Trumponomics, Asymmetric Animal Spirits and Income Inequality

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Abstract

Trumponomics is calling for individual and corporate tax cuts along with an infrastructure spending boost. One major reaction to these announcements can be seen in the all-time high U.S. equity indices. Some say that "animal spirits" are at play. Are lofty animal spirits a boon for the economy? The answer is complicated. For example, following the Great Recession, the Federal Reserve went to extraordinary lengths to support asset prices and bolster household finances and consumer spending. These efforts were met with muted results—asset prices rebounded but consumer spending has been slow to recover. In addition, slower personal spending growth along with rising income inequality may suggest that animal spirits produce asymmetric effects on the economy.

Our work quantifies animal spirits by constructing an index using information from major sectors of the economy. We stress that a better gauge of animal spirits should include information across major sectors and not just based on one (financial) sector. The effect of both monetary and fiscal policies on animal spirits is also estimated. Furthermore, we estimate the effect of policy changes on major variables (i.e. personal spending and S&P 500 Index) to analyze whether the effect is asymmetric.

Our analysis suggests that the effect of the proposed Trump individual tax cut on personal spending is smaller than those of the Reagan/Bush tax cuts. On the other hand, the estimated effect of the Trump corporate tax cut on the financial sector is greater compared to the Reagan/Bush tax cuts. Analysis also suggests a further rise in income inequality in the U.S. as most policies tend to favor financial sectors more than personal spending/income. Furthermore, these policy changes may widen income inequality and that effect may take a longer period to show up in an analysis than some analysts think. Therefore, policy makers need to estimate direct/indirect as well short-term and long-term effects of a policy change in order to design effective policies.

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Introduction

This paper estimates the effects of a policy changes (using recent tax cuts as a case study) on the U.S. economy. We believe such a policy change produces dual effects on the economy, which are (a) direct effects and (b) indirect effects. This effect, we believe, is brought about by animal spirits. In addition, we quantify animal spirits by constructing an index using information from major sectors of the economy. The effect of policy changes on animal spirits is also estimated. Furthermore, the effect of changes in animal spirits is generated to examine which sector is affected the most by animal spirits. In other words, we test whether animal spirits produce asymmetric effects on the economy—different effects for different sectors. We believe our study would help decision makers to characterize the animal spirits effect on the economy into symmetric and asymmetric categories. An asymmetric effect, particularly if certain segments (financial sector for example) of the economy's gain is significantly higher than other segments (non-financial or lower income groups, for instance), may widen income/regional inequality. Therefore, it is crucial for policymakers to estimate the direct as well as indirect effects (effects through changes in animal spirits) of a policy change on the economy to gauge the accumulative effect of that policy change.

Trumponomics is calling for individual corporate tax cuts along with an infrastructure spending boost. One major reaction to these announcements can be seen in the all-time high for U.S. equity indices. Some say that animal spirits are at play. Are animal spirits good for the economy? The answer is complicated. For example, following the Great Recession, the Federal Reserve went to extraordinary lengths to support asset prices and bolster household finances and consumer spending. These efforts were met with muted results—asset prices rebounded but consumer spending has been slow to recover. In addition, slower personal spending growth along with rising income inequality may suggest that animal spirits produce asymmetric effects on the economy.

Keynes said that animal spirits is one of the key factors (among others) behind fluctuations in the economy (or behind different phases of a business cycle). Moreover,

for decision makers it would be very helpful to find drivers of animal spirits as by knowing those factors decision makers may be able to influence the animal spirits. Furthermore, a quantitative measure of animal spirits may open doors to estimate the potential effect of a change in animal spirits on the economy. Two potential drivers of animal spirits are economic policies (monetary and fiscal policies for example) and the phase of a business cycle (recession/recovery for instance). That is, policymakers try to boost confidence (influenced by animal spirits) by cutting interest rates (monetary policy) and tax incentives/increase federal spending (fiscal policy) during recessions/economic slowdowns. On the other hand, a stronger recovery would boost confidence while fears about a recession may put pressure on investors and consumers to delay big ticket spending.

In addition, a policy change, in our view, produces dual effects; (a) direct effect on the economy, and (b) influence on the animal spirits, causing change in the animal spirits that would affect the economy. Since business cycle phases are also a potential animal spirit driver, the effect of a policy change on the economy/animal spirits may also depend on the phase of the business cycle. For example, a policy change which intends to boost the economy may produce higher output (more effective) in the early phase of a recovery than a policy change implemented in the middle/late phase of an expansion.

Another important point we want to stress here is that the animal spirits effect on the economy is different than the multiplier effect. A multiplier effect boosts aggregate demand more than the initial spending and the increment depends on the magnitude of the marginal propensity to consume (MPC), all else equal. The animal spirits, on the other hand, has the potential to change the size of the MPC (people may spend more than the past MPC) and thereby boost the aggregate demand more than the multiplier effect (as the multiplier effect depends on the past MPC size). Basically, a multiplier effect may only boost the economy according to some past quantitative averages (MPC for example) however, animal spirits may boost the economy beyond those past averages and also effect economic agents' behavior (such as changes in the size of the MPC). In other words, a multiplier effect boosts the economy but may not change the behavior of economic agents, while animal spirits may boost the economy and change the behavior of economic agents.

We construct a comprehensive index to quantify animal spirits which includes information from five variables: (1) the S&P 500 index, (2) Conference Board's consumer confidence index, (3) Yield spread, (4) VIX index and (5) Economic policy uncertainty index. These five variables capture actions of major economic agents as well as represent major sectors. In addition, these variables also shed light on economic agents' expectations about the near term economic outlook. The animal spirits index (ASI) goes back to January 1967 and gives us an opportunity to analyze the index behavior during different business cycles. Two noticeable observations from the current business cycle: first, the lowest value is -1.65, which was reached during the Great Recession in October 2008. Second, the ASI stayed in the negative zone till January 2014, which is consistent with a very slow economic recovery from the Great Recession. In addition, the index shows an optimism since 2014 as the index stays above the zero line for the majority of the time since February 2014, but does not see the strength of the past two recoveries in 1992-2000 and 2002-2007.

Our analysis suggests that the Bush tax cuts produced longer term direct effects on consumption compared to the Reagan/Trump tax cuts. That is, the effect of the Bush tax cut remained positive for the first 8 quarters compared to first 5 quarters for both the Reagan and Trump tax cuts. One major reason of the longer term effect of the Bush tax cut on personal spending may be the phase of the business cycle. The Bush tax cut was implemented in the early phase of a recovery compared to the Reagan tax cuts which were implemented during the expansion. The estimated direct effect of corporate tax cuts peaks in the first quarter for both tax cuts with the Bush 2003 effect at 0.69 percentage point and 0.55 percentage point for the Trump tax cut. The total first year effect is 1.78 percentage points for the Bush and 1.47 percentage points for the potential Trump tax cut. Both tax cuts produce positive effects for the first four quarters and then become meaningless, which may suggest that corporate tax cuts are beneficial in the short term relative to consumer tax cuts. A major reason for the short term positive effect of the corporate tax cut is that the Bush 2003 tax cuts were set to expire after 2010. Therefore, the short term effect of the corporate tax cut may be consistent with the Ricardian equivalence theory as investors may worry about future higher taxes.

To quantify the monetary policy effect on the animal spirits, we shock the model by reducing the fed funds rate by one percentage point (accommodative monetary policy) and generate the effect on the animal spirits index. Furthermore, the accommodative monetary policy boosted animal spirits in all three cases with the largest in the Bush 2003 case (1.63 points in the first year), followed by the Reagan 1986 (1.55 points) and Trump 2017 (0.53 points). The largest effect of an expansionary fiscal policy is estimated for Trump 2017 (the ASI increased by 2.13 points in the first year), followed by the Bush 2003 (1.72 points) and Reagan 1986 (1.47 points). In sum, monetary and fiscal policies are effective tools to boost the animal spirits.

To estimate the indirect effect of a policy change on consumption and profits, we shock the animal spirit index (increased by one percentage point). A rise in the animal spirits is associated with rising consumption and profits growth in all three cases (Reagan 1986, Bush 2003 and Trump 2017). Furthermore, the direct effect of a policy change was positive for both consumption and profits and the indirect effect is also positive for consumption and profits. Therefore, the accumulative effect (direct plus indirect effect) of a policy change is significantly larger than the direct effect itself.

To verify the asymmetric animal spirits effect notion we estimate the effect of a shock in the animal spirits on the S&P 500 index and number of food stamps recipients (food stamps). An increase in animal spirits produces positive effects on both the S&P 500 index as well as food stamps which suggest a widening in the income inequality. Furthermore, the Trump 2017 period shows the largest increase in the S&P 500 index and in the number of food stamps recipients, which suggest a rise in the income inequality compared to the past policies. Moreover, the animal spirits effect usually peaked within a year in our analysis, except for the food stamps which experienced a peak of the effect after 2 years (10^{th} quarter for Trump 2017). In addition, the animal spirits effect remains positive (statistically meaningful) for all 12-quaters for both Bush 2003 and Trump 2017. This indicates the longer-term effect of a policy change. That is, these policy changes may widen income inequality and that effect may take a longer period to show up in an analysis than some analysts think. Therefore, policy makers need to estimate direct and indirect as well short-term and long-term effects of a policy change in order to design effective policies.

