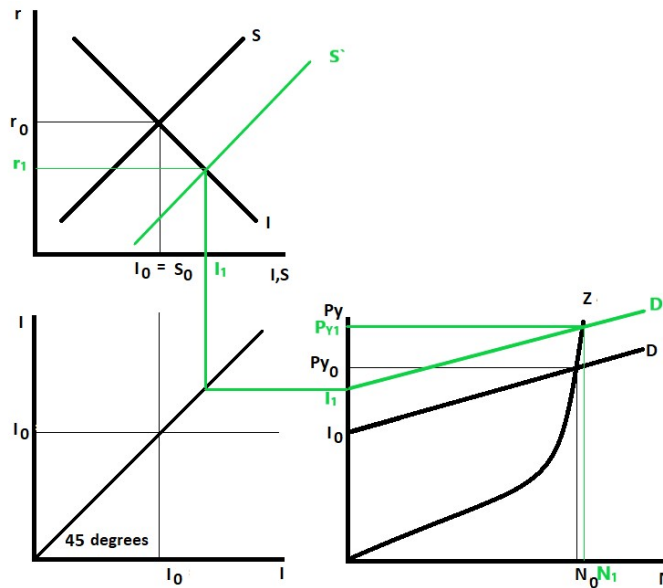


Figure 3.6: An increase in Savings leads to an increase in Investment and GDP.

#### IV. “I’m the Government and I’m Here to Help”: Introducing Deficits

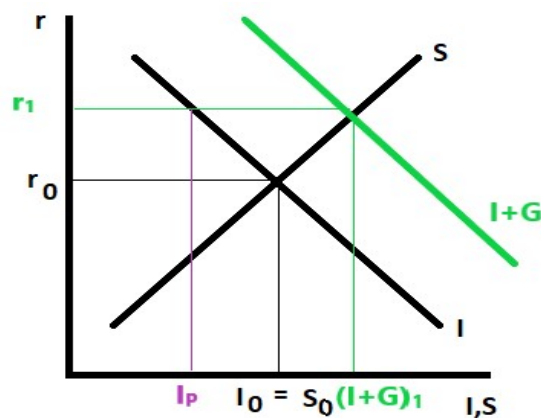
Up to this point, we have excluded the role of Government Purchases in the macroeconomy, only studying Investment and Consumption. In this section, we will examine the impact the government has on GDP and Investment, focusing on the special case of a budget deficit.

When the government runs a budget deficit, it spends more money than it receives through taxes. If a normal family spent more money than it received in income, they would put the difference on a credit card, taking on debt. The government, however, uses Treasury Bills as its “credit card,” and the credit card company – or those who are willing to supply money in order to finance debt – are people/institutions that purchase Treasury Bills.

In our simple Loanable Funds model (Figure 3.1), the government ran a balanced budget (taxation equaling government spending), playing no role in affecting the level of demand or

supply for loanable funds. But, when the government runs a deficit, as the United States has for the vast majority of years since World War II, it must “borrow” money from the financial markets, as the financial markets are willing to exchange dollars for Treasury Bills (Gorton & Ordonez 2013).

Effectively, the government is entering the market for loanable funds (i.e., people’s savings) on the demand side. To reflect this increase, Figure 4.1 shows the I curve shifting up and to the right. Now there is a new intersection between Savings – which remained unchanged – and the “new” demand curve, which simply adds Government Spending to the normal private Investment curve. This intersection is the new interest rate,  $r_1$ .



*Figure 4.1: Loanable Funds model with government deficit.*

Note that the aggregate level of spending increased from  $I_0$  to  $(I+G)_1$ . If we take this  $(I+G)_1$  value and translate it to our hybrid model below (Figure 4.2), we observe an increase in the D curve’s intercept from  $I_0$  to  $(I+G)_1$ , which shifts the D curve up to  $D'$ .

