Testimony before the Joint Economic Committee on

"The Road to Economic Recovery: Prospects for Jobs and Growth."

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Chair Maloney, Vice Chairman Schumer, Ranking Members Brady and Brownback, and members of the Committee, it is an honor to be with you today to discuss the important topic of how to create jobs and return to sustained economic growth.

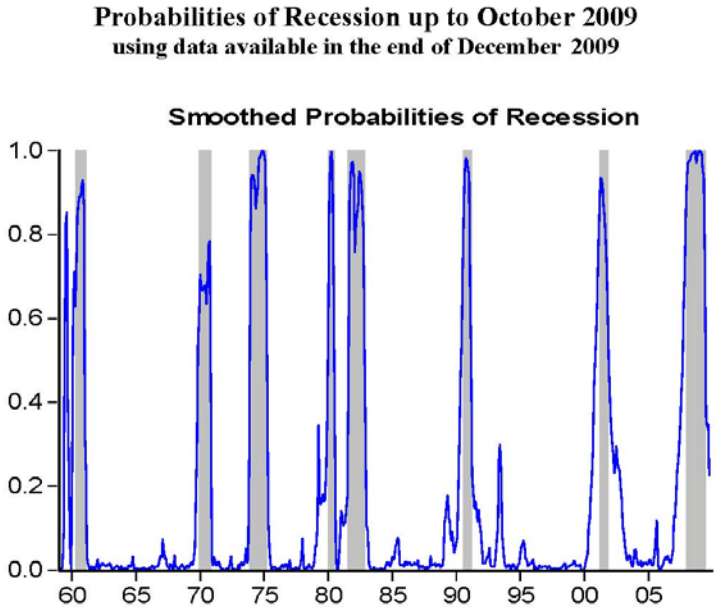
Today I will give a brief overview of our current economic situation, discuss what I see as the most pressing challenges for employment and growth, and also describe policy changes that would address our current challenges in the U.S. labor market.

Where Are We?

After seven long quarters of low or declining economic growth, last quarter's GDP numbers were a beacon of hope from an economy long devoid of good news. This month's announcement that unemployment had fallen below 10 percent fueled some optimism, although it was tempered by news that payrolls had actually declined another 20,000.

According to University of California Economist Marcelle Chauvet's highly reliable model of recession probabilities, there was a roughly 20 percent chance we were still in a recession in October, 2009, using data available to the end of December, 2009 (see Figure 1). The recession is almost surely over, probably ending last July, but the question is, what kind of recovery will we have?

Figure 1.[1]



[1] Chauvet (2009)

There are positive and negative economic signs at the moment. On the plus side, real GDP surged almost 6 percent in the fourth quarter of 2009, and the unemployment rate dropped from 10.1 percent to 9.7 percent by the end of January 2010. The unemployment rate reduction brings into question the strongly negative view that has prevailed amongst economists regarding unemployment. That view holds that unemployment will continue to worsen well into next year, perhaps reaching 11 percent, because job creation typically lags the rest of the recovery

A look at the history of job creation over the business cycle suggests that this consensus view is anything but certain.

Since 1950, there have been 10 recessions in the U.S., with the most recent one beginning in December of 2007 and most likely ending last July. If the recession did indeed end in July, then the decline in unemployment, which began in November, started in the fourth month after the recession's trough. A four month lag between the trough of a recession and the beginning of the decline of unemployment is actually a negative surprise. In the nine previous recessions, the average wait from the end of the recession to the first decline in unemployment was only 2.4 months. So this time it took a little longer.

Why, then, did so many experts expect the lag to last still longer this time? The biggest reason, in my view, is the widespread acceptance of a false narrative regarding the relationship between jobs and recessions, a narrative distorted by the experience of the last two recessions before the current one.

It is true that job creation often lags the cycle. While unemployment often blips down in the beginning of a recovery, the improvement rarely sticks; in seven of the previous nine recessions, the initial decline was reversed in subsequent months.

In the last two recessions -- July 1990 to March 1991, and March to November 2001 -- unemployment had a life of its own, continuing to surge for more than a year after the trough. Those back-to-back experiences seem to have influenced how experts viewed what would happen in the current recovery. But the last two recessions are probably not the best guide. On the way down, recall, they were so mild that economists had begun to accept the view that the world had undergone a "Great Moderation." But maybe recoveries moderated along with recessions.

A more optimistic model would be what happened at the ends of recessions in 1975 and 1982. These are the only two recessions since World War II that rival the current one in terms of severity. In those cases, the first decline in the unemployment rate signaled the good news that a sustained jobs recovery was on the way.