2. Quantifying Trumponomics: Estimating the Tax Cut Effect on the Economy

The Trump Administration is about to pass a tax reform bill which includes tax incentives (potential tax cuts) for both consumers and corporations. We estimate the direct effect of tax cuts on real personal consumption expenditures (PCE) and corporate profits. We provide a theoretical discussion along with an empirical estimation of the implications of tax cuts on the economy in this section.

One would expect that a tax cut may boost (disposable) personal income while some part of the increment would be consumed. However, life (at least in economics) is not that simple, and the tax cut effect on spending may not be as simple either. Ricardo (1888) suggested that a tax cut may not boost personal consumption (and aggregate demand) because consumers may expect higher taxes in the future to reduce the budget gap (as a tax cut would reduce government tax revenues) and this hypothesis is known as the Ricardian equivalence. For a detailed discussion about the Ricardian equivalence see Barro (1989). It is worth mentioning that there are criticisms on the Ricardian equivalence theory; see Galbacs (2015) for more detail. Basically, there are two groups of thought: one believing a tax cut would boost personal spending, and the other group disagreeing with that notion. Instead of favoring one group or another, we will estimate the tax cut effect on personal spending.

The effect of corporate tax cuts (lowering income tax rates on businesses) is unclear, at least in the theory. One group favors corporate tax cuts, as it would encourage new investments that would create jobs and boost growth. On the other hand, a corporate tax cut (like most tax cuts) would reduce tax revenues, at least in the short-run, and increase the budget deficit, essentially a strain of Ricardian equivalence for corporate tax cuts. Corporate tax cuts are often implemented for a certain period of time. The Bush 2003 tax cuts expired in 2010 and it may be possible that the potential Trump tax cut would be offered for a period of 10 years. Therefore, there may not be enough incentives for companies to invest in long term projects as they would expect higher future taxes to reduce the potential budget gaps.

The effect of a tax cut (whether for consumers, businesses or both) depends on several different factors, which is why there are different views concerning the potential tax cuts and their impact on the economy. First, if a tax cut boosts aggregate demand (in the case of a tax cut for consumers, boosting personal spending and thereby aggregate demand) and growth/creates jobs (corporations make new investments, which lifts growth and creates new jobs) then that would increases tax revenues in the medium term. Higher growth and new jobs would broaden the tax base and increase revenues from the existing tax payers, all else equal. Second, if consumers/corporations believe in the Ricardian equivalence (higher future taxes) then the effect of tax cuts on the economy would be muted. Third, it is possible that some would increase spending/investment, which would boost growth, but may not be boosted enough to reduce the budget gap.

The final point we would add to the discussion of the tax cut effects on the economy is that the phase of the business cycle is also important and needs to be considered when an analyst is going to estimate the effects of a tax cut. That is, a tax cut in the early recovery phase would have a different effect than a tax cut in the expansion (or late expansionary phase) phase of a business cycle. Typically, monetary policy is accommodative (lower interest rates and higher money supply) in the early phase of a recovery and central banks tend to normalize (higher interest rates) monetary policy stance during an expansion. Therefore, a tax cut in the early phase enjoys an accommodative monetary policy as well. Furthermore, in the later phase of the business cycle (around the peak) businesses may not start larger projects because of the fear of an upcoming recession. Therefore, phases of the business cycle and the monetary policy stance are important factors and need to be considered when estimating the effect of tax cuts.

A good example of the role of the business cycle on tax cut effects would be the Reagan 1986 tax cuts and Bush 2003 Tax cuts. The Reagan tax cuts occurred in the expansionary phase of the business cycle while the Bush tax cuts were intended to kick-start the economy (the recovery from the 2001 recession was painfully slower/weaker compared to historical standards). We share a very simple but intuitive example to show the importance of the business cycle phase in tax cut analysis. The real PCE average growth for the three years (1984-1986) prior to the Reagan 1986 tax cut was 4.91 percent and 3.50 percent for the post-tax cut period of 1987-1989. For the Bush tax cuts of 2003,

average real PCE growth for the pre-tax cut period of 2002-2003 (since the economy was in recession in 2001 and thereby we did not include 2001 in the analysis) was 2.85 percent, which is lower than the 3.47 percent growth during the post-tax cut period of 2004-2006. Therefore, business cycle phases need to be considered when estimating tax cut effects on the economy.

2.1 Estimating the Direct Effect of Trumponomics: The VAR and the Impulse Response Function

As mentioned earlier, we believe a policy change produces dual effects on the economy which are (a) a direct effect and (b) an indirect effect through the animal spirits. In this section we estimate the direct effect of Trumponomics. To estimate the direct effect we raise a question, what would be the likely effect of a one percentage point increase in the real disposable personal income, DPI, (assuming a tax cut would boost personal income) on real personal spending? To answer this question, we turn to the vector autoregression (VAR) modeling methodology. The beauty of VARs is that VARs can be "shocked" to show how all the variables in the model respond to a change in one of the other variables. The way the variables respond over time to a change in the "shocked" variable is called an impulse response function (IRF), see Sims (1980) for more detail.[1]

For example, a tax cut would boost disposable personal income (DPI) and thereby we shock DPI and estimate the effect of that shock in DPI on real PCE. Furthermore, the total effect of the shock in DPI on consumption may take time to realize (lag effect). Therefore, we generate the effect of a shock in DPI in the present quarter (we are using a quarterly dataset) on consumption for the next 12 quarters. Put simply, the effect of a tax cut on consumption for the next three years.

The VAR/IRF method estimates the effect of a one percentage point change in one variable, DPI for example, on other variable (s), real PCE. Furthermore, the VAR/IRF method is a linear approach therefore the estimated effect can be generalized to stronger/weaker than the one percentage point change effect. That is, we show the effect of a one percentage point increase in the DPI on real PCE, and we can generalize that

[1] For more detail about the VAR modeling and applications see Stock and Watson (2001) and Silvia et al. (2014).

effect to show a higher than one percentage point change in the DPI, such as three percentage points. For example, to show the effect of a three percentage point change in the DPI on real PCE we need to multiply the effect/IRFs by three. Basically, if we believe the change may be larger than one percentage point, then that change may be accommodative.

In addition, we estimate the Reagan 1986 and the Bush 2003 tax cut effects on personal spending and compare those effects with the effect of the potential Trump tax cut. We shock DPI by one percentage point for each tax cut and generate the effect on real PCE for the next 12 quarters. The major reason for an identical shock (same magnitude of the shock) is that we can compare the effect of different tax cuts, i.e., which tax cut boosts personal spending more/less than others.

To estimate the corporate tax cut effect on the after-tax corporate profits growth rates, we shock corporate tax receipts by one percentage point. We estimate the corporate tax cut effect for the Bush 2003 and the potential Trump 2017 tax cut. The reason to ignore the Reagan 1986 tax cut effect for corporate profits is that the Reagan 1986 tax reforms shifted $24 billion of the tax burden from individuals to corporations.

2.2 Is Tax Cut a Boon for Consumers/Corporations?

The estimated effects on real PCE are plotted in Figure 1 for the Reagan 1986, Figure 2 for the Bush 2003 and Figure 3 for the potential Trump 2017 tax cuts. The estimated effects along with two-standard deviation (potential upper and lower bands for the estimated effects) are reported for the 12 quarters. There are some similarities between different effects. For example, the highest effect (peak effect) is estimated for the first quarter for all three taxes cuts. The Bush tax cut produced a slightly higher effect (a one percentage point increase in the DPI would boost real PCE by 0.74 percentage point in the first quarter) followed by the Reagan effect (0.70 percentage point) and then the Trump effect (0.68 percentage point). The total effect of a tax cut in the first year is 2.40 percentage points (highest effect) for the Bush, 2.03 percentage points for the Reagan and 1.87 percentage points for the potential Trump tax cut.

Our analysis suggests that the Bush tax cuts produced longer term effects compared to the Reagan/Trump tax cuts. That is, the effect of the Bush tax cut remained positive for the

first 8 quarters compared to the first 5 quarters for both the Reagan and Trump tax cuts. One major reason of the longer term effect of the Bush tax cut on personal spending may be the phase of the business cycle. The Bush tax cut was implemented in the early phase of a recovery compared to the Reagan tax cuts which were implemented during the expansion. The potential Trump tax cuts, if enacted, would likely occur during late in the expansion (possibly close to peak) phase of the business cycle. The estimated effects for all three tax cuts are positive, which is not consistent with the Ricardian equivalence notion. A positive tax cut effect suggests a boost in spending is due to the tax cut.

The estimated effect of corporate tax cuts are shown in Figure 4 for the Bush 2003 tax cut and in Figure 5 for the potential Trump 2017 tax cut. The effect peaks in the first quarter for both tax cuts with the Bush 2003 effect at 0.69 percentage point and 0.55 percentage point for the Trump tax cut. The total first year effect is 1.78 percentage points for the Bush and 1.47 percentage points for the potential Trump tax cut. Both tax cuts produce positive effects for the first four quarters and then become meaningless, which may suggest that corporate tax cuts are beneficial in the short term relative to consumer tax cuts. A major reason for the short term positive effect of the corporate tax cut is that the Bush 2003 tax cuts were set to expire after 2010. Therefore, the short term effect of the corporate tax cut may be consistent with the Ricardian equivalence theory as investors may worry about future higher taxes.