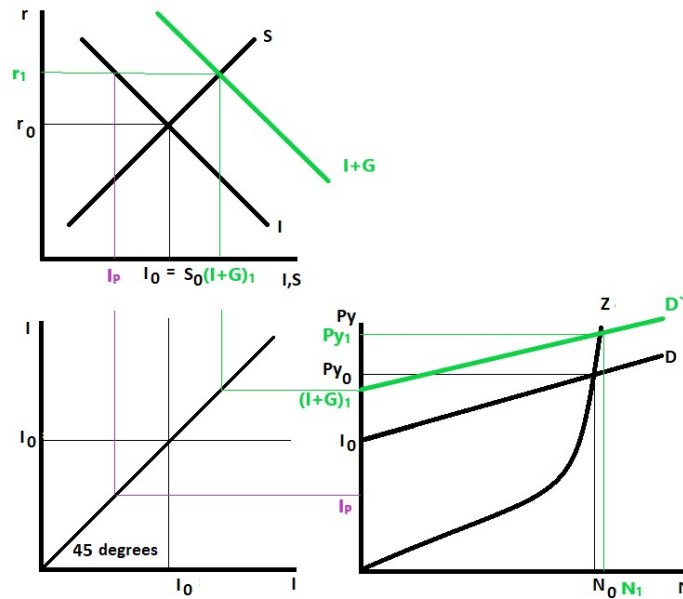


Figure 4.2: A government budget deficit leads to an increase in total spending.

Due to the government budget deficit, our “big three variables” of Investment, employment (N), and GDP all increased: from  $I_0$  to  $(I+G)_1$ ,  $N_0$  to  $N_1$ , and  $P_{Y0}$  to  $P_{Y1}$ , respectively. As discussed in Section II, increases in these variables reflect a growing economy.

However, the government’s budget deficit had a few side effects. We observe from the Loanable Funds model (Figure 4.1 or the top left quadrant of Figure 4.2) that the deficit caused a predictable increase in the interest rate to  $r_1$ . Even though Savings once again equaled total demand for loans at a higher level,  $(I+G)_1$ , the amount of *private* Investment spending actually fell to  $I_P$  due to the higher interest rate, as entrepreneurs are less willing to borrow money when it is more expensive for them to do so. In addition, the vertical increase of  $P_Y$  was much greater than the corresponding increase in  $N$ ; in other words, nominal GDP rose substantially faster than employment. For this to occur, prices would have had to have risen faster than the output created by the small addition to the workforce.

While a small and predictable amount of inflation is a sign of a healthy economy, uncontrolled inflation is damaging to many ordinary economic participants, like those living on fixed incomes. The government and central bank try to keep inflation around two percent per year; otherwise there are political consequences.

Though we still yielded some real level of economic growth on the graph (the additional employment to  $N_1$ ), price inflation was the main result of the government deficit. Furthermore, private enterprise was stifled, as the government captured resources. To understand why this occurred, we must return to the assumptions inherent in where the action started: the Loanable Funds model.

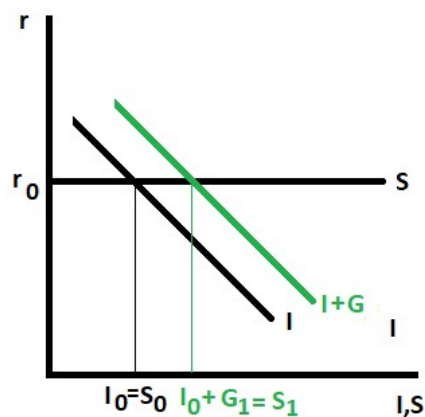
Recall that the Loanable Funds model is the primary neoclassical model that explains interest rate formation. Households save some of their extra income and earn interest, and banks loan out those Savings to entrepreneurs so they can invest. **This view relies on the assumption that banks need Savings in the vault in order to make loans**, so any increase in demand for Savings or decrease in supply of Savings will cause the interest rate to increase, discouraging or “crowding out” private Investment. Banks are wholly dependent on households to save, and only then can they extend loans.

In addition, the neoclassical view assumes that there is an automatic tendency for the economy to rest at full employment (Say 1803), where everyone who wants a job has a job and unemployment is transitional, temporary, or voluntary. If this is true, then a government deficit aimed at boosting employment would only cause price inflation, as the government is simply injecting excess cash into the economy. Therefore, the increase in  $P_Y$  brought on by a deficit, according to neoclassicals, is due wholly to inflation. In sum, the government deficit drives up

interest rates, crowds out private Investment, and causes undesired inflation. Ergo, the deficit is triply bad.

