Mihai V. Dohotaru '13

The Housing Bubble and the US Labor Market after

The Great Recession

ABSTRACT

Throuhgout this paper we aim to provide a comprehensive outlook on the conditions of the US labor market before, during, and after the 2008 recession. First, we survey a multitude of causes given for the severity of the recession and the subsequent weak labor market recovery, paying particular attention to both the arguments on the structural as well as those on the cyclical side of the unemployment debate. Next, we analyze major US labor market flows and trends to determine the long-term direction of gross labor flows as well as any significant deviations from the trends during and around the 2008 recession that might explain the lack of a robust recovery. Then, we conduct an overview of the significance of household leverage for the recovery by contrasting consumers that are highly levered with those that are low levered and determining the effects on future consumption growth. After that, we develop our own analysis using vector autoregressive models to estimate the relationship between a number of household balance sheet variables and the job creation rate and find that, given our ongoing assumptions, household leverage does play a significant role in the job creation mechanism. Finally, we offer timely policy advice that could alleviate some labor market issues and streamline a smoother recovery.

I. **Introduction**

The recent recession has been the most brutal since World War 2, earning the name *The Great Recession*. Not only did the unemployment rate rise steeply from 5% in December 2007 to 10.1% in October 2009, both the number of long-term unemployed as well as the median duration of unemployment reached a post World-War 2 high of 6,691people and 25.5 weeks respectively in June 2010 (Bureau of Labor Statistics). Accompanying these worrying signs have been deviations from both the Beveridge Curve and Okun's Law starting with 4Q 2009, both of which have long been considered reliable labor market indicators (Elsby, Hobjin, and Sahin 2010).

Characteristics showing an extremely weak labor market as well as deviations from long-lasting economic trends have prompted economic analysts to consider the effect of structural factors on the labor market. Others have maintained their view that current labor market developments are representative of cyclical factors and that the labor market will recover, albeit at a slower pace than usual. Overall, there seems to be a long-term decline in the rate of job creation in the US economy (Business Dynamics Statistics) combined with a trend of slower labor market recoveries following economic downturns. While both the 1974 and 1982 recessions experienced sharper drops in employment than the 1991 and 2001 recessions (Figure 1), they also exhibited much speedier recoveries in terms of growth in the level of employment (Figure 4). In particular, while the 2001 recession was very shallow in terms of the drop in GDP, employment took nearly 48 months or four years to get back to where it was in 2001, signalling a weak and prolonged labor market recovery (Figures 1 and 4).

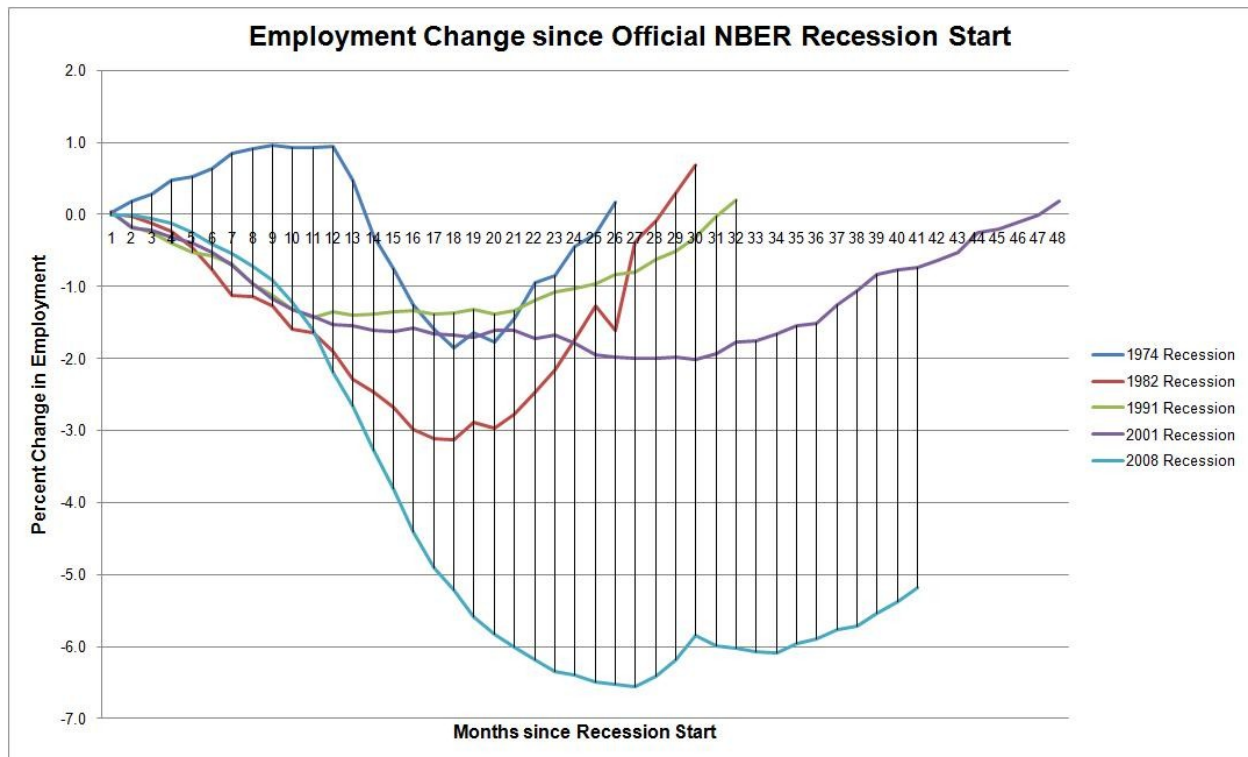**Employment Change since Official NBER Recession Start**

Figure – Percentage change in employment from official NBER recession start dates, calculated as change in the natural logarithm of employment. Data Source: Bureau of Labor Statistics

GDP growth following the official end of the 2008 recession in 2Q 2009 was not accompanied by a similar significant improvement in labor market conditions (Figure 4). Even more striking is that nearly all of the fall in unemployment from 10.1% in October 2009 to 8.9% in February 2011 is estimated to have come from people leaving the labor force rather than people becoming employed (J.Bradford DeLong 2011). Under these conditions, the question of why high unemployment has nearly become persistent requires extensive investigation and is of high importance for policymakers both in the US and worldwide.

II.   Structural and Cyclical Unemployment

In policy debates regarding the unemployment rate, the divide has often been between believers in structural versus cyclical unemployment. Those advocating for structural unemployment see the emergence of skill mismatch, lack of geographic mobility, and the extension of unemployment benefits as drivers of the unemployment rate whereas those advocating for cyclical unemployment believe a significant drop in demand following the housing bubble and the financial crisis is at the root of the current labor market weakness. A comprehensive picture emerges only by analyzing both points of view and determining the extent to which their hypothesized effects contribute to the labor market weakness.

i.   Skill Mismatch and Geographic Mobility

Using academic literature and empirical evidence there seems to be a strong argument against both skill mismatch across sectors and a fall in geographic mobility. While employment fell 25% and unemployment rose to 20% in construction – the most affected sector in the recession – the sector accounts for only a small amount of total employment, so the overall estimated effect on the unemployment rate is less than 0.4% (Valetta and Kuang 2010). Similarly, those who argue that low skilled jobs are being outsourced should look at David Autor's analysis, which concludes that while over the period 1990 to 1999 both demand for high and low skilled jobs increased, over the period 2000 to 2009 the demand for all but the lowest skill jobs decreased (Dean Baker 2011). Furthermore, both vacancy yields and quit rates are below their expected level across a multitude of industries – not merely construction, manufacturing, and finance –

suggesting that the significance of skill mismatch is not very high (Daly, Hobjin, and Valetta 2011).

Using an American Household Survey sample from California in the 1990s Ferreira, Gyourko, and Tracy estimate that negative equity leads to a 5.6% reduction, each $10,000 in mortgage losses leads to a 1.7% reduction, and each $1,000 mortgage interest differential leads to a 2.8% reduction in the two-year mobility rate (Ferreira, Gyourko, and Tracy 2008). Whether such decreases in mobility could be significant at the aggregate level remains to be investigated. Further, many analysts found a decrease in household mobility by using US Census data on mobility, yet Mike Konczal discovered that while mobility decreased after 1996, the decline in mobility due to the 2008 recession is not significant and resulted from a bug in the data (Mike Konczal 2010). Finally, the similarity in the experience of college graduates in this recession with that in other recessions suggests that the importance of skill mismatch and geographic mobility is overstated, because college graduates are the group that suffers the least from both of these two effects (Hobjin, Gardiner, and Wiles 2011).

ii.   **Extended Unemployment Benefits**

The extension of unemployment benefits has been a controversial political topic. While unemployment benefits alleviate the social suffering of those who are unemployed for a longer time, some have argued that they also lead to an increase in the unemployment rate and duration. Research estimates that extended unemployment benefits expiring on January 3rd 2012 have contributed nearly 0.8% to the unemployment rate and 3.5 weeks to the median duration of unemployment (Daly, Hobjin, and Valetta 2011). Others

estimate that a 53-week increase in unemployment benefits leads to a 0.7% to 1.8% increase in the unemployment rate and a 4.2 to 10.6 week increase in the unemployment duration, with EUB responsible for nearly 15% to 40% in the increase in the duration of unemployment spells (Elsby, Hobjin, and Sahin 2010). While these numbers seem significant, it is important to realize that unemployment benefits likely represent a temporary effect on the labor market, which will dissipate once they expire, conditions improve, and hiring picks up.

There are other worrying signs though, that suggest very weak labor market conditions. The take up rate, the rate at which those who are eligible for unemployment benefits apply for them, was 37% higher in 2010 than it was in 2007 (Hobjin and Sahin 2011), likely implying that weak hiring prospects lead many more to rely on unemployment benefits for sustenance. Further, estimates show that nearly 4.5% of the male adult population relies on disability benefits and applications increased by 26.4% over the last two years (Kwok, Daly, and Hobjin 2010). Other provisions such as mortgage modifications that allow a family to pay a maximum of 38% of income to mortgage payments as well as IRS tax breaks for those who show an inability to pay their bills could be reducing the incentives of individuals to seek employment (Casey Mulligan 2009), given weak labor market conditions and the availability of benefits.

iii.   **Changes in the Natural Rate of Unemployment or NAIRU**

Given the difficulty in determining the extent of and quantifying the effects of skill mismatch, geographic mobility, and extended unemployment benefits, economists often use a measure referred to as the natural rate of unemployment or the non-accelarating

inflation rate of unemployment (NAIRU). It represents the rate of unemployment the economy would have were it producing at full capacity under normal inflation, and was estimated at around 5% before the recession of 2008. There are several approaches accepted by academics for measuring the NAIRU, like using the shift in the Beveridge Curve, measuring the ease with which individuals find employment, looking at the job quits rate across the economy, or determining the easiness with which private businesses hire. The median estimate for the NAIRU using all of these approaches and the quarter average for 2010 is 6.7%, up from 5% in 2007 before the recession, yet most of the increase likely stems from extended unemployment benefits and is therefore likely to be temporary (Weidner and Williams 2011).

More importantly, a shift in the Beveridge Curve does not necessarily indicate structural unemployment through one-to-one increases in the NAIRU, because there have been temporary increases in the NAIRU in the past (in the 1980s) which were always less than the shift in the Beveridge Curve and receded once the recessionary period ended (Valetta and Kuang 2010). A more reliable approach is Pissarides' model in which the unemployment rate is determined by the intersection between the Beveridge Curve and the Job Creation Rate. Using Pissarides' model it is easy to notice that a shift of 3.5% in the Beveridge Curve does not lead to an equal increase in the NAIRU, but rather to an increase between 0.6% and 1.9%, with a preferred estimate of 6.25% for the current NAIRU (Daly, Hobjin, and Valetta 2011). Furthermore, many who use the shift in the Beveridge Curve to estimate the NAIRU do not adjust for a new natural vacancy rate for the new curve. Adjusting the natural vacancy rate from the old 3% to the new 3.5%

yields an estimate for the NAIRU at 6.25% (Barnichon, Elsby, Hobjin, and Sahin 2010), higher than the 5% before the recession, but still a long way away from an unemployment rate of 9.2% in June 2011.

Having analyzed several of the main factors that could be responsible for structural unemployment, the evidence suggests that while some of them such as EUB do indeed influence unemployment and have led to a higher level in the natural rate of unemployment, the effects are neither big enough nor likely permanent to encompass the entire rise in the unemployment rate. Therefore, this would likely mean that there is still considerable slack in the labor market that is not accounted by structural factors, but rather comes from either depressed demand or long-term patterns in employment.

iv.   **Productivity Growth**

One other major reason brought up by many for the lack of a robust recovery in the labor market is strong labor productivity growth. As workers become more productive, firms need fewer of them to produce at a certain level of income. Labor productivity grew at an annualized rate of 2.5% during the 2008 recession and at an even higher annualized rate of 2.8% over the course of the GDP recovery (3Q 2009 – 2Q 2010). Even after adjusting for the fact that labor productivity has been growing faster since 1996, both the 2001 and 2008 recessions exhibited strong growth in labor productivity (Daniel Wilson 2010).