3. Quantifying the Animal Spirits: A New Index

Keynes said that animal spirits is one of the key factors (among others) behind fluctuations in the economy. That is, animal spirits plays a key role in business cycles. Furthermore, recently Akerlof and Shiller (2009) suggested that human psychology drives financial events worldwide, i.e., a blind faith in ever-rising home prices to plummeting confidence in capital markets. Simply put, human psychology (or animal spirits) plays an important role in business cycles e.g., over confidence as well as high ambitions (or maybe gluttony) bring in boom and busts, and then policymakers step in and restore confidence (energize animal spirits) through monetary and fiscal policies that accompany recovery. That being said, if investors are confident then they will invest and create supply of goods and services as well as employment. On the other hand, if

consumers are hopeful about the future (their earnings would not smash) then they will spend (especially discretionary spending) and personal spending is the major component of the GDP.

There are several examples of animal spirits during the 2008-2010 period which shows the impact of animal spirits (both positive and negative shocks) on the economy. For example, when the U.S. House did not pass the ($700 billion) fiscal stimulus bill on September 29, 2008, that day the S&P 500 index dropped more than 8%, and October 2008 was the worse month for the S&P 500 index since the Great Depression. The S&P 500 index dropped more than 20% (month-over-month, MoM, percent change) in October 2008, highest MoM percent drop since April 1932. On the other hand, when President Obama signed the bill in February 2009 that restored confidence; for example the S&P 500 index gained more than 22% during March-June 2009. That was a perfect example of fiscal policy's effect on animal spirits (and the animal spirits' effect on the financial sector).

Another example, on January 22, 2008, the FOMC announced a 75 basis points (bps) cut in the key interest rate (fed funds rate) in a surprise announcement (announcement came in before the opening bell of the U.S.' equity markets) in order to support the U.S. financial markets. One major reason of this action was that stocks fell around the world on Monday January 21, 2008 and U.S.' markets were closed on that day due to a public holiday (Martin Luther King Jr. day). Moreover, the FOMC reduced the fed funds rate by 125 bps (from 4.25% to 3.00%) between December 2007 and January 2008. The immediate effect of the rate cut was less volatility in the U.S. equity markets. That was a good example of monetary policy's effects on animal spirits.

In addition, Akerlof and Shiller (2009) suggested that the drop in the confidence (negative animal spirits effect) was so fundamental during the Great Depression that it lasted for a decade. Moreover, confidence (so that the economy) restored after World-War-II (WW-II). This indicates that a recovery without confidence is highly unlikely. That raises the important questions; (1) why animal spirits is important? (2) How monetary and fiscal policies (and business cycle phases) effect animal spirits? The

answer to the first question is discussed here and sections 3.2 and 3.3 will explain the answer to the second question.

Why are Animal Spirits Important?

In our view, two factors play a key role in the decision-making-process of economic agents (investors, lenders, consumers for example), which are (i) ability and (ii) willingness. Furthermore, ability is a quantitative factor, which consists of monetary aggregation (income, financial assets, loans, etc.) and willingness is a qualitative factor including expectations about economy, earning, future ability, etc. For instance, in case of a lender (financial institutions including banks and bank holding companies), two things are very important in a lending decision; (1) ability to lend and (2) willingness to lend. Where ability to lend indicates how much liquidity/reserve is available (a quantitative factor) for lending. On the other hand, willingness to lend includes expectation about the economy, financial sector, borrowers' reputation and expected future ability to lend, etc. (qualitative factor).

Furthermore, a lender will lend/under-write a loan when she is able to and willing to lend (lending – decision = willingness + ability). For us, both willingness and ability are important factors in a decision-making-process. The willingness factor, however, is more important, or contains more weight. For example, as the willingness factor includes expected ability to lend and thereby a lender may be lending/under-writing more (more than her current ability to lend) in a recovery phase because she is expecting a higher future ability (of course, expecting higher future returns and a better economy). Therefore, lenders start lending more, more than their current ability to lend, and that may bring in a lending boom. On the other hand, in a contraction/slowdown willingness may reduce (confidence lost) and she may lend less (lesser than her existing ability). That would occur because she is expecting a diminishing future ability to lend (along with reduced earning and uncertainty about economy) and that brings in a bust, or may freeze the credit market. In a real world example, during the recent financial crisis (2008-2009), lenders refused to lend and credit market froze. It is true that lenders' ability to lend reduced; due to huge losses and many filed for bankruptcy, but there were many lenders which still had ability to lend. There was, however, no willingness to lend.

Particularly, Lehman Brothers' bankruptcy was one of the major factors which smashed lenders' willingness to lend. For instance, TED spread jumped to 3.4% by October 2008 (highest since July 1981). As we know, TED spread (difference between the interest rates on interbank loans and short-term U.S. government debt) is an indicator of perceived risk in the general economy. A widening in the TED spread indicates that lenders believe the risk of default on interbank loans (also known as counter party risk) is increased. Therefore, during the financial crisis, the willingness factor hit harder than the ability factor. Another example in the U.S., banks' willingness to make consumer loans dropped to -47% during the recent financial crisis (lowest level of willingness since 1980). Therefore, we believe that the willingness factor (animal spirits) plays a vital role in credit/lending boom-bust.

Essentially, what we are suggesting is that the animal spirits effect economic agents' decision making process through the willingness factor, and therefore animal spirits create both positive and negative effects on the economy. That is, in the case of a positive animal spirits effect, lenders would lend more than their ability-to-lend (optimistic about the economy and future ability scenario). By the same token, lesser lending than the ability-to-lend is attached to a negative animal spirits effect (pessimistic about the future of lending and the economy).

In addition, the two-factor approach is also important in investors' decision-making-process. For instance, investors make investment-decision based on their ability to and willingness to invest. Moreover, ability includes monetary resources (equity, loans, etc.) and willingness is a qualitative factor, including expected returns from investment, expectation about the economy, expected ability to invest, etc. An investor, usually, invests when he is able to and willing to invest. Again factors, ability and willingness, are important but willingness is more important. For example, since the willingness factor includes expected ability to invest thereby an investor may invest more (more than his present ability to invest) in recovery phase and that occurs, because, he is expecting a higher future ability to invest (also expecting higher future returns and a better economy). Again, higher investment, higher than the current ability to invest, may lead to an investment boom. On the other hand, in contraction (or after boom) willingness reduces (negative animal effect or confidence lost) and that may cause reduction in investment

(lesser investment than his present ability to invest). This happens with expectations of a diminishing future ability to invest, (along-with reduced earnings and uncertainty about the economy) bringing in a bust or recession.

The process can also be repeated for consumers in their decision-making-process, and that is consumers' spending decision (especially discretionary spending) based on ability to and willingness to spend. Therefore, willingness is an important factor in the decision-making-process and also causes fluctuation in business cycles.

Is Animal Spirits Effect Different than a Multiplier Effect?

Here we want to stress another important point, the size (magnitude) and speed of the animal spirits effect on the economy is different than those of the multiplier effect. A multiplier effect, for example, boost the aggregate demand more than the initial spending, and the increment depends on the magnitude of the marginal propensity to consume (MPC), all else equal. The animal spirits, on the other hand, has the potential to change the size of the MPC (people may spend more than the past MPC) and thereby boost the aggregate demand more than the multiplier effect (as the multiplier effect depends on the past MPC size). Basically, a multiplier effect may only boost the economy according to some past quantitative averages (MPC for example) and the animal spirits may boost the economy beyond those past averages and also effect economic agents' behavior (such as changes in the size of the MPC). Again this will happened through the willingness factor. In other words, a multiplier effect boosts the economy, but may not change the behavior of economic agents, however, the animal spirits may do both, boost the economy and change the behavior of economic agents. Basically, the animal spirits produces a larger (than the multiplier effect) effect, it affects the willingness factor and the multiplier effect by channeling through the ability factor.

Another difference between the animal spirits effect and the multiplier effect is the speed of adjustment. That is, the change in the animal spirits produces a sudden effect (in line with a shock effect) and that creates a swift change (either rise or drop) in the willingness factor. That sudden effect can be seen in the swift drop/rise in the S&P 500 index or drop in personal spending during the Great Recession. The multiplier effect usually, works through the ability factor, and thereby the speed is slower than the animal spirits effect.

In sum, the animal spirits work through the willingness factor and the speed and size of the potential effect is faster and larger than the traditional multiplier effect. The multiplier effect, on the other hand, works through the ability factor and thereby the effect is smaller and slower than the animal spirits.

3.1. A New Animal Spirits Index: A Dynamic Factor Modeling Approach

As mentioned earlier, Keynes coined the term "animal spirits" in 1936 and since then many studies have attempted to quantify the animal spirits and its effect on the economy. Most studies have utilized measures of consumer confidence (and some studies have employed the S&P 500 index) as a proxy for the animal spirits, for more detail see Benhabib and Spiegel (2017).

In our opinion, however, instead of using a single variable, consumer confidence index or the S&P 500 index, to characterize animal spirits it could be more informative to construct an index based on several indicators to represent major sectors/economic agents to quantify an accurate measure of the animal spirits. That is, an economy consists of many major sectors and economic agents in those sectors react differently to different policy changes and business cycle phases. For example, the consumer confidence index has increased by 173% in the post Great recession era, but personal consumption increased only by 22% during the same time period. Similarly, the S&P 500 have produced one of the largest gains in the current recovery/expansion, but the current economic recovery is among the slowest in the post-World-War-II era. Therefore, a single indicator may not be able to fully represent the animal spirits and we need to include information from various major sectors of the economy to construct a reliable measure of the animal spirits.