If either of these assumptions (banks need Savings to make loans and the economy tends toward full employment) are false, then we need an alternative view. The post-Keynesian school – which is where the Z-D diagram is taken from – makes different assumptions about the financial and labor markets and derives different conclusions.

First, Post-Keynesians state that banks do not need Savings to create loans. This is called the endogenous money view, where banks create money from thin air. If an entrepreneur walks into a bank and convinces the banker to extend her a loan, then the bank creates a deposit account for her and credits it with the principal of the loan. Even if the bank did not have any Savings on hand, it could still make the loan immediately and look for excess Savings, which are called reserves, on the interbank market. Furthermore, the central bank targets interest rates, so if the supply of reserves is low, the Federal Reserve will step in and automatically supply funds in order to keep interest rates from spiking. Together, this creates a Savings supply curve as shown in Figure 4.3, a simple horizontal line fixed at an interest rate that the central bank sets. The only constraints on the quantity of loanable funds supplied, therefore, are the willingness of individual banks to take on risk and the amount of latitude granted banks by government regulators.



*Figure 4.3: A Government deficit with endogenous money.*

Under the Endogenous Money view, a budget deficit (represented by  $I + G$ ) does not cause interest rates to increase and therefore keeps private Investment at the same level it would have been without the deficit – no crowding out occurs. The increase in Government spending does not harm private spending.

The other assumption that Post-Keynesians make about the macroeconomy is that it does not automatically come to rest at full employment. While there is definitely frictional unemployment, Post-Keynesians believe that there are structural barriers preventing the economy from remaining at full employment once it gets there (Seccareccia 2015). Recall that the Post-Keynesian Z-D diagram depicts the “equilibrium” level of employment as just an equilibrium level – an intersection between business expectations and actual sales. This does not mean that everyone who wants work can find it, only that businesses are hiring enough workers to generate the certain level of sales they expected.

If the economy does not automatically reach full employment, then it may be necessary to find a way to increase total spending through exogenous means, like through a government deficit. Since the Post-Keynesian view assumes that money is endogenous and a deficit will not affect the interest rate, our macro model now looks like Figure 4.4 below.

Our budget deficit, as expected, translates to an increase in  $P_Y$ , but there is also a sizable increase in  $N$ , the number of employed persons. Though some of the increase in  $P_Y$  could be due to inflation, much of it appears to be a result of more workers earning and spending their new incomes, which itself generates additional output.

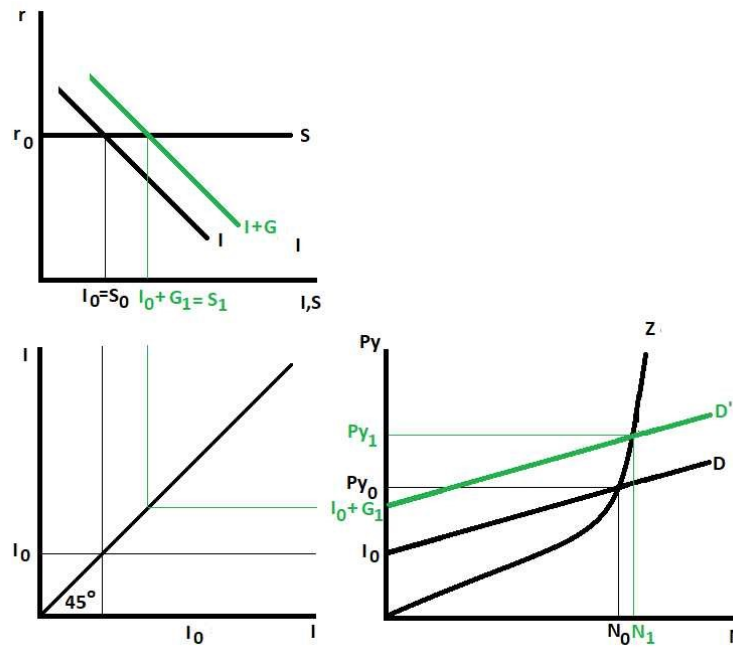


Figure 4.4: A deficit with endogenous money and an economy not at full employment.