Looking at the other major recessions – 1974, 1982, and 1991 – none of them display the productivity growth rates found during the 2001 and 2008 recessions, showing

mainly small productivity increases or even declines (Figure 2). Even when looking at the quarterly averages of the productivity growth rates, only the 2001 and 2008 recessions both show substantial increases each quarter. Many associate rising labor productivity rates during recessions with *jobless recoveries*, as businesses reorganize and delay adding to employment.
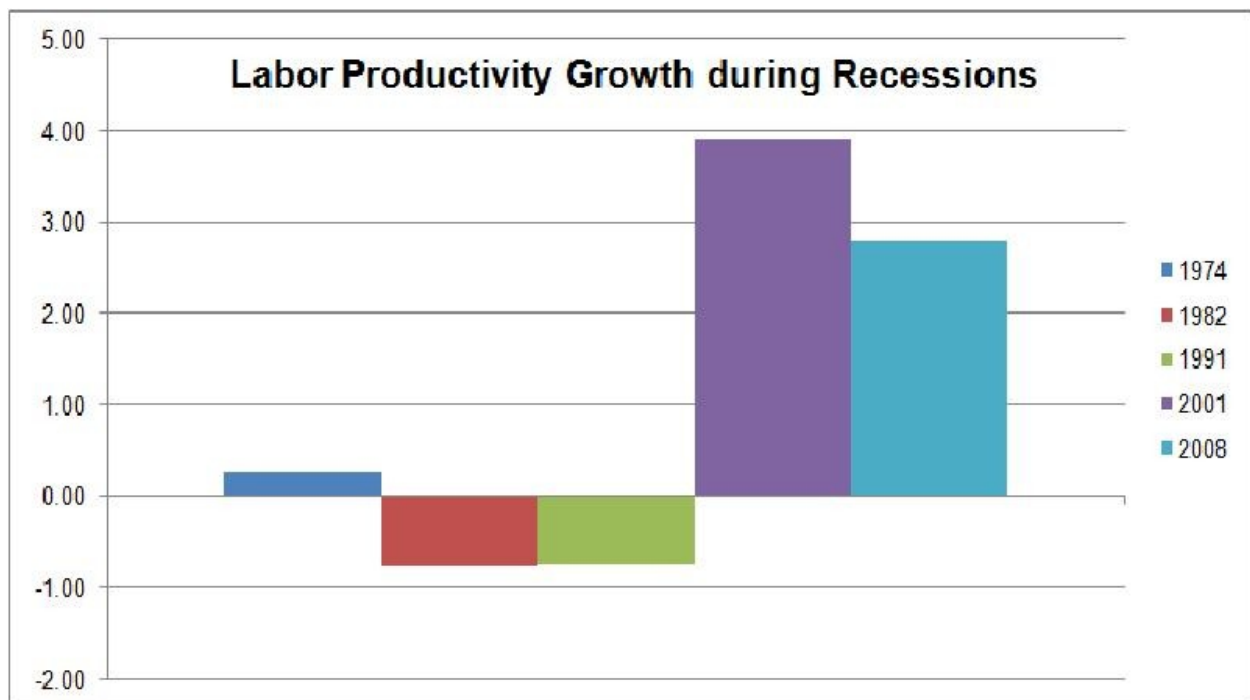

Figure – Total changes in labor productivity, calculated using an indexing method and official NBER recession dates. Data Source: Federal Reserve Bureau of San Francisco, John Fernald

TFP (total factor productivity) is a measure that determines the growth in GDP not coming from growth in inputs like labor or capital. While TFP declined during the recession and rebounded significantly during the subsequent recovery, using a measure of TFP created by John Fernald that takes into account changes in how intensly firms utilize labor, TFP adjusted for utlization actually surged during the recession and

declined during the subsequent recovery (Fernald and Matoba 2009). Therefore, there is a significant disparity between TFP and adjusted TFP, much of which can be accounted for by firms changing the intensity with which they utlilize labor at different times during a downturn and a recovery (Figure 3).
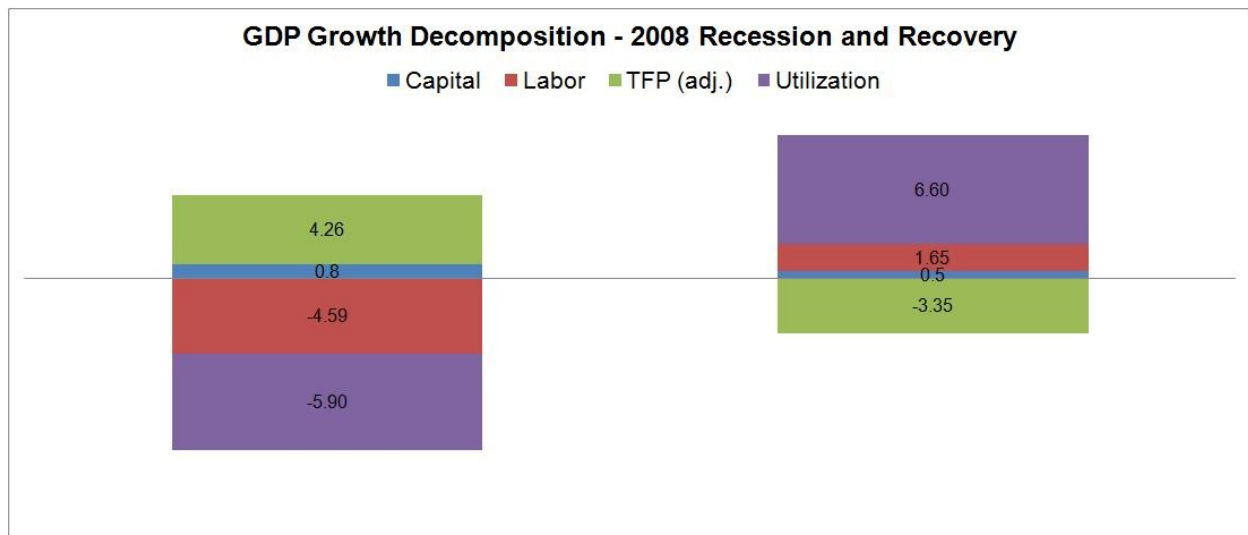

Figure – GDP growth decomposition during the 2008 recession (1Q 2008 to 2Q 2009) and the subsequent recovery (3Q 2009 to 4Q 2010). Data Source: Federal Reserve Bureau of San Francisco, John Fernald

When the recession first strikes firms have more workers than they need, given that demand has fallen and revenue streams are weakening. As a result, when income falls and labor remains constant firms are underutilizing their workers and the same people are now producing less than before. Subsequently, as the recession deepens and firms face significant additional costs due to labor, they start to layoff workers massively. As the income decline stabilizes, firms attempt to maintain and increase output without hiring additional workers, leading to a surge in worker utilization (Figure 3). In times of great economic uncertainty marked by the absence of a strong rebound in demand,

firms delay the hiring of new workers and attempt to gain more out of every worker through management practices and increased capital utilization, both of which serve to increase labor productivity (Daly, Hobjin, and Valetta 2011).

In the long run TFP growth is mainly driven by changes in knowledge, technology, and efficiency, yet in the short run an increase in utilization adjusted TFP like that during the 2008 recession could be driven by firms deferring intangible investments to handle present cash flow concerns. If this were the case, then there would be little evidence for a fall in potential output during the recession, meaning the current output gap is significant (Fernald and Matoba 2009). A large output gap would signify that the labor market presents significant slack and that the unemployment rate has the potential to fall to a lower level given sufficient demand in the economy.

After the housing bubble burst, both household as well as corporate saving went up whereas public saving reached staggering negative levels. While corporate profits have reached record levels, firms are breaking the positive feedback loop in the economy by not translating higher profits into more hiring, which would lead to higher wages, income, and tax revenue. Rebecca Wilder finds that there is a positive correlation of 85% between the corporate saving glut and the unemployment rate, with her estimate for the natural rate being 5.8% if the corporate saving glut were zero (Rebecca Wilder 2011). Investigating the causes of why the private sector currently deos not create enough jobs to bring the unemployment rate down to its natural level is a question worth pursuing throughout the rest of this paper.

III. Employment Flows in the US Economy

To obtain a comprehensive outlook on the US labor market it is necessary to take into account most or all of the worker flows throughout the economy, like job creation, hiring, quit rates, layoffs, and many others. For example, while net job creation during 2008 stood at almost 1 million, gross job creation was around 17.5 million and gross job destruction around 16.5 million (Business Dynamics Statistics), making it is important to understand that most net flows in the labor market are driven by significantly larger gross flows.

i. Inflows and Outlfows

Every month nearly 2.5% of the population moves between the three states consisting of employment, unemployment, and out of the labor force. A key observation is that the percentage of people undergoing these flows can have the same value at differing unemployment rates (e.g. 1994 and 2003). This implies that the value of the unemployment rate is a very broad measure of the condition of a labor market at a point in time that fails to capture underlying trends and dynamics. There is empirical evidence that employer-to-employer flows have fallen during recessions and failed to recover during subsequent expansions (Fallick and Fleischmann 2004), movements not captured by changes in the unemployment rate. Therefore, to understand the robustness of the US labor market economic analysts have to look at the major underlying flows.

Two major causes for fluctuations in the unemployment rate are the rate of inflows into and outflows out of unemployment. Inflows into unemployment occur when individuals are laid off, quit, or enter the labor force whereas outflows out of unemployment occur when individuals either find a job or leave the labor force. Inflows and outflows normally move cyclically in opposite directions: inflows rise and outflows fall at the start of the recession whereas inflows fall and outflows rise during the subsequent recovery.

During the 1974 and 1982 recessions, these flows moved with a lag in opposite directions at nearly the same rate, leading to robust labor market recoveries following the recessions (Figures 1 and 4). During the 1991 and 2001 recessions, however, inflows were not as strong as before yet outflows were very weak (Figures 1 and 4), leading to long protracted labor market recoveries, termed as *jobless recoveries* (Daly, Hobjin, and Kwok 2009A). The 2008 recession combines both the sharp decline in employment during the 1974 and 1982 recessions with the slow recovery in employment of the 1991 and 2001 recessions (Figures 1 and 4), making it one of the worst recessions in terms of labor market conditions after the Great Depression.

Currently, both the share of those who have been permanently laid off as well as the share of those who are involuntarily employed part-time for economic reasons is at historical highs. In comparison, the share of those temporarily laid off in the 1982 recession nearly doubled, whereas in the current recession that share declined, suggesting that many of the jobs lost will not come back quickly. Furthermore, outflows from unemployment reached a postwar low during 4Q 2009 (Daly, Hobjin, and Kwok 2009A) and show few signs of a strong recovery.
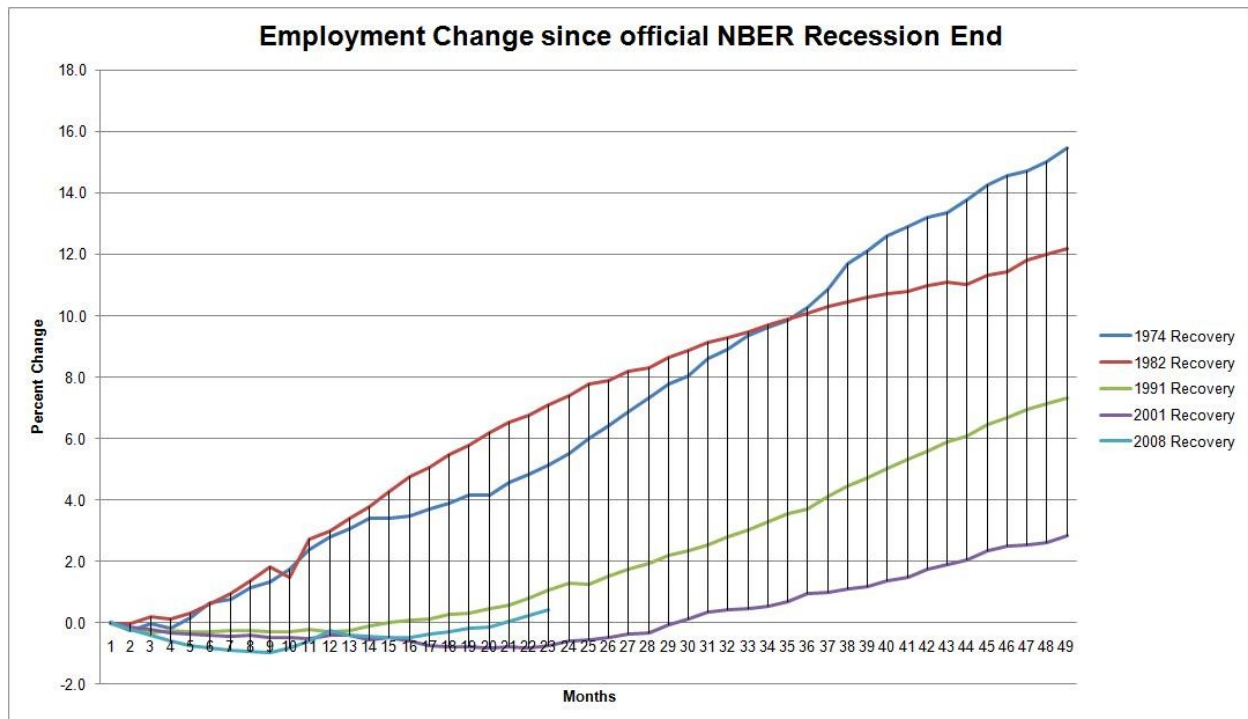
Figure 4 – Percentage change in employment up to four years from official NBER recession end dates, calculated as change in the natural logarithm of employment. Data Source: Bureau of Labor Statistics

Barnichon uses a matching function to explain the influence on changes in the unemployment rate of two of the most fundamental flow determinants: vacancy posting and job separation. With the matching function, it can be estimated that job separation determines nearly 40% of the changes in the unemployment rate, but almost 62% in the assymetry of the trend faced by the unemployment rate, with the rest being accounted by vacancy posting (Regis Barnichon 2009). Consequently, while job separation is essential in the early stages of a recession to bring the unemployment rate up, it is vacancy posting – leading to employment growth – that is the predominant factor for the recovery and expansion of a labor market.