We construct a comprehensive index to quantify the animal spirits and the index includes information from five variables which are (1) the S&P 500 index, (2) Conference Board's consumer confidence index, (3) Yield spread, (4) VIX index and (5) Economic policy uncertainty index. These five variables capture actions of major economic agents as well as represent major sectors. In addition, these variables also shed light on economic agents' expectations about the near term economic outlook. That is, the S&P 500 index represents the financial sector. If the financial sector participants are optimistic about the

economic outlook then, usually, the S&P 500 index moves upward, all else equal. On the other hand, typically, the S&P 500 index trends downward during recessions. As mentioned earlier that the private consumption is the largest component of GDP, thereby we include the consumer confidence index in the model to capture consumers' sentiments.

The spread between the 10-year Treasury yields and Fed funds rate (the yield spread) is included in the index to represent credit markets. Furthermore, the yield spread is widely considered as a forward looking indicator, as the yield spread is a component (along with the S&P 500 index and 8 other variables) of the index of leading indicators (LEI). In addition, the inverted yield curve is often widely considered as a recession predictor, as the yield curve inverted before each of the last seven recessions. Therefore, investors may be uneasy in the case of an inverted yield spread. The fourth component of the animal spirits index (ASI) is the VIX index (the CBOE volatility index). The VIX index is a reliable measure of investor sentiments and financial markets volatility, and therefore we include it in the model.

Economic policies are another key driver of economic activities as they affect economic agents' sentiments, and therefore we include the economic policy uncertainty index in the model to capture policies aspect of the economy. Baker, Bloom and Davis (2015) created the economic policy uncertainty index and the index is widely utilized to measure movements in policy related to economic uncertainty.[2]

We utilize the dynamic factor modeling (DFM) approach to construct the animal spirits index. The DFM method extracts information (common patterns) from a dataset and then those patterns are combined into one index number. The original dynamic factor modeling (DFM) approach dates back to the 1970s (Sargent and Sims, 1977) and, during the 1990s, Stock and Watson (1999) improved the original DFM method by utilizing advanced estimation techniques. The fundamental assumption of the DFM approach is that each economic variable can be decomposed into a common factor component plus an idiosyncratic component. The common component is driven by a few dynamic factors

[2] For more detail about methodology and application of the economic policy uncertainty index, see the following website: http://www.policyuncertainty.com/

(far less than the number of available economic variables) underlying the whole economy.[3]

Stock and Watson (1999) showed that, with reasonable assumptions, principal component analysis (PCA) can be used to estimate these components consistently. The Federal Reserve Bank of Chicago (Chicago Fed) followed the Stock-Watson approach and produced a national economic activity index for the U.S. economy, which is known the Chicago Fed National Activity Index (CFNAI).[4] The CFNAI is a weighted average of 85 economic indicators. The index extracts the first principal component from the 85 variables and then the first principal component is used as a representative of the national economic activity.

We follow the Stock-Watson and the Chicago Fed approaches and extract the first principal component from the 5 variables mentioned earlier and then that component is utilized as a measure of the animal spirits.

Here we discuss, briefly, the DFM approach, for more detail see Stock and Watson (1999). Let X_t be the n-dimensional vector of time series variables and it is observed for t=1,2,……,T. Additionally, X_t is transformed to be stationary, if not stationary at level, and for notational simplicity we assume also that each series has a mean of zero.[5] The dynamic factor model representation of the X_t with $\bar{r}$ common dynamic factors f_t,

$$X_t = \rho_i(L)\, f_t + \varepsilon_{it} \qquad (1)$$

For i=1,2,…..,N, where $\varepsilon_{it} = (\varepsilon_{1t}, \varepsilon_{2t}, \ldots\ldots\ldots, \varepsilon_{Nt})$ is a $N \times 1$ idiosyncratic disturbance. $\rho_i(L)$ is a lag polynomial in non-negative powers of L, it is modeled as having finite orders of at most s , so $\rho_i(L) = \sum_{j=1}^{s} \rho_{ij} L^j$.

The finite lag assumption permits rewriting (1) as

$$X_t = \Lambda\, F_t + \varepsilon_t \qquad (2)$$

[3] See Stock and Watson (1999) for more detail about the DFM approach.
[4] For background information about the CFNAI, see the Chicago Fed website; http://www.chicagofed.org/webpages/publications/cfnai/index.cfm
[5] We use year-over-year (YoY) percent form of all variables to solve non-stationary issue.

Where $F_t = \left(f_t', ..., f_{t-s}' \right)'$ is an $r \times 1$ vector of common factors, where $r \leq (s + 1)\bar{r}$. The i-throw of the Λ is $(\rho_{10,} \rho_{i1,} ...., \rho_{is})$ is a matrix of factor loadings.

The key advantage of this static form is that the unobserved factors can be estimated consistently as $N,T \rightarrow \infty$ jointly by taking principal components of the covariance matrix of X_t, provided mild regularity conditions are satisfied (Stock and Watson, 2002).[6] An important note here is that since we are interested in the first principal component, we extract only the first component.

An index value above zero is an indication of optimism or positive animal spirits (consumers may increase discretionary spending, for example) and a value below zero suggests pessimism or negative animal spirits (consumers may put discretionary spending on hold, for instance). It is important to note that to show a positive value of the animal spirits index we utilize inverse of the VIX and economic policy uncertainty indices. As a rise is the VIX (and economic policy uncertaintiy) index represents unfavorable conditions for consumers/investors (both may reduce spending/investment) but a rise in the S&P 500 index (and consumer confidence index) shows optimism. Therefore, to make it consistent we utilize the level (original) form of the S&P 500 index, consumer confidence index, and yield spread, along with inverse of the VIX and economic policy uncertainty indices in the estimation process.

The animal spirits index goes back to January 1967 and gives us an opportunity to analyze the animal spirits index behavior during different business cycles (recession/recovery periods). Two noticeable observations from the current business cycle: first, the lowest value, of -1.65, which was experienced during the Great Recession in October 2008 (Figure 7). Second, the ASI stayed in the negative zone till January 2014 which is consistent with a very slow economic recovery from the Great Recession. In addition, the index shows an optimism since 2014 as the index stays above the zero line for the majority of the time since February 2014, but does not see the strength of the past two recoveries in 1992-2000 and 2003-2006.

[6] See for detail, Stock and Watson (1999 and 2005).

3.2. Monetary Policy and the Animal Spirits

During recessions (and economic slowdown/bust), we believe that the willingness (which includes animal spirits) factor disappears from the economy and monetary and fiscal policies are important tools in order to restore confidence. Moreover, during the bust or recession, policy makers (monetary and fiscal policies) step in and restore confidence (repair willingness + ability factors), which leads to a recovery.

We first discuss monetary policy as a countercyclical stabilization tool and then its effect on the animal spirits. In the case of the U.S., the main objective of monetary policy in the Fed's view, is that, "The Federal Reserve sets the nation's monetary policy to promote the objectives of maximum employment, stable prices, and moderate long-term interest rates" (The Federal Reserve Board). The conventional monetary policy's tools are interest rate and money supply. The limitations of monetary policy include the liquidity trap, zero-bound lower interest rate and inflation.

During the recent financial crisis; investors, lenders, borrowers (especially private sector) demand for money (more liquid assets) increased rapidly. Due to Lehman Brothers' bankruptcy and the collapse of AIG, there was a loss of confidence (negative animal spirits). One example of lost confidence is that the S&P 500 index dropped more than 20% (MoM percent change) in October 2008. The important factors which blew confidence up included Lehman's bankruptcy, collapse of the AIG and the U.S. house not passing the ($700 billion) fiscal stimulus bill (although they altered their decision later). Due to these factors credit markets froze, lenders stopped lending and thereby demand for cash/liquidity skyrocketed. The Fed reduced short term interest rate (fed funds rate) to a record low, 0-0.25% range by December 2008; 175-200 bps cut during September-December 2008 time period. Moreover, the Fed increased money supply (nominal M2) by more than 4% during the same time period. In addition, the Fed pumped liquidity in the financial system through non-conventional methods (TAF, TALF, and TSLF, for instance). Due to these extraordinary steps taken by the Fed, the liquidity-gap began narrowing and credit markets started unfreezing by middle of 2009. The liquidity-gap starts narrowing because of the following factors; (1) the Fed increases liquidity supply at a faster rate, (2) the Fed starts acting aggressively to restore the confidence, so lenders

(private sector) begin lending and investors start investing, and (3) as confidence starts restoring, demand for liquidity (growth rate of liquidity demand) starts decreasing. Therefore, liquidity-gap widen due to a negative animal spirits (confidence lost) and reduce/narrow when confidence is restored. Furthermore, in our view, monetary policy is effective in helping to narrow the liquidity-gap and boost positive animal spirits (restore confidence).

To quantify the monetary policy effect on the animal spirits, we utilize the VAR and impulse response functions methodology. We shock the model by reducing the fed funds rate by one percentage point (accommodative monetary policy) and generate the effect on the animal spirits index. Furthermore, we generate the shock for three different time periods which are, Reagan 1986 (Figure 8), Bush 2003 (Figure 9) and Trump 2017 (Figure 10). The accommodative monetary policy boosts the animal spirits in all three cases, with the largest in the Bush 2003 case (1.63 points in the first year), followed by the Reagan 1986 (1.55 points) and Trump 2017 (0.53 points).

In sum, monetary policy is an effective and a useful tool to combat recessions and financial crises. Moreover, due to recessions, financial crises and exogenous shocks (oil prices spike, etc.), economic agents (investors and consumers in particular) lost their confidence (negative animal spirits). The Fed steps in and utilizes monetary policy tools to boost animal spirits (restore confidence), which helps to lead to (or strengthen) an economic recovery.