In sum, their broad disagreement can be distilled to the fact that the two schools of thought radically differ on two key premises:

1. The source of the funds available for bank lending; and
2. The tendency of the macroeconomy towards full employment.

While the Neoclassical/crowding out school argues that banks loan out private savings, the Post-Keynesians say that the nature of modern finance is such that the only constraints on lending are the willingness of financial institutions to take risk and the latitude permitted these institutions by government regulators. With respect to full employment, Neoclassical models suggest that it is the natural resting place for the economy, while Keynes and his proponents believe that no such tendency exists. In fact, sub-maximal employment is the norm, not the exception.

Both arguments make sense on their own terms. The ultimate question, therefore, is the validity of their assumptions, which I will examine below.

## V. “You Know What They Say about Assuming:” A Discussion of the Premises

If the chief concern with running a budget deficit is the way in which it dries up the well of financing available for private businesses, then we must examine how that well of financing exists in the first place. Fundamentally, we need to determine how money is created, and who/what is the creator.

Financial research suggests that when an entrepreneur receives a loan from the bank, the bank does not go into the vault and hand the entrepreneur  $x$  amount of paper dollars. Instead, it credits the entrepreneur’s checking account with the principal of the loan, making the money “out of thin air” (McLeay et al 2014), using no reserves from the vault to make the loan.

Essentially, this means that **banks do not need Savings to create loans.**

When the loan was created, new money was injected into the economy. An entrepreneur who did not have  $x$  dollars now does, and since no cash from the bank’s reserves was used to create the loan, the principal of the loan is brand new money. While there is still a reserve requirement (10% of deposits over \$124.2 million<sup>6</sup>), banks have fourteen days to meet this regulation. However, the banking system has approximately \$1.7 trillion in *excess* reserves as of this writing<sup>7</sup>, so the reserve requirement is functionally a non-issue, as banks with excess reserves will be happy to lend them out and receive interest on this short-term interbank loan.

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<sup>6</sup> <https://www.federalreserve.gov/monetarypolicy/reservereq.htm>

<sup>7</sup> <https://fred.stlouisfed.org/series/EXCSRESNS>

Even if the entire system were running short of reserves due to a greater demand for loans, the central bank would step in and automatically supply them, as it targets interest rates. A systemwide shortage would cause interest rates to spike above the target, which is undesirable. While the central bank may increase the target rate over time, it is kept fixed in the short run. Fluctuation in demand for loanable funds, therefore, does not alter the interest rate. This includes an increase in demand for loanable funds from the government. If the government runs a deficit (through the use of Treasury bills), it does not affect the economy-wide interest rate, keeping other factors more or less constant. Again, this is the story told by those who study or work in the banking system, not just by Post-Keynesians.

. Even if the interest rate were dependent on the demand for loanable funds, the government essentially self-finances any deficit it runs (Wray 2006), as it issues Treasury Bills to primary dealers, then the primary dealers turn around and sell Treasury Bills to the central bank. If the central bank did not accommodate, then interest rates would rise. However, it always does. Businesses, therefore, do not compete with the government for funds. They almost operate in separate environments.

In sum, each time a bank makes a loan, it increases the money supply, and it does not need Savings in the vault to do so. Central banks are generally accommodative – they supply reserves when the system needs reserves – and they set a target interest rate. Any increase in demand for loanable funds does not affect the interest rate. Ergo, the interest rate an entrepreneur receives on a loan is not contingent on the macroeconomic demand for loanable funds, so a government budget deficit will not, by itself, lead to crowding out. Endogenous money prevails, and it appears that the real-world equivalent of the S-curve is horizontal.

The second (and much trickier) assumption to resolve is whether the economy automatically tends toward full employment. First, we must define the term. Full employment is where, *at the prevailing wage rate, every worker who wants a job has a job*. At full employment, any unemployment is either completely voluntary (a worker chooses not to work for the prevailing wage) or frictional (a worker quits his job or is laid off and is temporarily unemployed while seeking a new one).

Under this definition, one may conclude that the economy automatically rests at full employment. After all, if a business can hire any worker at any wage and the worker can either accept or reject the job offer of their own volition, then choosing ‘reject’ and remaining unemployed is entirely voluntary. A laid-off CEO could almost definitely get a job for a nickel a year.

However, the notion that a laid-off CEO could or should work for a nickel a year is preposterous. She would starve to death. In a country like the United States with high productivity, all should be able to enjoy a relatively high minimum standard of living.