One should also note that changes in the job separation rate are negatively correlated with productivity growth and move concurrently whereas changes in job finding are positively correlated with productivity growth and move with a lag (Fujita, Shigeru, and Ramey 2009). These observations are in accordance with the TFP adjusted for utilization analysis in [II. iv.], which claimed that firms layoff workers massively to reduce costs once they realize the severity of a recession, but then only slowly begin hiring once demand picks up and firms can support the additional costs of labor. The length of the lag depends mainly on the economy's ability to recover in terms of employment from the recession (Figure 4).

Furthermore, in recent decades the importance of job separation for changes in the unemployment rate has decreased, mainly because there has been a fall in both vacancy posting and layoffs (Fujita, Shigeru, and Ramey 2009). This means that overall recessions have become less steep in terms of the drop in employment (1991 and 2001 versus 1974 and 1982 recessions – Figure 1), but it also takes a longer time for the labor market to regain the lost employment during the recovery (1991 and 2001 versus 1974 and 1982 recoveries – Figure 4). Many analysts who look at initial unemployment claims overstate the issue in terms of layoffs and understate it in terms of job creation. The average of 470,000 weekly unemployment claims for 2010 seems high given that GDP growth was positive in all quarters, yet the numer reflects not only layoffs, but also how many eligible individuals decide to claim unemployment benefits in a given week, also known as the take up rate. Therefore, weekly UI initial claims = layoffs x eligibility rate x take up rate. Adjusting for the fact that the take up rate was 37% higher in 2010

than in 2007, the new estimate for initial weekly unemployment claims becomes 386,000 (Hobjin and Sahin 2011). The increased reliance of people on unemployment benefits likely reflects the underlying weak labor market conditions, most likely caused by the job creation rate reaching a record low-level postwar (Figure 5).
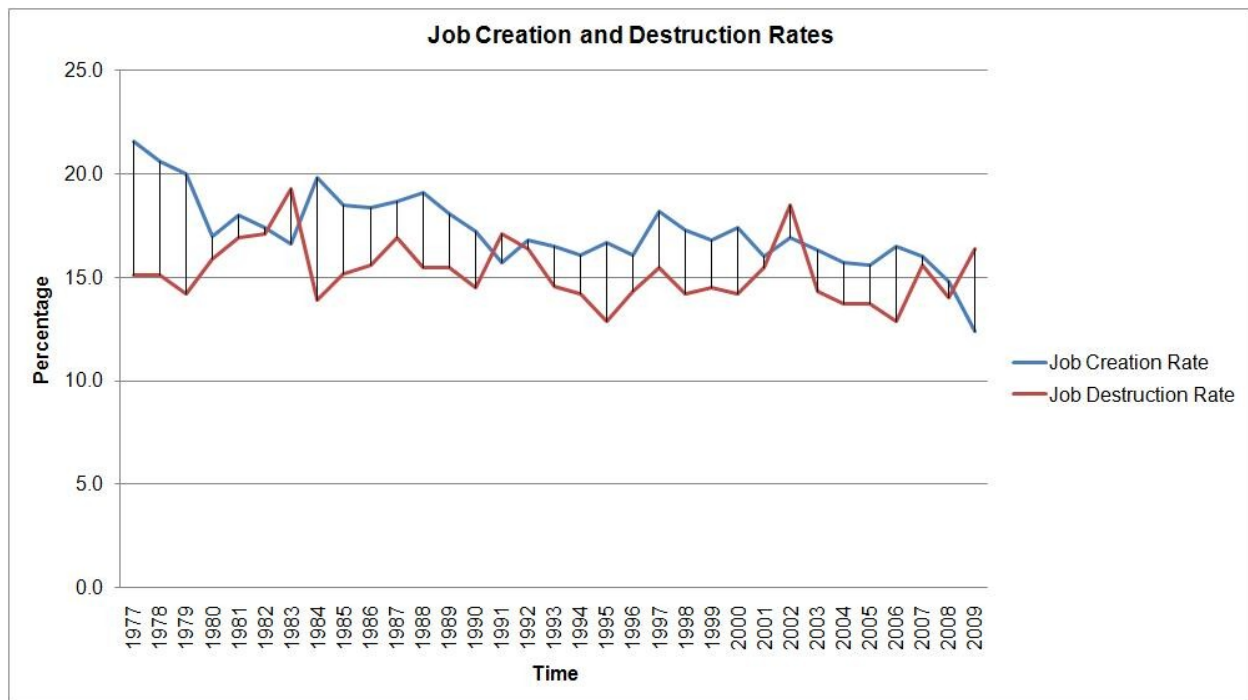

Figure – Job Creation and Destruction Rates in the US economy. Data Source: US Census Bureau, Business Dynamics Statistics

As previously mentioned, while layoffs and inflows are responsible for driving the unemployment rate upwards, job creation and outflows matter much more for the subsequent labor market recovery. Investigating the reasons for the record low job creation rate is essential for understanding the underlying issues facing the condition of the US labor market.

ii. **Long Term Unemployment**

In early 2011 nearly half of the unemployed had been out of work for at least 27 weeks (Krueger and Mueller 2011) and the number reached a post World-War II record high of 6,691 people in June 2010 (Figure 6). Further, in more recent recessions (1991 and 2001), there have been progressively slower recoveries from long-term unemployment when compared to older recessions (1974 and 1982). This suggests a dismal labor market that is not creating jobs at a rate that is fast enough to reduce unemployment, leaving many of the individuals who initially became unemployed relying on benefits while they search for a new job.
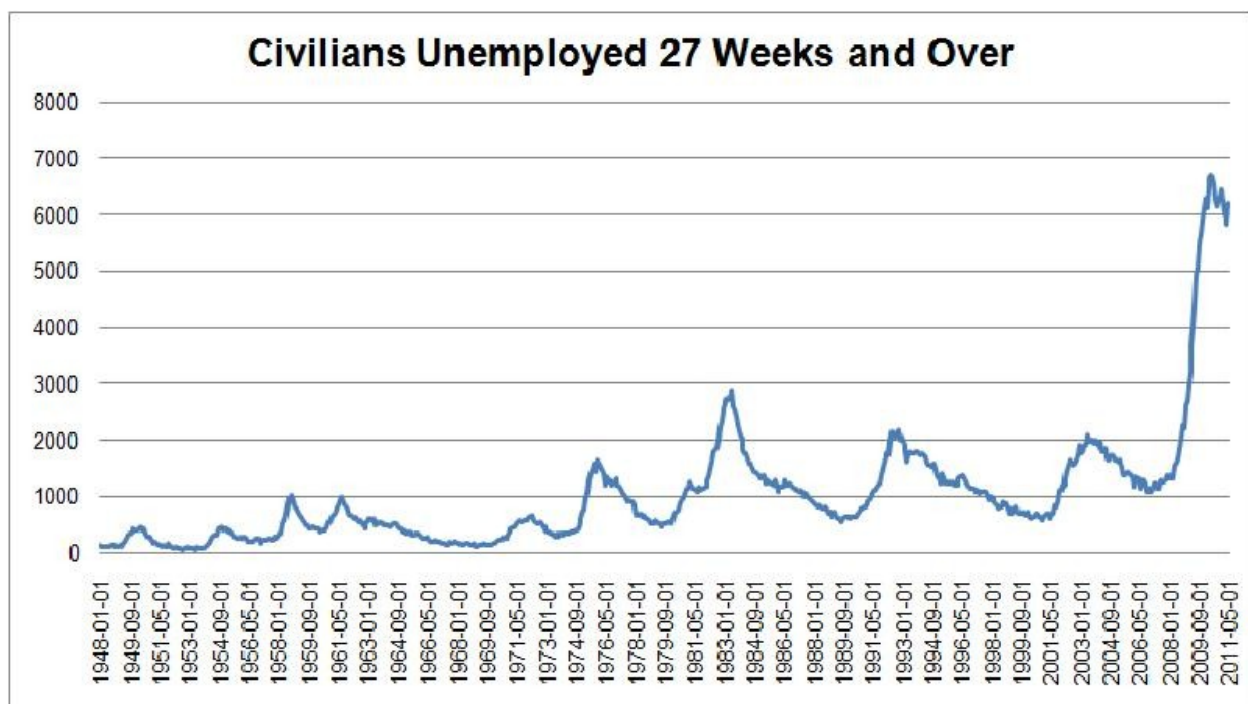

Figure – Number of civilians unemployed 27 weeks and over. Data Source: Bureau of Labor Statistics

Krueger and Mueller describe and analyze the adverse effects of individuals becoming long-term unemployed. The amount of time spent searching for a job declines significantly over the span of an unemployment spell, as workers become increasingly discouraged due to the lack of success in securing employment. What's worse is that the exit rate from unemployment by finding a job is directly correlated with the amount of time one has been unemployed, meaning the long-term unemployed have a significantly smaller chance of finding work the longer they are unemployed (Krueger and Mueller 2011). This lower likelihood of securing employment the longer one has been unemployed likely comes from either discouragement on the part of the worker or very weak conditions in the labor market. Further, the BLS published an issue in May 2011 that showed that the longer workers are unemployed the higher the rate at which they decide to exit the labor force alotgether instead of continuing to search for employment. A significant indicator Krueger and Mueller found was the reservation wage, the wage workers expected to receive in exchange for them becoming employed rather unemployed and collecting benefits. Estimates show that a lower and more modest reservation wage leads to a higher probability of securing employment and subsequently remaining employed (Krueger and Mueller 2011).

iii.   **Labor Participation**

While often overlooked, labor participation has recently played a crucial role in explaining the decline in unemployment from 10.1% in October 2009 to 8.9% in February 2011 (J.Bradford DeLong 2011). When labor market conditions are weak, yet financial markets offer strong asset returns and there is good credit availability

combined with generous unemployment benefits, individuals might decide to eventually leave the labor force and pursue other opportunities (Daly, Hobjin, and Kwok 2009B). Such a movement would bring the unemployment rate down in boom times without necessarily leading to an improvement in labor market conditions. Labor market participation growth slowed down during the 1990s as the stock market boomed and the rise in female labor participation tapered off, started declining during the 2000s as both the stock and housing market boomed, and is currently in a declining trend (Figure 7).