3.3. Fiscal Policy and the Animal Spirits

Fiscal policy normally works through incentives (tax reduction/break, increase unemployment insurance benefits or duration, for instance) and spending (federal, state and local government spending). Keynes emphasizes on fiscal policy and suggested that during recessions public spending is an important tool to stimulate the economy and increase aggregate demand. He also introduced the multiplier notion—net addition in the output may be higher than the increment in public spending.

To some extent, fiscal policy changes automatically during expansion and recession. It is also known as automatic-stabilizers. In simple words, automatic-stabilizers work without explicit policy action by the government. For instance, the size of the government budget

deficit tends to increase as a country enters recession. That is because of the following factors; more people lose their jobs and file for unemployment insurances, increasing insurance benefits payments. Income tax is generally, at least, somewhat progressive. If a person's income rises, then his/her average tax rate increases. This implies that as incomes fall, households pay less as a proportion of their income in direct taxation. Same is true for corporate tax that is generally based on profits, rather than turnover. In a recession profits tend to fall much faster than turnover. Therefore, a corporation pays much less tax while having only slightly less economic activity. In booms, usually less people lose their jobs and thereby less insurance benefits payments are made by the government. Moreover, people and corporate income/profits rise so that causes increase in the tax revenue.

Automatic-stabilizers are very important tools, however, it only affects the ability factor of consumers and investors. For instance, if a person lost his job then his ability and willingness to spend are effected due to disruption in income and uncertainty about future income. Automatic-stabilizers may restore ability to spend (at least some part of the lost income will be received through unemployment benefits, for a specific time period) but may not restore willingness to spend. It is also common during the recessions, especially, during the recent financial crisis and recession, that people have risk/fear of layoff (they may lose their job). In this case the ability factor may not be affected but confidence (willingness) lost would be. That being said, automatic-stabilizers may not boost animal spirits (restore confidence) and we need explicit fiscal stimulus packages.

In our view, during the Great Recession, there were a number of factors which could decrease personal consumption much more than people even imagined. For instance, huge wealth loss (due to asset prices' falling and stock market crashes), job loss (recent recession has the highest job loss, over eight million, since WW-II), fear of layoff/job loss, credit market froze (credit wasn't easy available to consumers even they qualified for that), etc, destroyed consumers ability plus willingness to spend. Reduction in consumption, however, was not that much and it occured because of fiscal (of course monetary) policy. The U.S. government worked very aggressively (the Bush and Obama administration introduced many stimulus packages). The stimulus packages boost animal spirits (confidence) and repair the ability factor. Moreover, fiscal stimulus shows the

federal government's comments to stimulate the economy and increase positive expectations about the future economy, which leads to increased willingness to spend (and invest).

Following the above mentioned VAR/IRFs methodology, we reduce tax receipts (a tax cut) by one percentage point and estimate the effect on the animal spirits index. The largest effect of an expansionary fiscal policy is estimated for Trump 2017 (Figure 13 and the ASI increased by 2.13 points in the first year), followed by the Bush 2003 (Figure 12 and 1.72 points) and Reagan 1986 (Figure 11 and 1.47 points). Therefore, our analysis suggests that fiscal policy is an important tool to boost the animal spirits.

4. Estimating the Indirect (Animal Spirits) Effect of a Policy Change on the Economy

To estimate the indirect effect of a policy change on the economy (consumption and profits for example) we shock the animal index (increased by one percentage point) and results are shown in Figures 14-16 (for consumption) and Figure 17-19 (for profits). A rise in the animal spirits is associated with rising consumption and profits growth in all three cases (Reagan 1986, Bush 2003 and Trump 2017). Furthermore, as discussed earlier, the direct effect of a policy change was positive for both consumption and profits, and the indirect effect was also positive for consumption and profits. Therefore, the accumulative effect (direct plus indirect effect) of a policy change is significantly larger than the direct effect itself.

Asymmetric Animal Spirits Effects and Income Inequality

As mentioned before, the animal spirits may produce an asymmetric effect (different effect in term of size and speed for different sectors). To verify the asymmetric effect notion we estimate the effect of a shock in the animal spirits on the S&P 500 index and number of food stamps recipients (food stamps). The food stamps series is utilized to represent a lower-income group (and poor families) as those people are eligible to join the Supplemental Nutrition Assistance Program (SNAP), or commonly referred to as food stamps program.[7] The S&P 500 index is a proxy for the financial markets and most

[7] For more detail and eligibility criterion for the SNAP see: https://www.fns.usda.gov/snap/eligibility

of the upper-income group (and rich families) is related with the financial markets. Basically, we estimate the effect of a change in the animal spirits on rich (higher income) and poor (lower income) income groups to analyze whether there are different effects for these two different income groups.

Additionally, we are estimating, implicitly, whether a policy change produces asymmetric effect on different income groups. That is, if a tax cut boosts animal spirits, and then test whether animal spirits boost income for all income-groups are not. The results for the effect of a one percentage point increase in the animal spirit on the S&P 500 index are reported in Figures 20-22. The Trump 2017 policy change produced the largest effect (1.88 points increased in the first year) followed by the Bush 2003 period (0.84 points) and Reagan 1986 era (0.29 points). In other words, a policy change has different effects during different time periods, and therefore instead of relying on the past estimates, decision makers should re-estimate the effect of policy changes using the most recent data (information) available.

The results for the animal spirits effect on food stamps are shown in Figure 23-25. There are several interesting observations from the results. First, the Reagan 1986 period show an overall negative effect (2.23 points drop in the 12-quarters period) which suggest a decline in the food stamps recipients, and that may suggest a reduction in the income inequality. Second, estimates for the Bush 2003 era show an increase of income inequality by 2.41 points and the effect peaked at the sixth quarter. Third, the Trump 2017 period showed income inequality would widen by 4.13 point with a peak effect in the tenth quarter. Finally, the animal spirits effect usually peaked within a year for the rest of the analysis but for the food stamps it peaked after 2 years (10^{th} quarter for Trump 2017). In addition, the animal spirits effect remains positive (statistically meaningful) for all 12-quaters for both Bush 2003 and Trump 2017. This indicates the longer-term effect of a policy change. That is, these policy changes may widen income inequality and that effect may take a longer period to show up in an analysis than some analysts think.

In sum, a boost in animal spirits produces positive effects on both the S&P 500 index as well as food stamps which suggest a widening in the income inequality. Furthermore, the Trump 2017 period shows the largest increase in the S&P 500 index and in the number of

food stamps recipients, which suggest a rise in the income inequality compared to the past policies

Conclusion: Beware of the Asymmetric Animal Spirits Effect

This paper estimates the effect of a policy change (using recent tax cuts as a case study) on the U.S. economy. We believe a policy change produce dual effects on the economy which are (a) direct effect and (b) indirect effect, through the animal spirits. Therefore, it is crucial for policymakers to estimate the direct as well as indirect effects of a policy change on the economy to gauge the accumulative effect of that policy change.

Our work quantifies the animal spirits by constructing an index using information from major sectors of the economy. We stress that a better gauge of the animal spirits should include information from major sectors and not just based on one (financial) sector. The effect of both monetary and fiscal policies on the animal spirits is also estimated. Furthermore, we estimate the effect of policies changes on major variables (personal spending and S&P 500 Index for example) to analyze whether the effect is asymmetric.

To verify the asymmetric animal spirits effect notion we estimate the effect of a shock in animal spirits on the S&P 500 index and food stamps. A boost in animal spirits produces positive effects on both the S&P 500 index as well as food stamps which suggest a widening in the income inequality. Furthermore, the Trump 2017 period shows the largest increase in the S&P 500 index and in the number of food stamps recipients, which suggest a rise in the income inequality compared to the past policies. In addition, the animal spirits effect remains positive (statistically meaningful) for all 12-quaters for both Bush 2003 and Trump 2017. This indicates the longer-term effect of a policy change. That is, these policy changes may widen income inequality and that effect may take a longer period to show up in an analysis than some analysts think. Therefore, policy makers need to estimate direct/indirect as well short-term and long-term effects of a policy change in order to design effective policies.