Further, it is not CEOs who have trouble finding work, but the least skilled workers. Using educational attainment as a proxy for skill, we observe that low-skilled workers have the highest unemployment rate, even in periods of economic expansion, as depicted in a chart from 2017 below (Bureau of Labor Statistics).

Median weekly earnings and unemployment rate by educational attainment, 2017

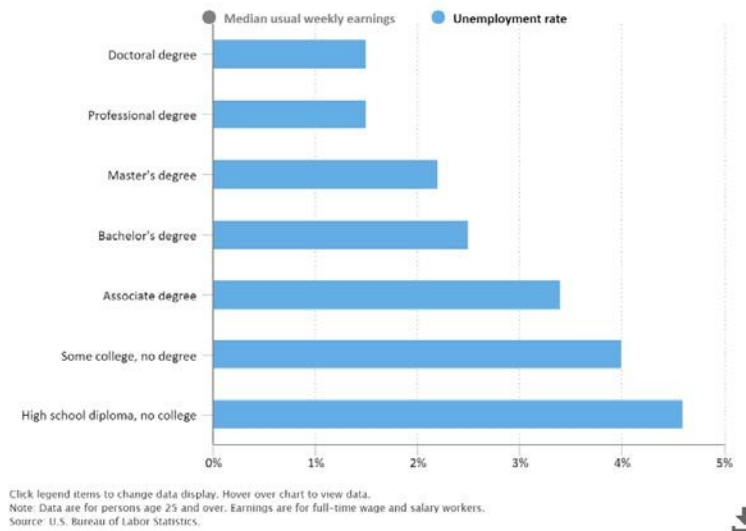


Figure 5.1: Unemployment data by skill level.

Though these low-skilled workers demand the lowest wages, with median weekly earnings between seven and eight-hundred dollars, they still find themselves out of work more than any other group. It is likely not their demand for an exorbitant wage that keeps them unemployed. Low-skilled workers with modest, “realistic” demand for wages still cannot find employment, even in the midst of an economic upturn.

This can be demonstrated by a simple supply-and-demand diagram. At the prevailing wage rate of  $W_0$ , there are  $N_0$  people who want to be employed. Therefore,  $N_0$  is the point where full employment is reached. However, firms are only demanding  $N_1$  worth of labor. While it may seem like there will be downward pressure on wages until we reach the intersection, the labor market is actually already at an equilibrium point. Firms are pleased because they have hired exactly the number of workers they would like; the employed are pleased because they both have a job and are working at a higher wage than they otherwise would have accepted. The only displeased segment is  $N_0 - N_1$ , the involuntarily unemployed. While some of them would work for

less than the prevailing wage, firms are simply not hiring. The question naturally arises: what causes firms to only demand a certain number of workers?

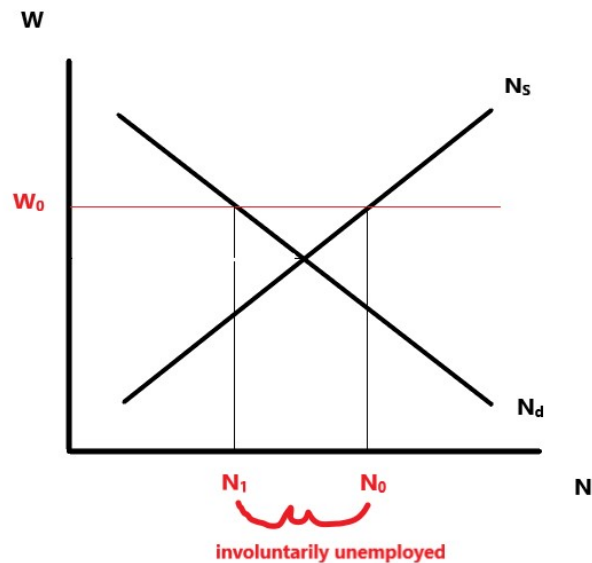


Figure 5.2: A labor market in equilibrium with involuntary unemployment.