Figure   – Labor participation as a percent of the working age population. Data Source: Bureau of Labor Statistics

The pace at which the unemployment rate will fall over the next few years depends in large part on labor participation as much as it does on a labor market recovery. The labor participation rate fell from 66% before the financial crisis and reached a twenty-five year low of 64.7% in August 2010, explaining much of the fall in the unemployment

rate. At a population growth rate of 1% per year, the US would have to add an average of 100,000 jobs per month just to keep the unemployment rate at a constant level, given the current participation rate. The CBO predicts the unemployment rate will drop to 7.96% by 2012 given a participation rate of 64.8%, meaning the economy would have to add around 227,000 jobs per month. During the previous economic expansion job creation stood at an average of 124,000 per month, well below both what the BLS (294,000), SSA (208,000), and CBO (227,000) require for the unemployment rate to fall to around 8% in 2012 (Kwok, Daly, and Hobjin 2010). Given the current meagre job creation rate of 25,000 in May and 18,000 in June 2011, all of these previous estimates seem extremely optimistic in terms of job creation. While it is possible that the unemployment rate falls to 8% in 2012, the more likely scenario under current trends is that the reduction comes from a further decline in labor participation.

iv. **Long-Run Private Sector Job Creation**

Analyzing the way businesses create and destroy jobs is crucial in determining the overall trends in the labor market that might be significant for the current weakness in the recovery. The US economy has long been heralded as the epitomy in terms of labor market dynamics and policies. US Census Bureau published Business Dynamics Statistics data between 1977 and 2009 suggests a long-term decline in both the job creation and destruction rates. Every decade since the 1970s witnessed on average a much lower rate of job creation and a slightly lower rate of job destruction, meaning that on net employment in the economy grew at a slower rate as time went by (Figure 8). The effect of this decline could lead to an overall slowdown in the labor market, which

then becomes more apparent when the economy undergoes a downturn and takes a longer than usual time to recover back to full employment. Understanding some of the causes behind these developments could shed light on the slowness of the labor market recovery.
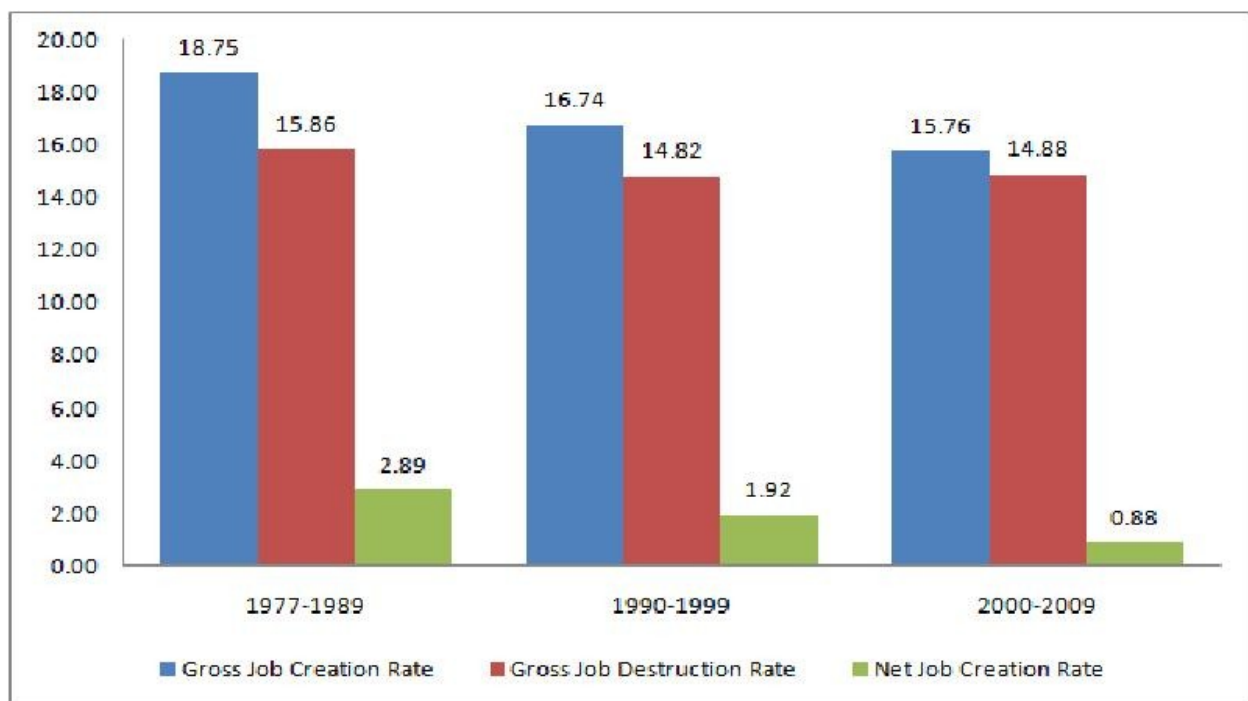

Figure – Gross job creation rate, gross job destruction rate, and net job creation rate, calculated as average of all the values during the indicated periods. Data Source: US Census Bureau, Business Dynamics Statistics

Every year new firms in the economy add on average 3% to employment, making them a major contributor to employment growth. Over the period 1987 to 2005, net job creation was on average 1.8% of employment, meaning without new firms constantly creating jobs employment in the overall economy would decline (Haltiwanger, Jarmin, and Miranda 2008). This implies that the labor market depends on constantly renewing itself through individuals pursuing entrepreneurial activities that lead to significant job

growth. It does not imply, however, that any other type of firm that is not a new firm subtracts from overall employment, but rather that all the other firms taken together contribute to a net decline in employment. Haltiwanger, Jarmin, and Miranda discover that there is often an "up or out" phenomenon for new businesses, in which those that are successful experience amazing growth rates in their employment level, whereas those that are not successful shut down and end up destroying many of the jobs they initially created. As a result, both the new and small firms as well as the expanding and slightly older firms are significant contributors to job growth. While very large and old firms do not have nearly the employment growth rates that new and small ones have, they are much less volatile in their job creation and account for nearly 25% of total employment, meaning the steady growth they provide is significant in the long term (Haltiwanger, Jarmin, and Miranda 2008).

The job creation rate reached in 2008 was lower than at any time since the 1980s, signalling a historic decline in labor market activity following collapse of the housing market. The job creation rate started declining in the 1980s and accellarated its decline after 2006, reaching a record low in 2009. Overall, estimates show that in the 2000s the job creation rate was 13% lower, the job destruction rate 8% lower, the job creation rate from startups 25% lower, and the net job creation rate 56% lower than in the 1980s (Haltiwanger, Jarmin, and Miranda 2011). A significant portion of the historical decline in the job creation rate comes from startups, meaning there are fewer new firms that enter the economy to grow employment at a fast enough rate to recover from economic downturns.

Using the Business Dynamics Statistics series, which divide employment flows by firm age or size, it is noticeable that there has been a significant change in employment gains by small or young firms starting with 2000. The net job creation rate for firms one year into business declined significantly in 2000 and entered negative territory around 2001. It never truly recovered before experiencing another severe decline in 2006 and reaching record lows during the 2008 recession. All other firms except new firms and those that have been in business for more than 26 years experienced negative net job creation throughout most of the time since 1982, but the pattern of sharp declines in the net job creation rate in both 2000 and 2006 is remarkably similar.

When looking at firm size, firms of most sizes display a significant slowdown in the net job creation rate during 2001 followed by an extremely weak recovery, with the net job creation rate below historical average and a sharp decline in 2006 followed by a record negative net job creation rate during the 2008 recession. The only exception to this rule are corporations (10,000+ employees) which experienced a much sharper decline in the net job creation rate during the 1982 recession than during the 2008 recession, mainly due to more layoffs rather than a lower job creation rate. In fact, for most firms of any size and age, layoffs explain surprisingly little of the sharp decline in the net job creation rate, whereas a lower trending job creation rate throughout the 2000s is what explains the current weak labor market (Business Dynamics Statistics).

Often, a good way to determine the validity of conclusions is to use alternative datasets that portray a similar labor market flow. The Job Openings and Labor Turnover Survey (JOLTS) has recently been used extensively in academic papers and includes job

openings, hires, total separations, and quits after 2000. According to JOLTS, both hires and total separations have been trending downward since 2000, with the most recent rise in unemployment caused by hires declining faster than total separations between June 2008 and September 2009. Similarly, job openings reached a record low level over the same period and have hardly recovered since (Figure 9).
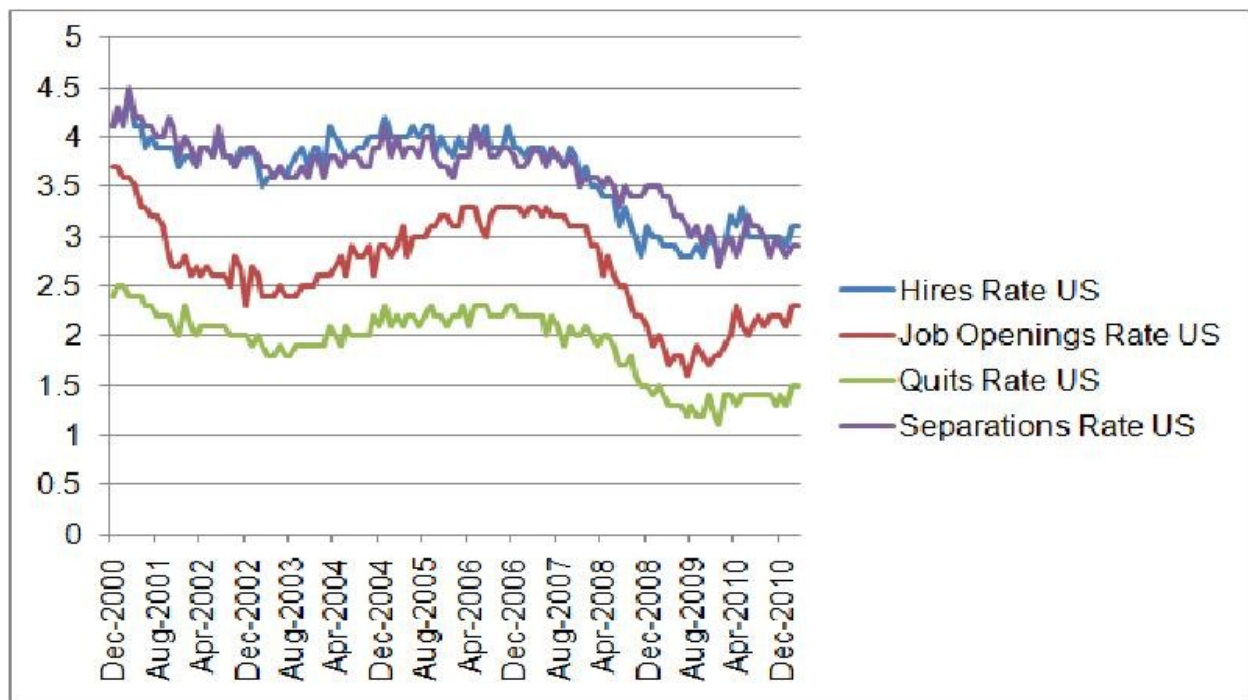

Figure – Hires, job openings, quits, and total separations rates. Data Source: Bureau of Labor Statistics, JOLTS

This suggests that the current labor market condition is not at all similar to the 1982 recession, mainly caused by a rise in separations that led to high unemployment and a strong subsequent recovery, but that there is an overall slowdown in both the rate at which jobs are created and destroyed. Furthermore, the rate at which job openings grow slowed down after the 2001 recession, rebounded only slightly, and then experienced a very sharp drop during the 2008 recession, which is indicative of firm's hesitance to

create new jobs in an uncertain economic environment. When looking at JOLTS across sectors, the sectors that recovered best from the crisis had a slightly higher job openings rate relative to the quits rate, meaning people had more options in choosing to leave a job and find another one. On a comparison basis, the fast recovering sectors have been manufacturing, professional and business services, and education and health services whereas the slow recovering sectors have been construction, trade utilities and transportation, and leisure and hospitality. In spite of this differential, the chance of structural unemployment is slim, as even the strongest recovering sector (education and health services) still experienced a significant decline in job openings during the 2008 recession.

What constitutes a large discrepancy between JOLTS and BDS is the effect of the post-2000 slowdown when looking at firm size. According to JOLTS, the bigger the firm size the stronger the trend in the fall of hires and separations between 2000 and 2010. Firms in the smallest size categories barely show a declining trend, whereas those in the larger size class show a clear declining trend in both hiring and firing. Furthermore, the quit rates for larger firms are much smaller than for smaller firms, suggesting that individuals at larger companies are less likely to quit their jobs when compared to people at smaller boutiques. The data also shows another interesting phenomenon in job opening volatility, with the smallest and largest firm sizes being more volatile in their job openings rate than their counterparts are. In spite of these differences, both BDS and JOLTS strongly depict the declining trend in both hires and separations, rendering it significant for the analysis of the labor market. Therefore, the record low level of the job

creation rate is likely at the root of the current labor market weakness and determining its causes is therefore essential.

v. Current Business Conditions

According to the Small Business Trends Survey in October 2010, a net of -17% were expecting higher sales in the future, with 30% of the businesses surveyed reporting weak sales as the main problem that inhibits expansion. Furthermore, almost 91% of businesses surveyed reported their borrowing needs had been met and a historical high level of 53% reported no additional need for borrowing to expand (Dunkelberg and Wade 2010). This suggests that contrary to 2008 when the financial crisis was unfolding and credit dried up, credit availability is no longer the main issue thanks to loose monetary policy by the Federal Reserve. Therefore, it is likely that a lack of revenue growth coming from weak consumer sales is what primarily drives the weak labor market recovery, which makes many businesses hesitant to invest and create jobs.