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Figure 1: Estimating the Direct Effect of Reagan Tax Cut on Personal Consumption

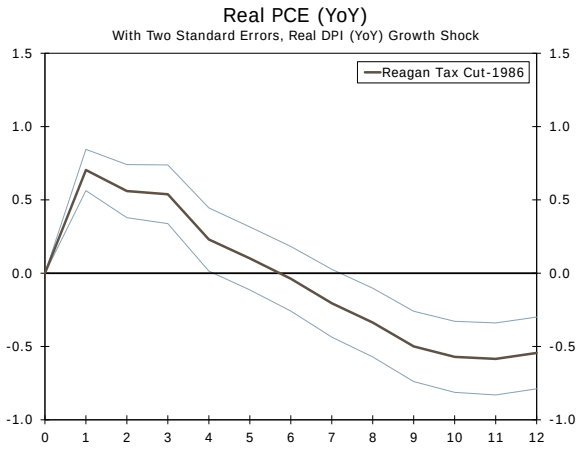

Figure 2: Estimating the Direct Effect of Bush Tax Cut on Personal Consumption

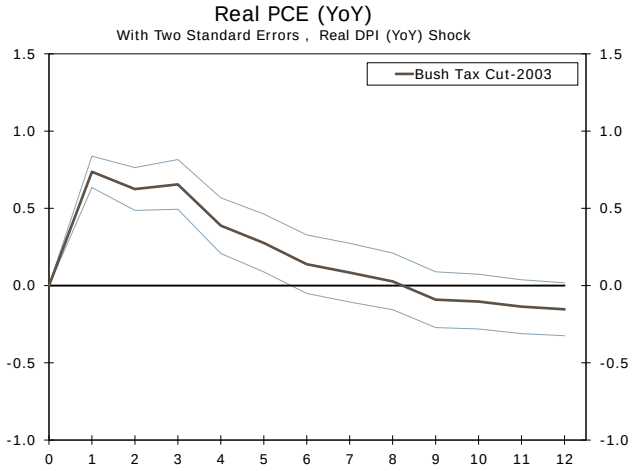

Figure 3: Estimating the Direct Effect of Trump Tax Cut on Personal Consumption

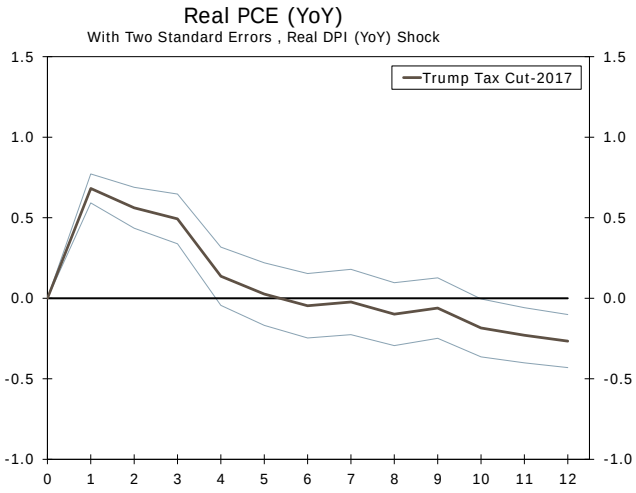

Figure 4: Estimating the Direct Effect of Bush Tax Cut on Corporate Profits

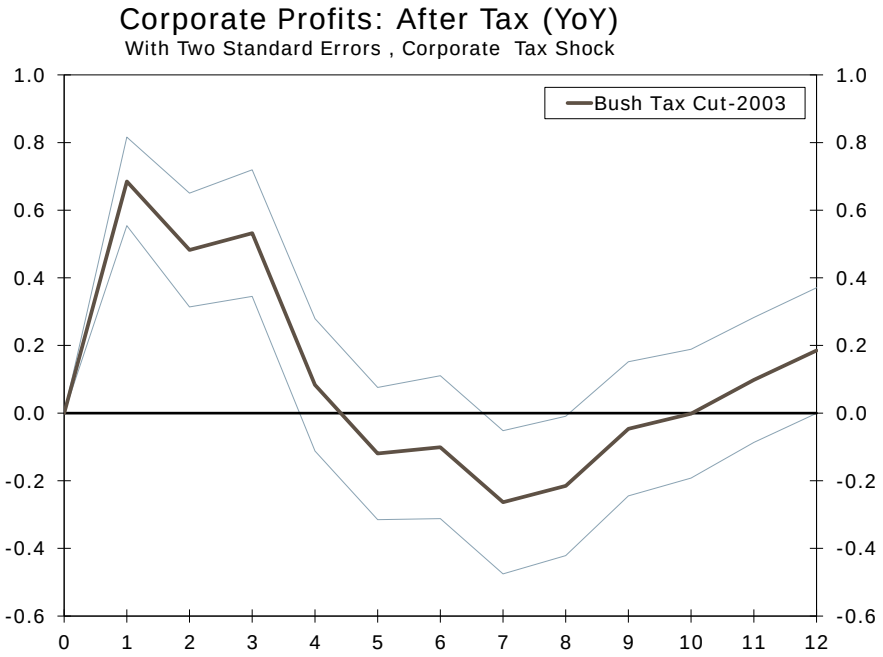

Figure 5: Estimating the Direct Effect of Trump Tax Cut on Corporate Profits

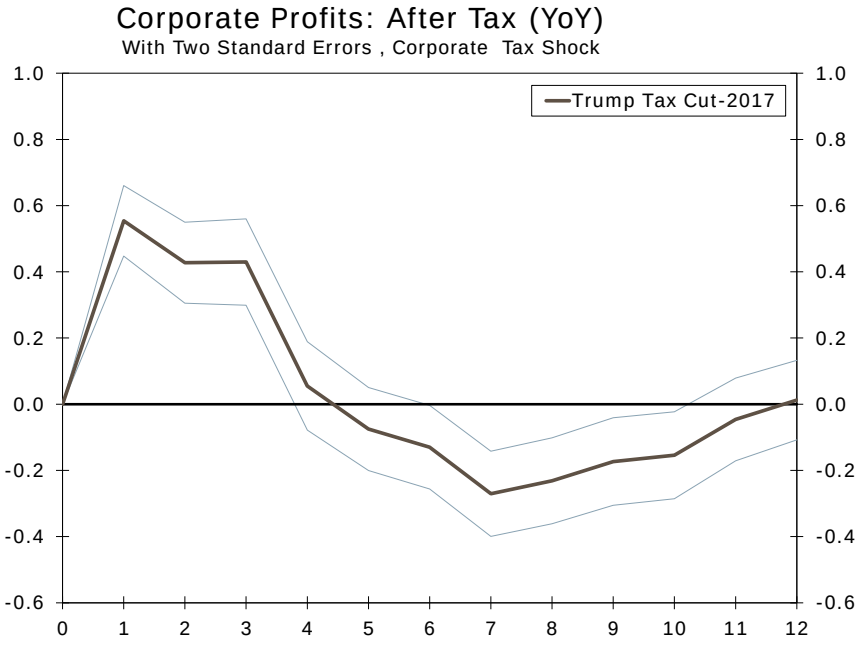

Figure 6: The Animal Spirits Index (12-Month Moving Average)