Ultimately, fluctuations in employment can be explained by fluctuations in aggregate demand. Recall Keynes' Z-D diagram below: *any* point where D intersects Z is an equilibrium level of employment. Equilibrium employment does not necessarily equate to full employment. If Investment falls to  $I_1$  and the demand curve shifts down as shown below, substantially fewer workers are employed. Those who lost their jobs ( $N_0 - N_1$ ) are involuntarily unemployed. They wanted to work, but their employers let them go. Also, the grand drop in GDP from  $Py_0$  to  $Py_1$  not only implies a severe recession, but more broadly indicates that the economy was once operating at a higher level. If the lower level of employment becomes the new normal, the new equilibrium, then it cannot be full employment. The goalposts cannot keep moving.

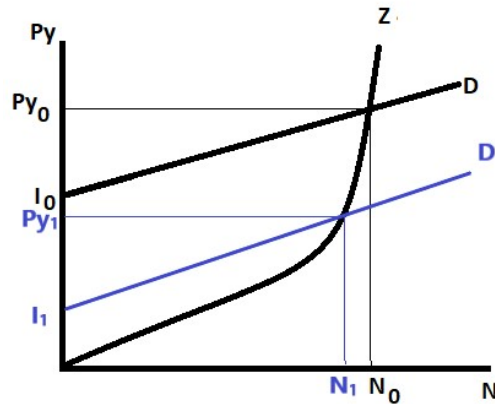


Figure 5.3: A drop in Investment, Employment, and GDP.

But the question remains: is there some tendency that draws the economy *back* to a level of full employment, where everyone who wants a job has a job? Answering this would require jumping off into the wonderful and highly technical world of theoretical macroeconomics, so for this paper, we will leave it at this: there is such a thing as involuntary unemployment, and the economy may not eliminate it automatically.

To recap, the neoclassicals and Post-Keynesians differ on two key issues: the source of the funds used for loans and the tendency of the economy to automatically return to full employment. The evidence from a wide variety of sources supports the Post-Keynesian view on endogenous money. This means that in real life, the S curve is either perfectly horizontal or very close to it. This would mean there is no crowding out from a government deficit. With respect to full employment, the answer is less clear cut. If crowding out does not occur, however, it would seem that the consequences of stimulating the economy even though it could eventually right itself are not severe.

## VI. Goodnight, Everybody: Conclusion

Until now, we have only examined the dollar values of economic variables, looking at how much Investment, GDP, and employment are generated by a generic government deficit, or how the value of the interest rate adjusts to that same deficit. However, not all values are created equal. This is easiest to understand when examining income (GDP), since though it may increase greatly, that increase may concentrate in the hands of a few individuals. In short, context matters. In other words, even if crowding out is a myth and the economy in truth automatically returns to full employment – making deficit spending and the consequent upward shift in Demand unnecessary – how the government spends money matters. Is the deficit spending a one-off purchase of a non-durable good (e.g., Government Consumption like building a space laser) or is it on a project that can perpetuate additional GDP growth itself (e.g., Government Investment such as repairing infrastructure)?

It turns out that this may make a difference, as suggested by econometric studies on government spending, interest rates, and private sector growth. While it is unsurprising that the results depend on the model (and the author/journal's particular school of thought), here are some highlights of the literature:

1. Government spending on infrastructure or public-goods programs can lead to "crowding in," where private Investment is actually higher (Blackley 2014, Bom 2017).
2. Government Consumption spending leads to crowding out (Fouladi 2010, Traum & Yang 2015).
3. In some countries, "indirect" crowding out is observed, where the interest rate does not rise, but banks still lend less regardless (Anyanwu 2017). This is especially true

of developed countries (Kandil 2009). This may, incidentally, be because their financial system is less able to generate endogenous increases in the money supply than ours, suggesting a more positively sloped S curve.

Whatever the case, the broader lesson suggested by this paper is that macroeconomic theory is key when navigating the complexities of the real world. Econometric studies like those above are certainly useful to some extent; one must remember, however, the old adage: “If you torture the data long enough, it will confess.” Therefore, we must be wary when yet another econometric analysis predicts dire consequences for the United States and bear in mind that it is only as reliable as its underlying assumptions. Or, in the case of Reinhart and Rogoff and The Colbert Report, the spreadsheet may be chock full of errors! For policymakers, the message is clear, if challenging: proceed with caution, and make sure you know the premises underlying the models used by your advisors. If you do not, then another old adage may come into play: “Garbage in, garbage out.”

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