IV. Household Leverage and Consumption Growth

Atif Mian and Amir Sufi believe that changes in credit conditions and the subsequent rise in household leverage play a large part in explaining the depth of the 2008 recession as well as the slow subsequent recovery. Reuven Glick and Kevin Lansing claim that leverage impacts future consumption growth significantly and is important to consider in the context of a financial crisis.

i. Household Leverage

The amount of debt accumulated by households has been rising steadily since 1975 and accellarated its increase starting with 2001, growing more between 2001 and 2007 than it had grown between 1950 and 2000 (Mian and Sufi 2011). As a result, the level of household debt nearly doubled between 2001 and 2006 (Mian and Sufi 2010A), before decreasing for the first time in post World-War II history starting with 2006 leading to unprecedented postwar negative household borrowing (Federal Reserve Board). Further, the ratio of household debt to assets reached an all time high of 21.7% in 1Q 2009, indicating the significant degree to which households had both increased their debt levels during the housing bubble and lost in asset prices when the bubble finally burst (Figure 10). Obviously, these developments represent significant deviations from the trend and merit special consideration when conducting a complete analysis of the 2008 recession and the subsequent recovery.

Many of these changes in debt and household leverage occurred due to the housing bubble. Using an elasticity driven model, Mian and Sufi find that the supply of credit is what leads to higher home prices, rather than higher home prices being the main driver of credit supply. The increased supply and availability of credit led to a boom in mortgage related debt followed by higher home prices (Mian and Sufi 2010C). As a result, much of the increase in housheold debt after 2001 is attributable to mortgages consumers took during the housing bubble. The proportion of mortgages sponsored by non-GSE increased from 3% to 20% between 2002 and 2005. These mortgages targeted primarily subprime borrowers of high risk, which is likely the main culprit for the 20% default rate in 2008 that led to the collapse in the housing market.
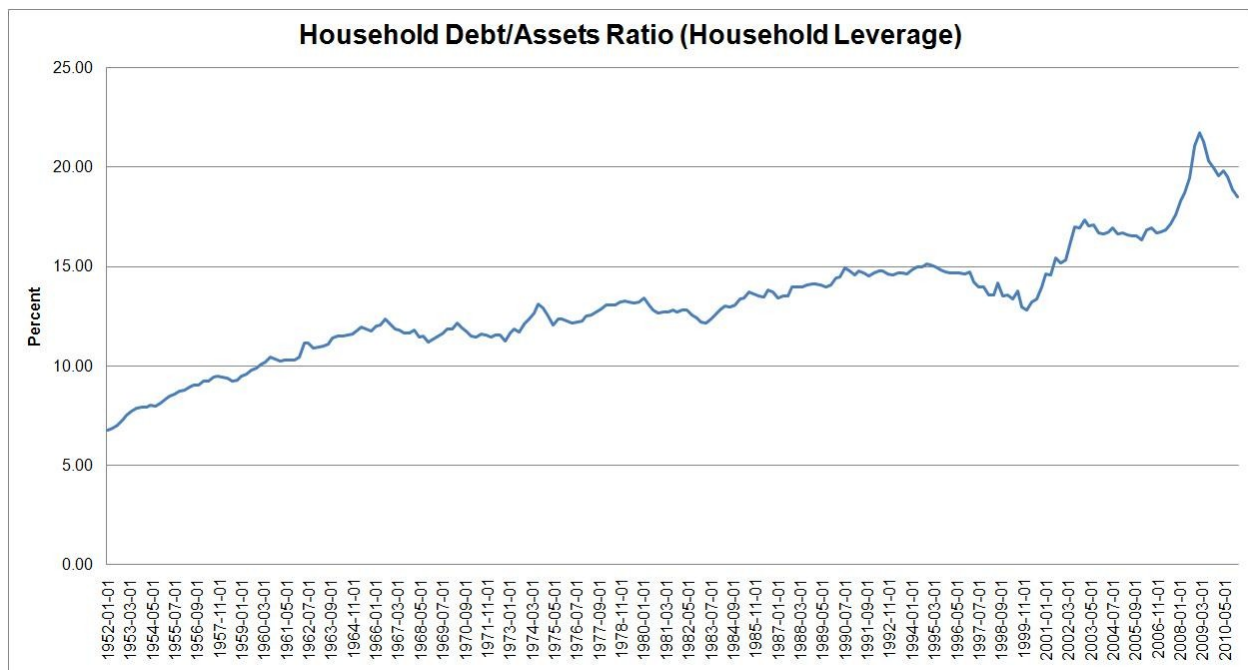
Household Debt/Assets Ratio (Household Leverage)

Figure – Household debt to assets ratio, calculated by dividing total household debt over total household assets. Data Source: Federal Reserve Board

As the value of their home rose, many individuals borrowed an estimate of 25 to 30 cents for every dollar they gained in home equity and spent the borrowed funds primarily on personal consumption (Mian and Sufi 2010C). Surprisingly, individuals with the lowest credit scores and highest credit card debt were the most likely to take out home equity and spend it whereas consumers in the top quartile of credit scores showed no significant change in behavior (Mian and Sufi 2010A). Consequently, the correlation between mortgages and disposable income was negative between 2001 and 2005 after it had been positive at all times since 1990 (Mian and Sufi 2010C). Therefore, not only did consumers take increasing amounts of debt, they also took debt they had very little chance of repaying if home prices would unexpectedly drop leading to asset depreciation.

ii.   **Future Consumption Growth**

Economists Glick and Lansing set up a model in which nearly 90% of the changes in the saving rate after 1960 can by explained by looking at credit availability, so it is likely that credit availability played an important role in exacerbating the housing bubble. Whereas credit availability has been increasing since the 1980s, the saving rate has been decreasing over the same period. The decline in the saving rate coincided with a significant increase in the household debt to disposable income ratio, which was 65% in the 1980s and would reach almost 130% in 2007 (Glick and Lansing 2009). Therefore, growth in consumers' disposable income did not keep up with the rate at which they were taking on debt, leading them to become more highly leveraged. This led to a boom in consumption, as US households were increasing their spending faster than the increase in their disposable income.

The shocking decrease in credit availability starting in 1Q 2007 coincided with an increase in the personal saving rate, leading consumers to save more just as the housing bubble was bursting. Since 2007, the household debt to disposable income ratio dropped from 130% to 118% and the saving rate rose from 1% before the crisis to 6% (Glick and Lansing 2011). To make matters worse, between 3Q 2007 and 3Q 2008 household wealth declined by nearly 6.7 trillion, leading to the greatest contraction in household equity since the Great Depression (Daly, Hobjin, and Kwok 2009B). It is likely that the lack of savings combined with the high accumulation of debt and a collapse of asset prices then lead to one of the worst recessions since the Great Depression in terms of consumer balance sheets. Fixing these issues will probably require years of

higher saving as well as a combination of repaying or defaulting on debt, all of which will lead to lower consumption growth.

Deleveraging is nearly always a very painful process for most participants involved in the economy. After the burst of the stock market and real estate bubble of the 1990s, nonfinancial Japanese firms drastically reduced their debt to GDP ratio by nearly 30 percentage points. This led to stock and home prices twenty years later being still 70% and 40% lower than before the crisis as well as very weak economic growth overall. A deleveraging in the US household sector similar to the one in the Japanese corporate sector during the last two decades would mean households would have to reduce their debt to disposable income ratio from 130% before the crisis in 2007 to 100% in 2018, which would require the saving rate to go up even more to 10% in 2018. Estimates show that such a move would subtract almost 0.75 percentage points or more from annual consumption growth (Glick and Lansing 2009). Because consumption in the US economy makes up nearly 70% of GDP, changes in future consumption growth are highly singificant for overall economic growth and the condition of businesses investing in the US.

iii.   Effects of High Leverage versus Low Leverage

Using microdata at the county level, Mian and Sufi reveal a striking contrast between highly leveraged and low leveraged counties. While growth in highly leveraged counties started declining in 2006, low leveraged counties merely experienced a mild slowdown in growth starting in 2008 when the financial crisis struck (Mian and Sufi 2010C).

In terms of housing, between 2Q 2006 and 2Q 2009 the top leveraged counties experienced a 12% increase in defaults and home prices fell by nearly 40%, whereas the low leveraged counties had a 3% increase in defaults and house prices actually rose by 10%. Similarly, between 2005 and 2008 highly leveraged counties experienced a 40% decline in auto sales and orders for building permits declined by 150%, whereas low leveraged counties experienced a 20% rise in auto sales and orders for building permits only declined by 50%. Concerning employment, highly leveraged counties showed a 2.5% increase in unemployment between 4Q 2005 and 3Q 2008 while low leveraged counties showed no increase. After 3Q 2008, however, the correlation between the two types of counties becomes weaker or dissapears altogether, likely due to the financial crisis and its aggregate disruptive effects (Mian and Sufi 2010B).

V. Job Creation Rate and Household Balance Sheets

Economists Mian and Sufi show the extent to which the poor condition of household balance sheets can lead to a slow recovery overall, by contrasting highly levered and low-levered counties using microeconomic data. Further, Glick and Lansing identify a decline in the saving rate after 1985 that coincided with a rise in credit availability and an increased indebtness by US households. Finally, the job creation rate shows a gradual decline starting with the 1980s and accellarating after both the dot.com boom and housing bubble. Could the decline in the job creation rate be related to changes in household credit conditions at the aggregate level?

i. **Datasets Used**

To determine the extent to which the buildup of consumer debt in the past three decades combined with the spikes in household leverage after the dot.com boom and the housing bubble affect the rate at which jobs are being created in the US economy we will use two data sets to estimate bivariate vector autoregression (VAR) models. One of the datasets contains the annual job creation rates pubslished by the US Census Bureau in its Business Dynamics Statistics dataset for the years 1977 and 2009, whereas the other contains the quarterly job creation rates published by the Bureau of Labor Statistics in its Business Employment Dynamics dataset for the period 3Q 1992 and 3Q 2010. The two series vary not only in their data frequency (yearly vs. quarterly) and the time – frame used (1977 – 2009 vs. 1992 – 2010), but also in the values given for each year and quarter respectively. As a result, any estimates or trends we encounter in the analysis of both series are consistent and worth analyzing further, whereas those divergent across the series are inconsistent. We add to both datasets four other variables that are indicators of the health of household balance sheets. Compiled and calculated using data from the Federal Reserve Board, these are consumer credit as a percentage of GDP, debt as a percentage of disposable income, debt service payments as a percentage of disposable income, and the debt to assets ratio in percentages. For some of these series, we averaged quarterly values to yield yearly values. With the help of VAR, we can model the effect of changes in the condition of household balance sheets on the overall job creation rate.

ii.   **Analysis using Vector Autoregression (VAR)**

VAR models enable economists to look at the interrelationship between two macroeconomic variables by analyzing the way exogenous shocks to one of the variables affect the other both contemporaneously and over time. The reason why a VAR model might be helpful is that oftentimes shocks to macroeconomic variables affect other variables in different ways at different times. An example of a VAR with two variables and one lag would be:

$$X_t = a_0 Y_t + a_1 Y_{t-1} + b_1 X_{t-1} + \varepsilon X_t$$

$$Y_t = c_0 X_t + c_1 X_{t-1} + d_1 Y_{t-1} + \varepsilon Y_t$$

First, we separately conduct VAR estimation on the annual and quarterly data using the STATA software. Then, we focus our attention on any results that are either very similar or inconsistent across the two datasets. Finally, we highlight our most important results with the help of orthogonalized impulse response functions. Orthogonalized impulse

response functions offer a graphic depiction of the effect exogenous shocks to one variable have on the other variable, over a specified period.

As seen above, the essential components of a VAR model are the number of variables used as well as the number of lags. To simplify our analysis and results we have chosen to use only VAR models with two variables, although in future research including more variables might be helpful. All of the models contain the job creation rate as one of the variables and one of the household balance sheet variables as the second variable. Our primary interest is in how exogenous changes in the household balance sheet variable affect the job creation rate at different points in time. A VAR model, however, implicitly allows for other types of analysis as well, like the way in which exogenous changes in a variable at a point in time lead to changes in that same variable over many periods. Therefore, finding the ideal number of lags for a VAR model is important, because if too few lags are used the main effect of the exogenous shock might not be captured, whereas if too many lags are used a lot of statistical noise and undesired side effects might be captured. In determining the number of ideal lags for each VAR model, we used the Schwarz Bayesian Information Criterion (SBIC).

In terms of the effect that primarily interests us, that of the household balance sheet variables on the job creation rate, the results are very consistent in terms of the trend found across the two datasets and fairly consistent in terms of the estimated values. Inconsistencies are present when looking at other effects such as how exogenous changes in the job creation rate affect the debt to assets ratio or consumer credit as a percentage of GDP, but these effects are of secondary importance to our analysis. In

the short run, high consistency and a greater degree of statistical significance can be found when analazying the effect of the debt to assets ratio on the job creation rate. In the longer run, high consistency and a greater degree of statistical significance can be found when analyzing the effects of consumer credit as a percent of GDP, debt as a percentage of disposable income, and debt service payments as a percentage of disposable income on the job creation rate. Inconsistency and higher variablity arises when analyzing the effects of consumer credit as a percentage of GDP, debt as a percentage of disposable income, and debt service payments as a percentage of disposable income on the job creation rate in the short run.

iii.   **Results**

The estimated VAR models point to two main results:

1. While the short run effects are not very clear, most VAR models analyzed suggest that over the longer run (4-8 years) a rise in consumer credit and household debt leads to slightly lower job creation rates;

2. In the short run (1-2 years) a rise in the debt to assets ratio could have significant negative effects on the job creation rate.