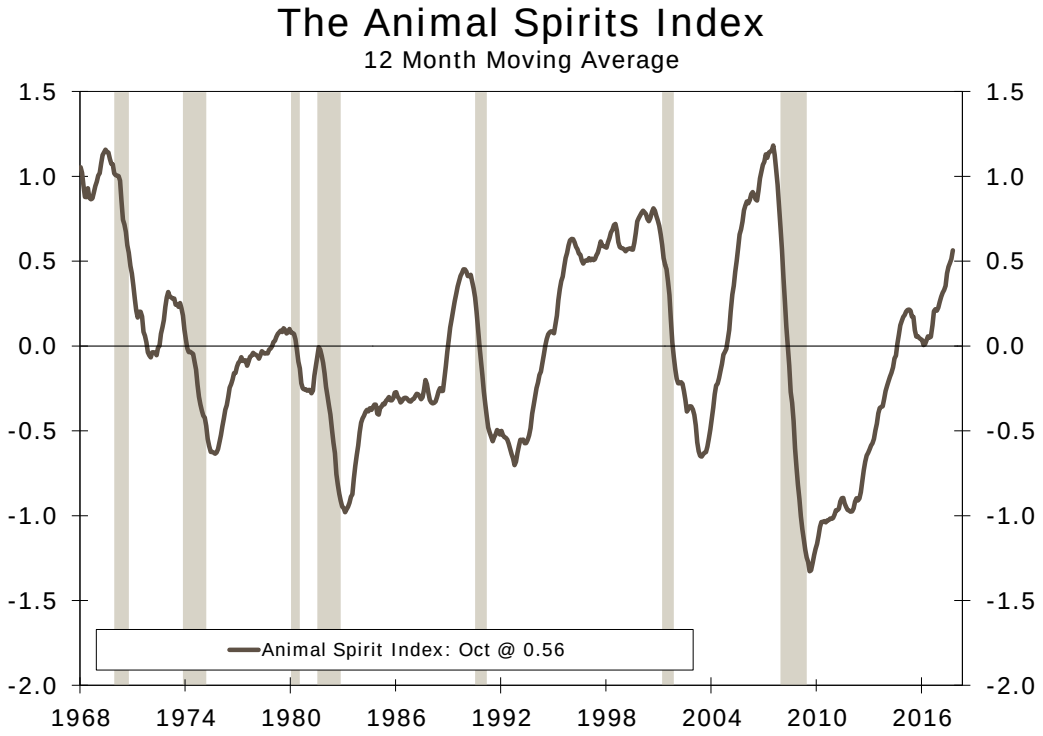

Figure 7: The Level of the Animal Spirits Index

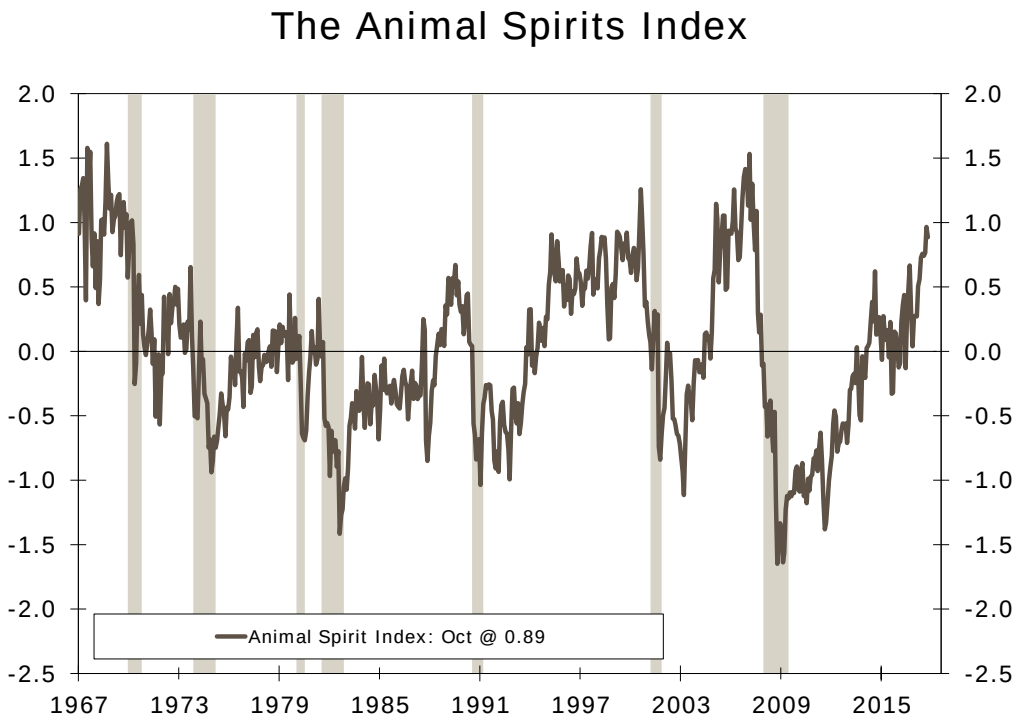

Figure 8: Monetary Policy and the Animal Spirits Index: Reagan 1986

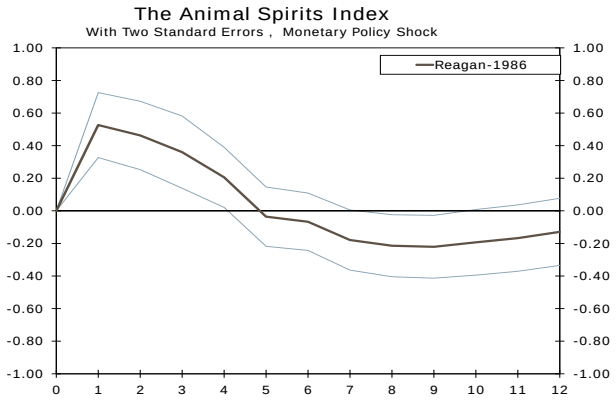

Figure 9: Monetary Policy and the Animal Spirits Index: Bush 2003

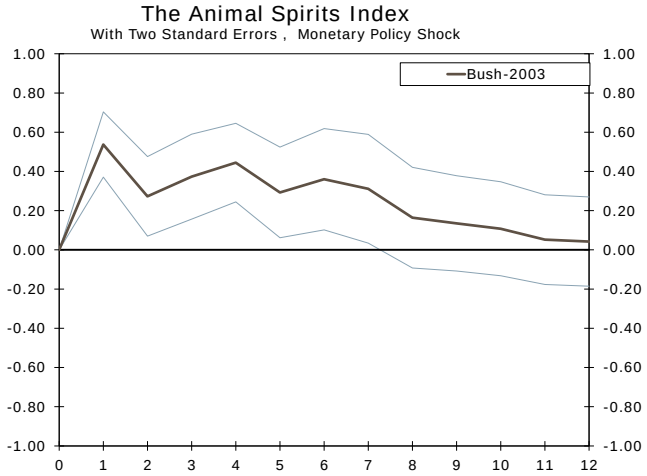

Figure 10: Monetary Policy and the Animal Spirits Index: Trump 2017

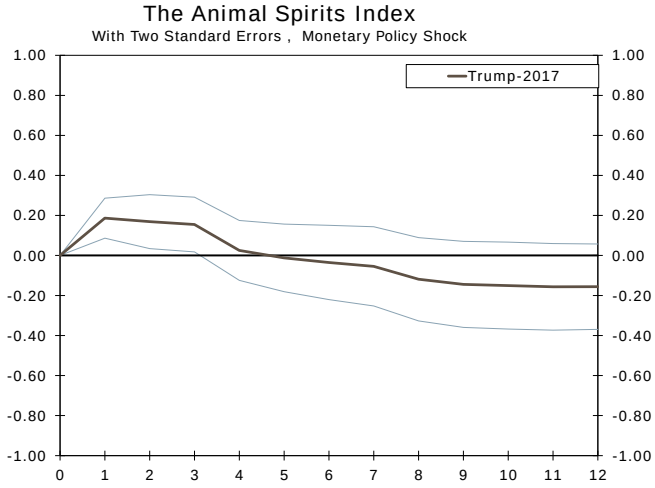

Figure 11: Fiscal Policy and the Animal Spirits Index: Reagan 1986

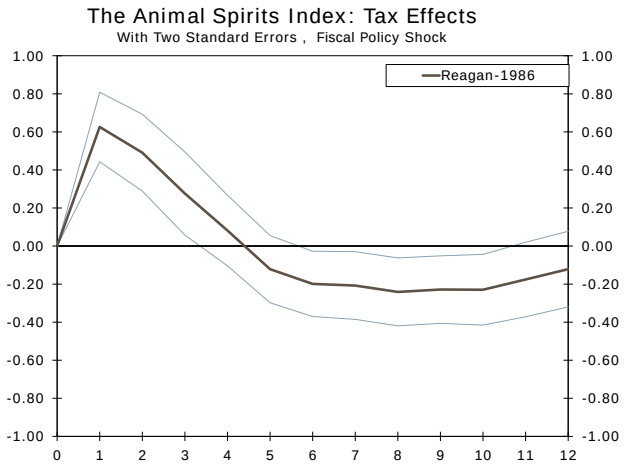

Figure 12: Fiscal Policy and the Animal Spirits Index: Bush 2003

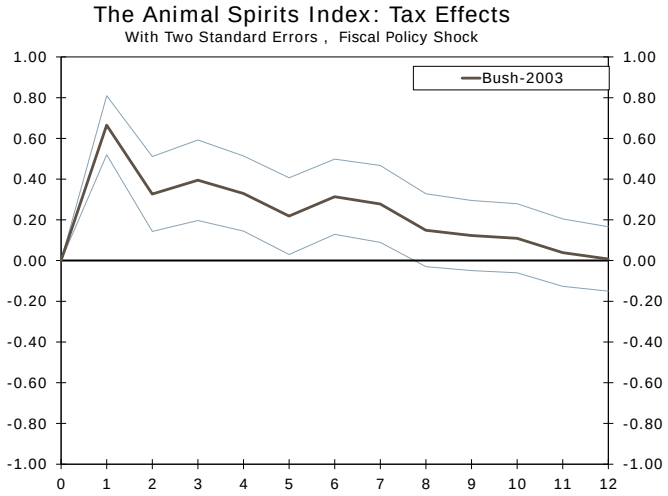

Figure 13: Fiscal Policy and the Animal Spirits Index: Trump 2017

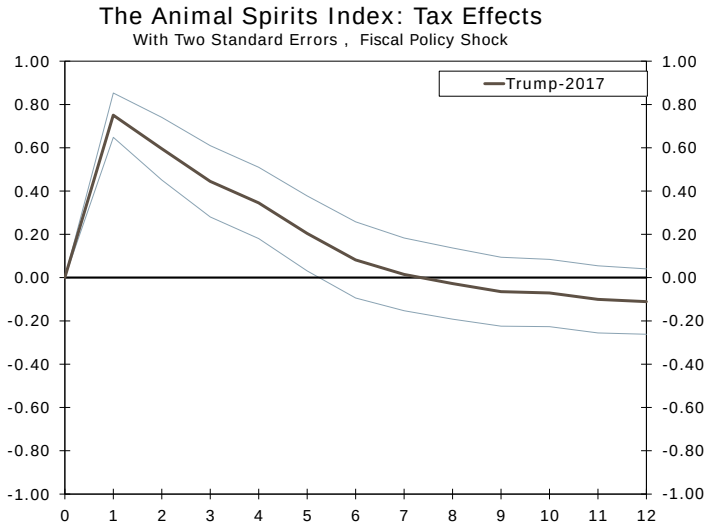

Figure 14: The Animal Spirits (Indirect) Effect on Consumption: Reagan 1986

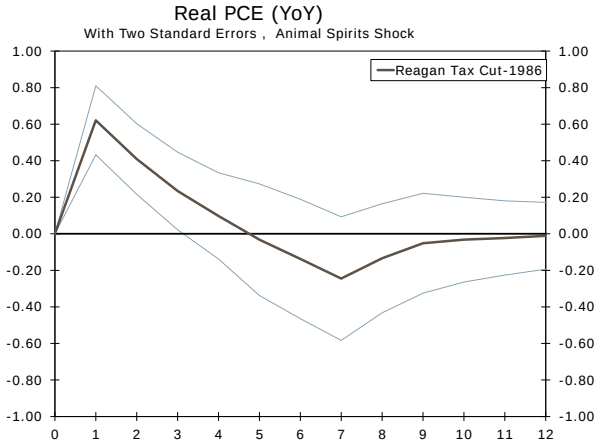

Figure 15: The Animal Spirits (Indirect) Effect on Consumption: Bush 2003

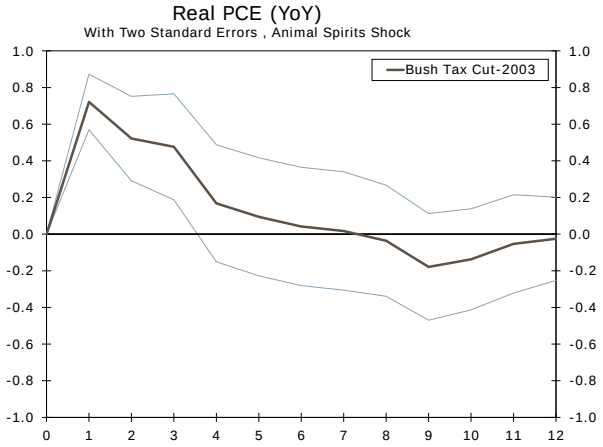