In the first case, while a boom in consumer credit and household debt can have both positive and negative effects on the labor market in the short run, the models show that in the longer run higher household debt most likely leads to a lower job creation rate in the economy. The lower long-run growth in employment might be coming from a variety of reasons. When people become indebted at a faster rate than the growth in their

disposable income, they might reduce their future consumption to service the higher debt payments, which would then dampen business expansion due to lower demand. In particular, disposable income had always been higher than household debt until 2002, when household debt reached a higher level than disposable income for the first time in post World War II history and is currently still higher (Figure 11). The reason for these changes is that while disposable income has recently been growing in a relatively linear fashion, household debt accelarated its growth starting with the 1980s reaching a postwar high in 2007 before falling to lower levels (Figure 11).
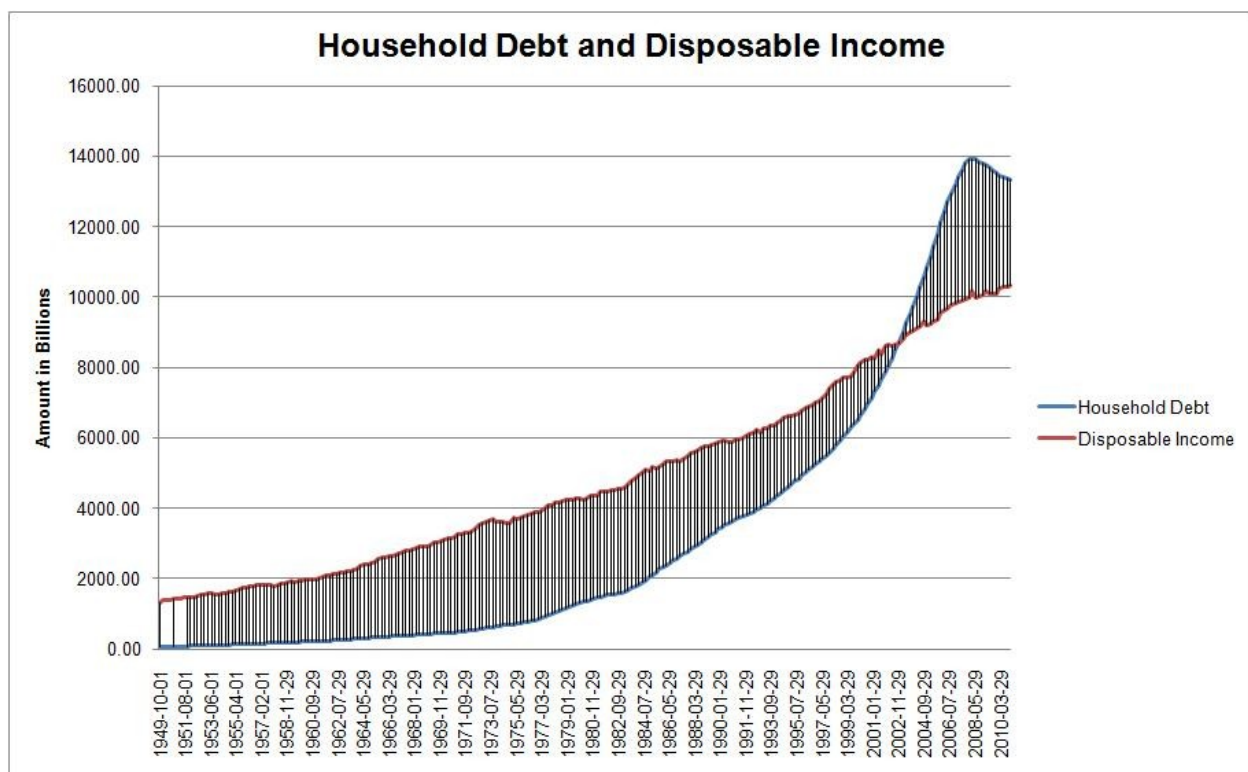

Figure – Household debt (blue) and houehold disposable income (red). Data Source: Federal Reserve Board

Further, individuals who carry significant debt burdens might also be much more hesitant in becoming entrepreneurial and creating small businesses, which are

important for strong job growth in the US economy. Another side effect of higher household debt may lead to more uncertainty over future growth in the business sector, which then decides to employ fewer people to expand production.
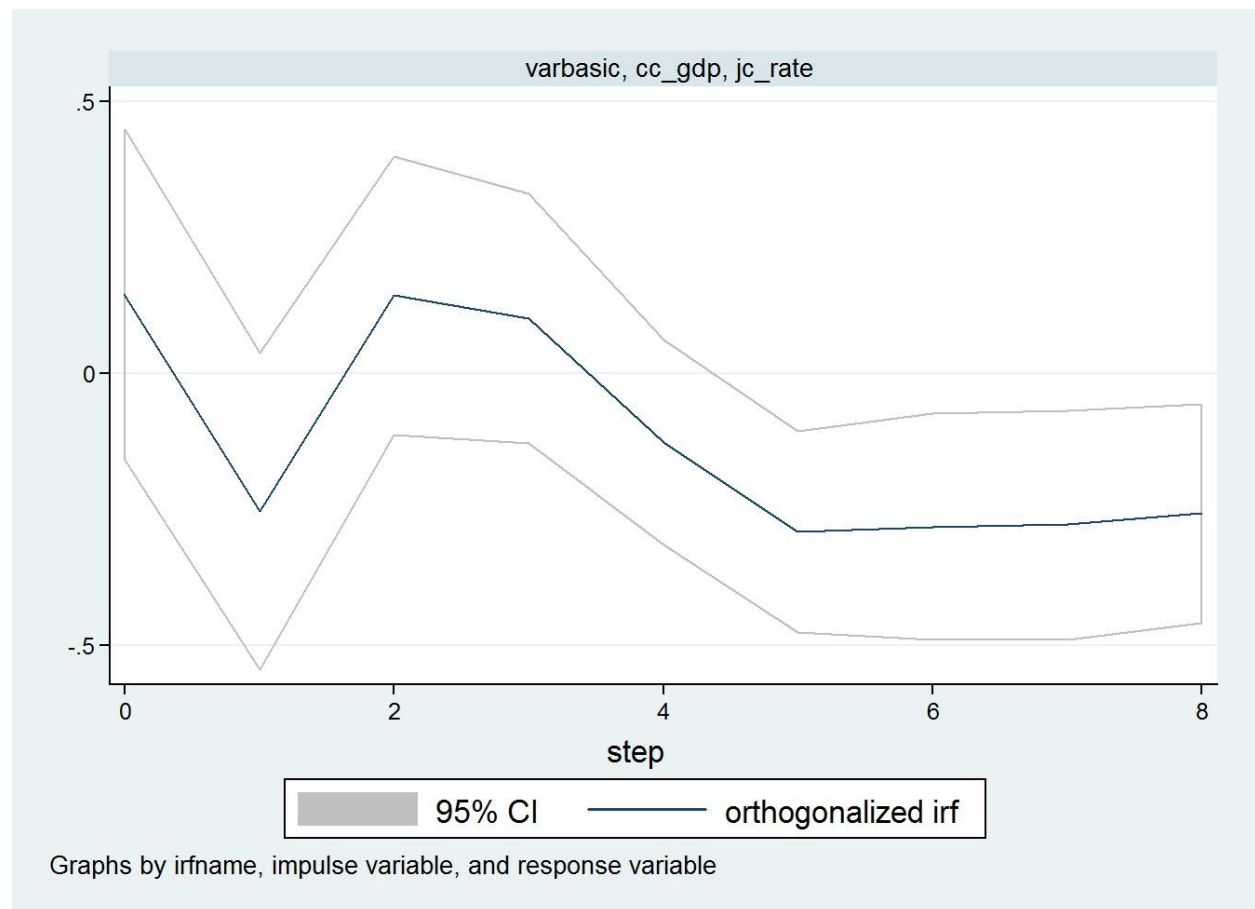

Figure 12 – Orthogonalized Impulse Response Function depicting the effect of an exogenous shock to the consumer credit as a percentage of GDP (cc_gdp) on the job creation rate (jc_rate) over a period of 8 years

Two different measures of indebtness are consumer credit, which does not include mortgage related debt, and household debt, which inlcudes all household liabilities including mortgage related debt. Both exogenous shocks on consumer credit as a percentage of GDP (Figures 12 and 13) and debt as a perentage of disposable income

(Figures 14 and 15) lead to lower job creation rates in the long run (4-8 years), with an unclear effect in the short run.
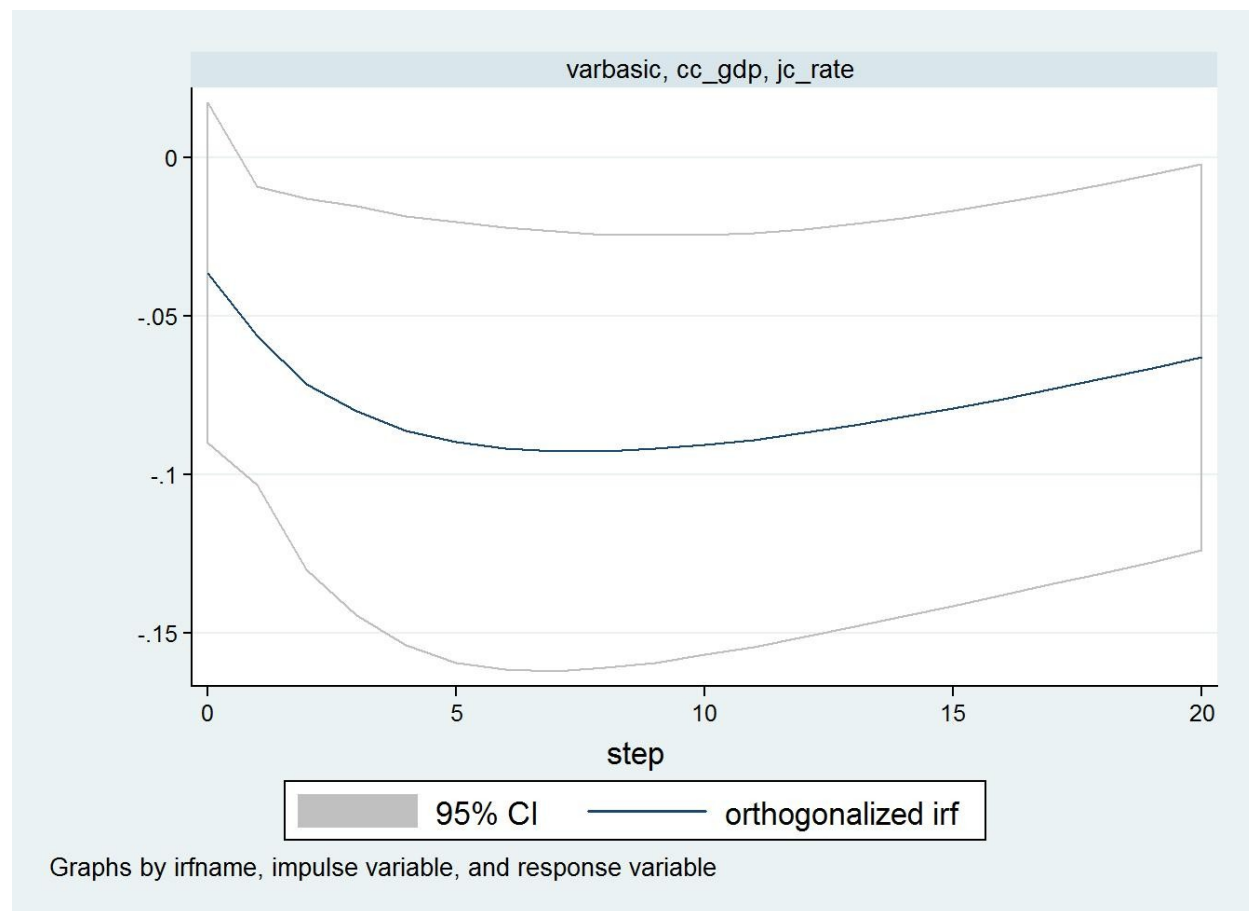

Figure 13 – Orthogonalized Impulse Response Function depicting the effect of an exogenous shock to the consumer credit as a percentage of GDP (cc_gdp) on the job creation rate (jc_rate) over a period of 20 quarters

In the second case, there is strong evidence from both the quarterly and annual data that the debt to assets ratio negatively affects the job creation rate in the short run. The debt to assets ratio has been rising steadily since the 1950s, yet there were times when the ratio grew very much in a very short timespan (Figure

10). A rapid rise in the debt to assets ratio occurs when asset prices suddenly drop after a period in which both household debt and asset prices grew. There are two such major events in the past three decades: the end of the dot.com boom in 2000 and the bursting of the housing bubble in 2007.
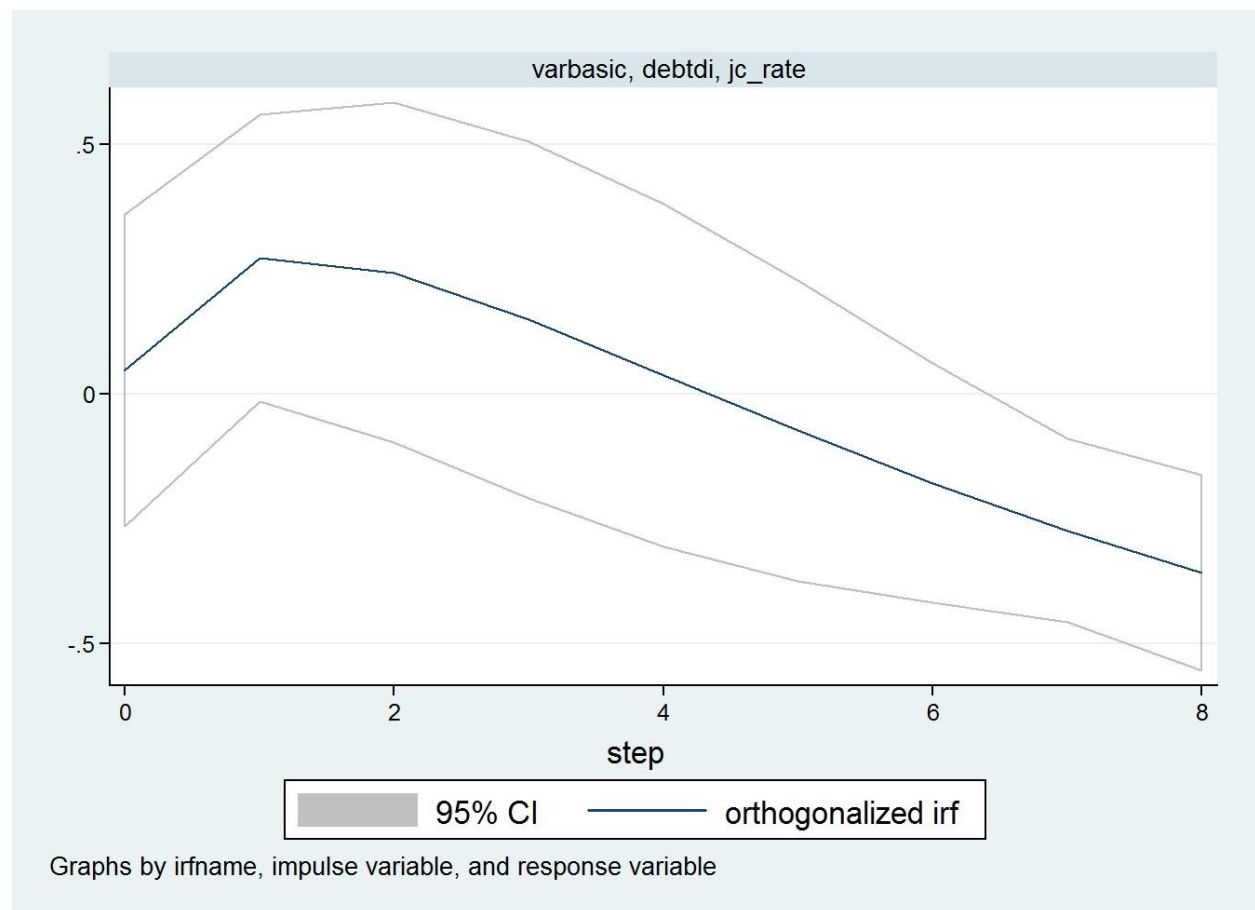

Figure 14 – Orthogonalized Impulse Response Function depicting the effect of an exogenous shock to the debt as a percentage of disposable income (debtdi) on the job creation rate (jc_rate) over a period of 8 years

Over the course of the 1990s and 2000s, household debt grew continuously and rapidly before experiencing its first major fall in post World War II history at the beginning of 2008 (Figure 11 and 16). During the 1990s asset prices grew faster than they had

grown before thanks to the stock market boom, but the boom ended and household debt kept growing while asset prices remained depressed (Figure 16). During the 2000s asset prices grew at an even faster rate thanks to both rising stock market valuations and house price appreciation, but the end of the housing bubble brought a crash in asset prices coming from both stock market valuations falling as well as house prices plummeting to very low levels (Figure 16).
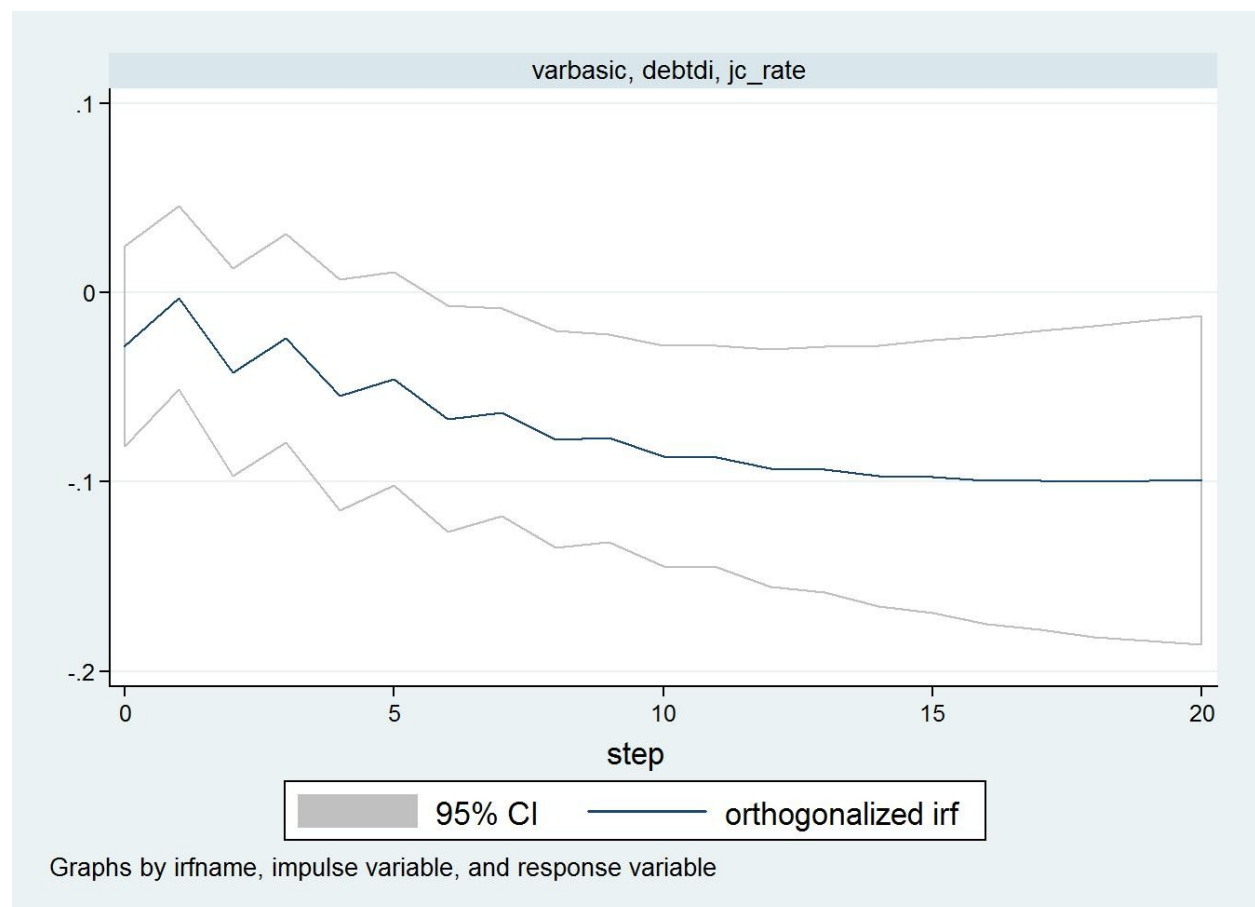

Figure 15 – Orthogonalized Impulse Response Function depicting the effect of an exogenous shock to the debt as a percentage of disposable income (debtdi) on the job creation rate (jc_rate) over a period of 20 quarters

What both the 2001 and 2008 recessions have in common are very slow labor market recoveries (Figures 1 and 4). While the 2001 was a very shallow recession, it had one of the slowest labor market recoveries in postwar history. The 2008 recession is even worse, because it combines a sharp decline in employment with an extremely slow labor market recovery (Figures 1 and 4).
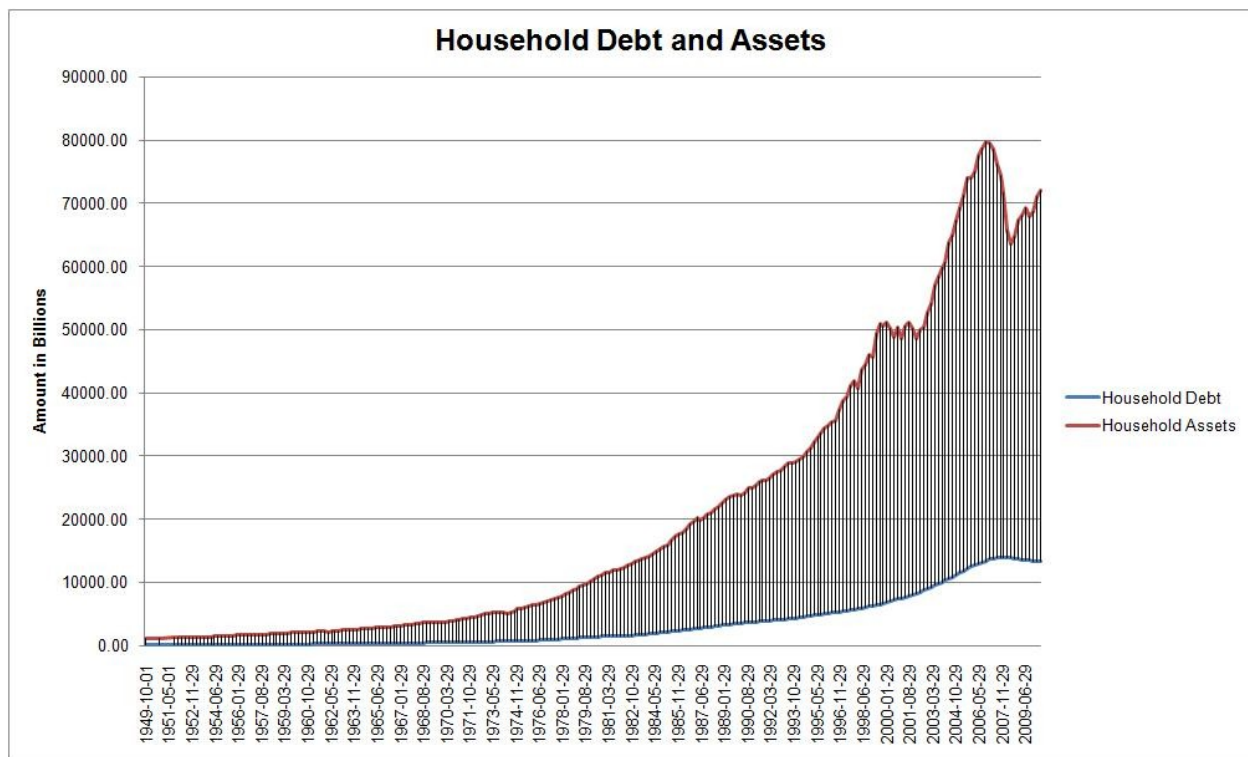

Figure 16 – Household debt (blue) and houehold assets (red). Data Source: Federal Reserve Board