Figure 16: The Animal Spirits (Indirect) Effect on Consumption: Trump 2017

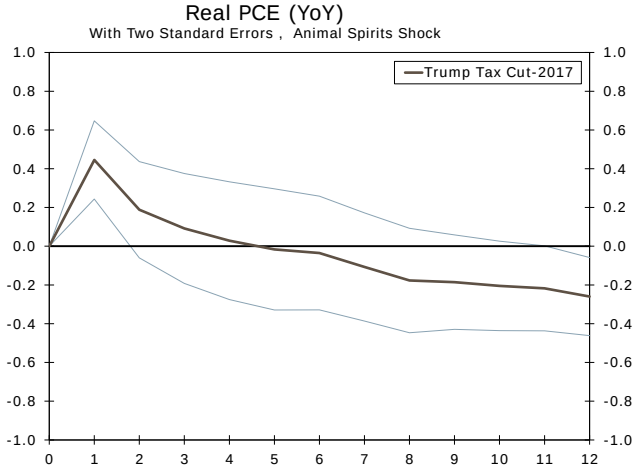

Figure 17: The Animal Spirits (Indirect) Effect on Profits: Reagan 1986

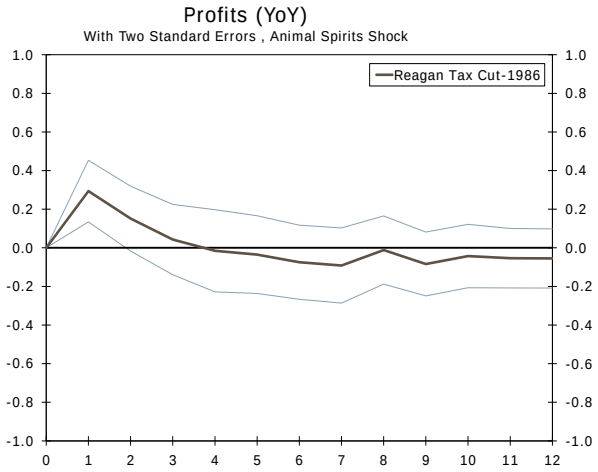

Figure 18: The Animal Spirits (Indirect) Effect on Profits: Bush 2003

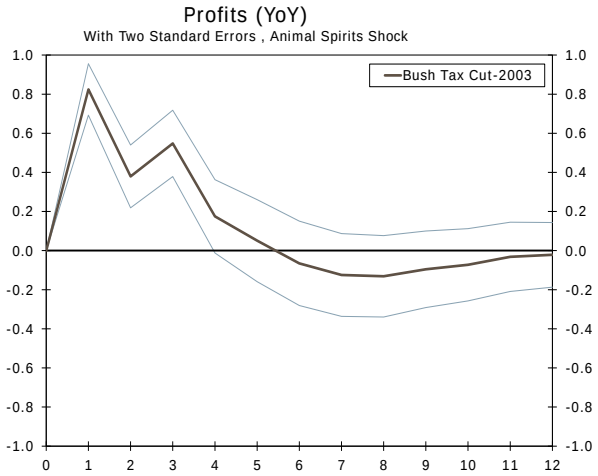

Figure 19: The Animal Spirits (Indirect) Effect on Profits: Trump 2017

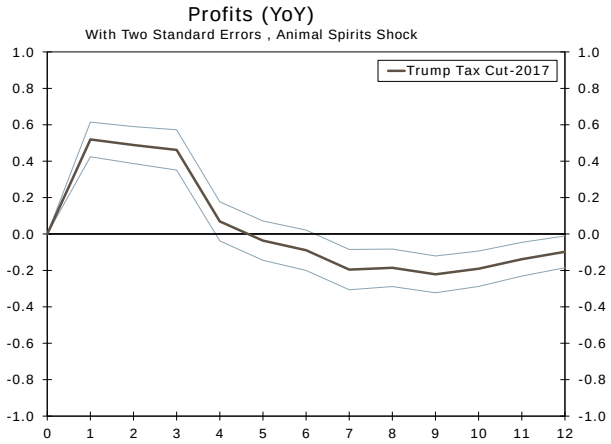

Figure 20: The Animal Spirits Effect on S&P 500 Index: Reagan 1986

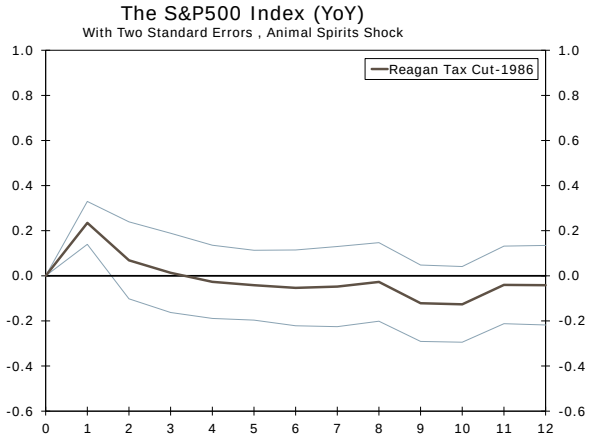

Figure 21: The Animal Spirits Effect on S&P 500 Index: Bush 2003

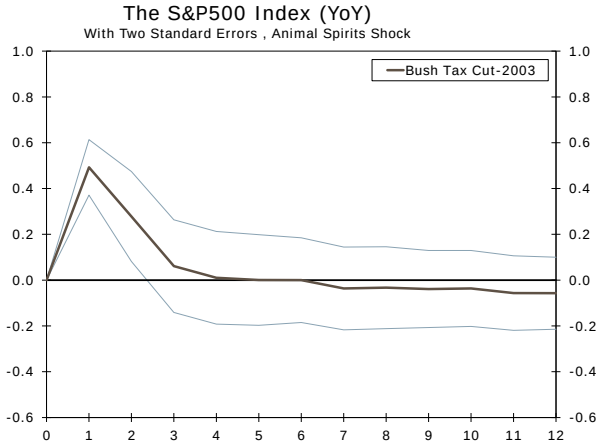

Figure 22: The Animal Spirits Effect on S&P 500 Index: Trump 2017

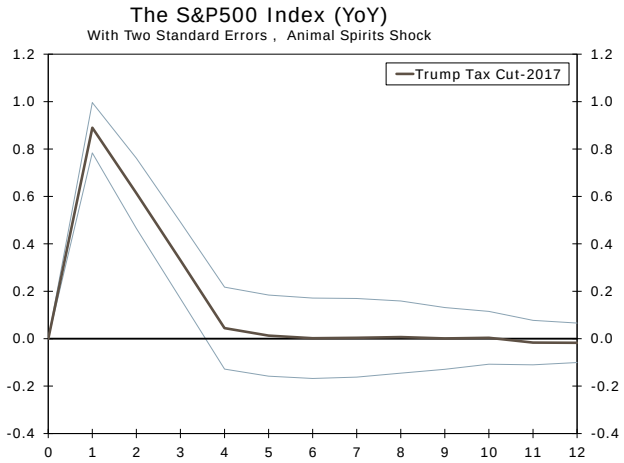

Figure 23: The Animal Spirits Effect on Food Stamps: Reagan 1986

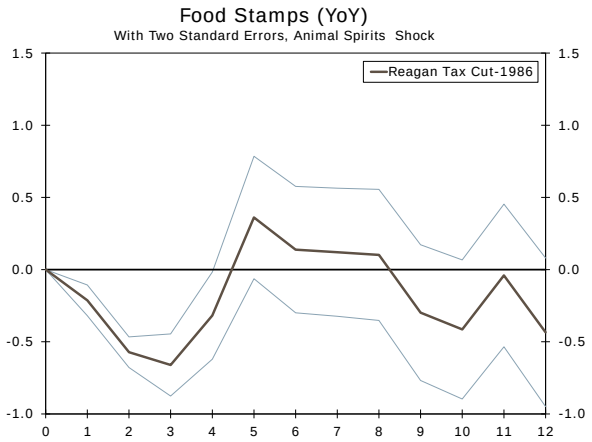

Figure 24: The Animal Spirits Effect on Food Stamps: Bush 2003

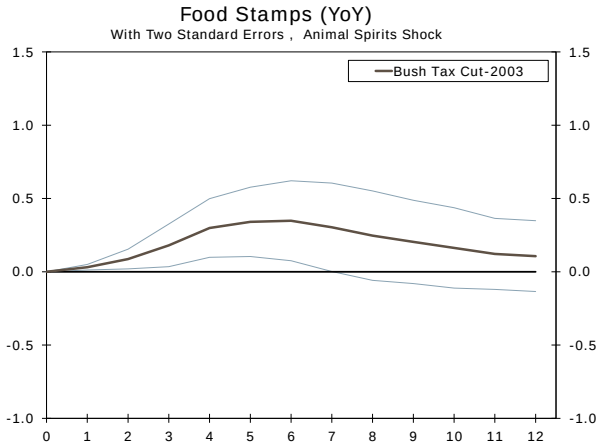

Figure 25: The Animal Spirits Effect on Food Stamps: Trump 2017