Large increases in the household debt to assets ratio following the bursting of asset bubbles characterize both the 2001 and 2008 recession. It is possible that once individuals realize they have lost wealth due to asset price depreciation yet the debt they have accumulated remains to be paid, they sharply reduce their overall consumption. Lower demand from the consumer side leads businesses to deferr

investment into expanding operations, because revenue growth is likely to be weak due to lack of sales. Businesses then adopt a variety of methods to maintain or slightly increase production without having to increase employment. It may take a while until individuals have repaid or defaulted on some part of their debt and asset prices start growing again, which would likely lead to a slow labor market recovery. As it turns out, the VAR model suggests that the household debt to assets ratio plays a short run role in the size of the job creation rate (Figures 17 and 18).
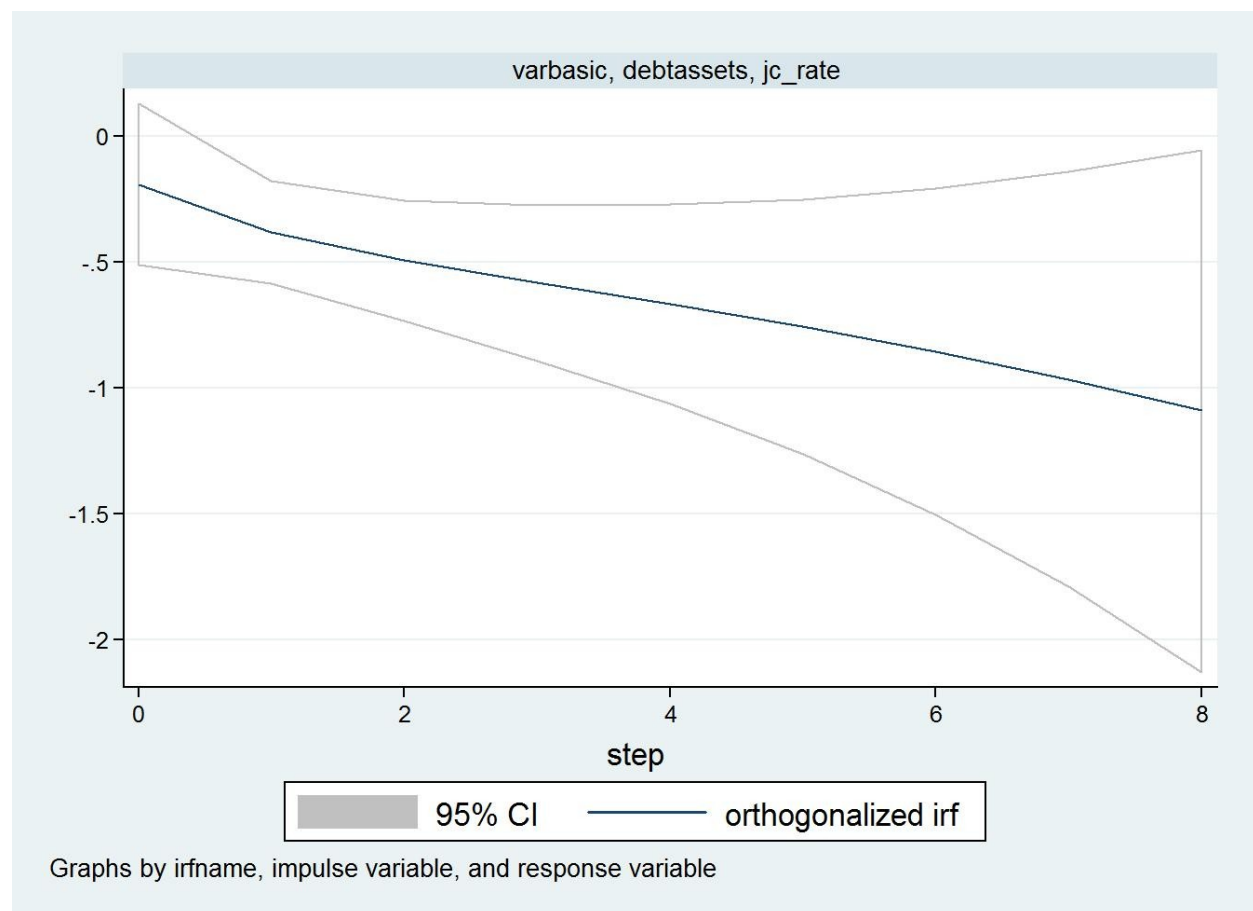

Figure 17 – Orthogonalized Impulse Response Function depicting the effect of an exogenous shock to the debt to assets ratio (debtassets) on the job creation rate (jc_rate) over a period of 8 years

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We have estimated that both consumers accumulating debt at a faster rate than the growth in their disposable income as well as sudden asset price depreciation could be two of the causes that lead to a reduction in the job creation rate, yet they do so in different ways. When individuals are accumulating debt at a higher rate than the growth in their disposable income, the job creation rate is likely to be affected in the longer run whereas when asset prices drop following an accumulation in debt by individuals the shock to the job creation rate is much greater in the short run.
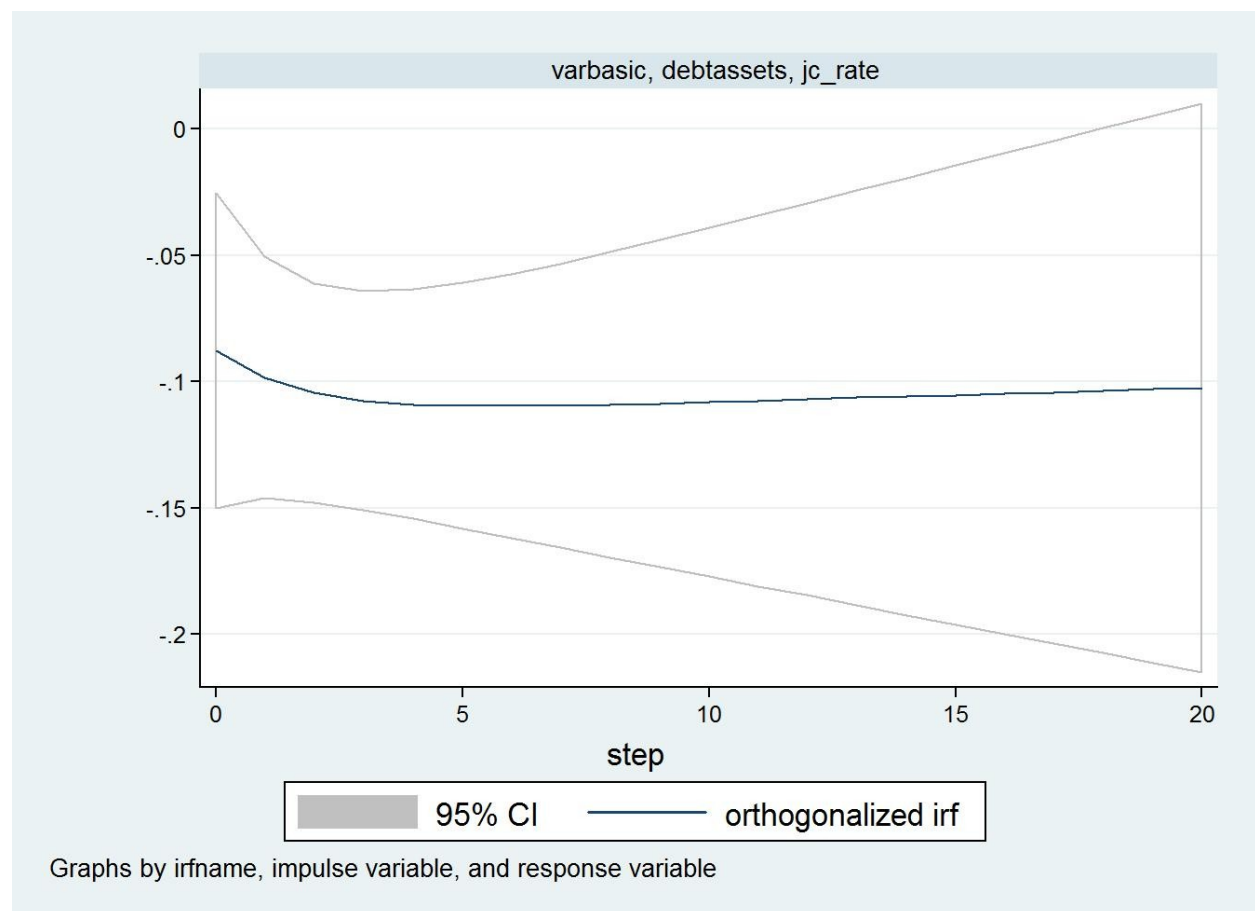

Figure 18 – Orthogonalized Impulse Response Function depicting the effect of an exogenous shock to the debt to assets ratio (debtassets) on the job creation rate (jc_rate) over a period of 20 quarters

Questions remain about how job growth reacts when debt starts declining, as it did in 2008. Could deleveraging be good for overall job growth in the longer run, even though in the short run it acts as a significant drag on growth? Does it matter for future job growth whether the current deleveraging comes from a default on debt or rather from a repayment of debt? Is there a certain defined point until which household debt actually provides a boost to the economy and the job creation and after which it becomes a drag? Further research is needed to answer these and many other questions, but understanding that household debt plays a role in the job creation rate is essential.

VI.   **Policy Input**

While the evidence analyzed suggests signs of structural unemployment, mainly due to the temporary extension of unemployment benefits, there still seems to be a considerable amount of slack in the labor market coming from the severity of the recession and the ensuing low demand. Given the range of estimates for the new natural rate of unemployment between 6.25% and 6.70%, there should be plenty of room for the unemployment rate to fall from 9.2% in July 2011 given sufficient demand in the economy. As a result, while structural reforms might have the effect of decreasing the unemployment rate slightly, it is a boost to demand combined with a credible plan for sustainable future growth that is more likely to yield stronger results.

The evidence throughout this paper suggests that the low demand in the economy comes mainly from a levered household sector, as much of the GDP growth in the past few decades has come from increases in personal consumption. The deterioration of household balance sheets combined with a sharp decline in employment during the

2008 recession followed by an anemic labor market recovery with signs of deleveraging bodes ill for future growth in consumption. Therefore, over the longer run (next 5-8 years) more growth in GDP will likely have to come from sources like investment and exports. Greater business investment in the US economy combined with more exports to consumers in fast growing emerging markets will lead to both higher standards of living for Americans and the creation of jobs across a variety of sectors, leaving individuals relying less on increasing their consumption by taking on large amounts of debt and becoming heavily leveraged. Developments like these sound unlikely in the short run (2-3 years), because both aggregate demand and confidence in the US economy has reached a very low level. To achieve a revamped economic model in the short run, it might be necessary for the government to step in and show initiative on both the investment and the exports side of the growth equation.

As private businesses are averse to investing and hiring in an economy in which consumers are in debt and do not spend as much as they used to, there is a case to be made for the federal government to sustain the investment side of growth in the short run (2-3 years) mainly by funding efficient and modern infrastructure projects. Among advanced economies in the OECD, the US lags in both infrastructure spending and the efficiency of its transportation system and the trend in the last decades has been one of declining spending on maintenance (The Economist, 2011). A stimulus bill containing a commitment to infrastructure development would not only provide a handful of construction and manufacturing jobs and therefore much needed demand, but also act as a clear sign of confidence in the ability of the US economy to grow in the future.

Furthermore, many believe improved infrastructure could play an important role in expanding trade; countries like Germany and China that invest massively in infrastructure are also some of the largest exporters in the world.

Apart from infrastructure investment, a commitment to developing cheap sources of renewable energy would lower costs coming from rising fuel prices for both consumers and businesses in the longer run. Technological innovation combined with government investment in projects like solar panels, wind turbines, electric automobiles, and even in natural gas power plants would likely generate aggregate demand in the short run and move the US on a more sustainable and cost effective energy path for the future. Further improvement in the export capacity of the US is achievable by combining the availability of sustainable energy sources with a clear commitment to free trade, which would involve a friendly regulatory environment for exporting industries encouraging innovation and global competitiveness in the marketplace.

Finally, given the current weak labor market it might be necessary to extend the duration of unemployment benefits, as employment will likely pick up very slowly and a sudden reduction in benefits is likely to depress consumer spending even further. Yet we recommend that the government not increase the value or extent of any benefits programs further, as this may exacerbate the issue of long-term unemployment and even distort work incentives.

VII. Conclusion

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In spite of minor signs of structural unemployment and a slight increase in the natural rate of unemployment, there still appears to be considerable slack in the labor market due to extremely low demand in the economy. The low demand most likely comes from both the damaged balance sheets of consumers who cannot keep spending as they have in the past, as well as the reluctance of businesses to invest in expanding their operations in the US given anemic growth prospects. *The Great Recession* and the collapse of both the dot.com and the housing bubble has accelerated the already declining trend of the job creation rate in the US economy over the past three decades, leading to record low outflows out of unemployment in 4Q 2009. The declining trend in the job creation rate coincided with a decrease in the saving rate as well as an increase in household debt. Estimates from vector autoregressive models suggest that consumer credit increasing faster than GDP and household debt increasing faster than disposable income can depress the job creation rate in the longer run. Significant for short run effects in the job creation rate likely are changes in the debt to assets ratio, most notable being market busts in which asset prices fall after consumers had taken increasing amounts of debt (e.g. the dot.com boom and the housing bubble). Moving forward, the US government needs to show a clear commitment to sustainable growth through its policy initiatives. Future growth during the deleveraging phase of the US consumer will have to be based less on further debt-financed consumption and more on investment and exports that grow employment and raise incomes.

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