In 1975, the unemployment rate peaked two months after the end of the recession at nine percent, and then began a steady decline that lasted almost five years. In 1982, the unemployment rate peaked at 10.8 percent one month after the end of the recession, and plummeted from there at a rate of about 1.5 percentage points per year.

An explanation for this connection comes from academic work on why the economy tends to snap back more quickly after a steep drop. This behavior, first observed by Milton Friedman, is analogous to that of a string on a guitar. The harder you pluck the string, the quicker it snaps back. Or think of it in these human terms: recovery is faster after a panic, because unlike more gradual forces such as decline in manufacturing, panic is 100 percent gone when it stops.

That unemployment has continued to decline after November is certainly a positive sign, one that gives cause for hope that the jobs picture is finally beginning to turn around. But other indicators suggest that the recovery we are now in is beginning to resemble the "jobless" recoveries of 1990-1991 and 2001. Thus the best model is probably not the pessimistic model that focuses on the two most recent recoveries or the optimistic one that focuses on the most severe recessions of the post-war era. Rather, reality is likely somewhere in-between.

There is ample cause for caution. While GDP increased almost 6 percent in the fourth quarter of 2009, over half of the growth in GDP—3.4 percent—was attributable to changes in inventories. This astonishing impact of inventory has ample historical precedent, and the bottom line has negative implications for the first half of 2010.

As Alan Blinder of Princeton University noted in a 1980 paper, inventories, while accounting for less than 1 percentage point of national output, accounted for 37 percent of the fluctuations in output during the post-war period. Since the 1980s, inventories have sustained their important role in driving changes in GDP. Updating Blinder's calculations through the fourth quarter of last year, inventories have accounted for about 34 percent of historical fluctuations in GDP since 1947.

Something that constitutes a small share of GDP can have a big impact on its overall volatility only if it is swinging about wildly. Inventories fluctuate so much for a simple reason: Predicting the future is really hard. As a firm tries to set its inventory level to match expected future sales, it must balance the financial cost of carrying inventoried items against the risk that customers might not find the product they are looking for. If we see inventories piling up, firms may need to adjust their future activity downward. On the other hand, sales sometimes jump unexpectedly, driving inventories below their desired levels. When that happens, we can expect firms to ramp up production to replenish their stocks.

Since 1970, there have been nine quarters, like the last one, when GDP grew by at least 3 percent and inventories accounted for at least half of that growth. The history of those quarters is hardly a favorable sign of what is in store.

Inventory spikes make for blowout quarters. In the nine quarters with such spikes, the average growth rate was 6.6 percent and the average inventory contribution was 4.4 percent, even higher than what was observed for last quarter. Spikes also produce hangovers. The average growth rate in the quarter after a spike was 0.9 percent, a whopping 5.7 percent lower. In the second quarter following a spike, the average growth rate is just 1.6 percent.

If we experience only the typical decline in growth that follows an inventory spike, first-quarter growth in 2010 will be right around zero. If that happens, talk of a double-dip recession will ignite. Thus, it seems that there are significant risks on both sides. From my point of view, the most important Moreover, even if unemployment continues to improve, it will do so from a terrible level. Policymakers, therefore, would be remiss if they failed to consider policies to improve the employment situation immediately.

Evaluating the Stimulus

It is crucial that something be done, but it is also crucial that it not be a repeat of what has been tried in the past.

The CBO report released this week provides estimates of the impact of ARRA. They offer broad ranges when estimating the economic effects, which are "intended to encompass most economists' views and thereby reflect the uncertainty involved in such estimates." This statement is unusual for the CBO in that it is an assertion about economists' views that is unsubstantiated by any evidence. No poll of economists is cited. Normally, the CBO does better when it makes factual assertions.

If such a poll were conducted, it clearly would not agree.

It is true that Keynesian models tend to predict effects like those mentioned by the CBO. A number of extensive reviews indicate there is a wide array of Keynesian models that suggest economic stimulus can be very effective (for other examples, see Barrell et al. 2004 or Roeger and Veld 2004). For the most part, fiscal multipliers in this arm of the literature range from slightly below 1 to perhaps as high as 1.4, suggesting that there is ample room in such models for significant short-run stimulus.

However, it is also fair to say that most economists learned in graduate school that models like those relied upon most heavily by the CBO provide nonsensical results. The reason the original

large scale Keynesian Macro forecasting models were discarded by most of the profession is that they make a simple logical error in assuming that individuals do not change their behavior based on the expectation of future policy. This flaw is easy to conceptualize with the famous "Fort Knox" example. Fort Knox has security, even though nobody has ever robbed it. A Keynesian response to that observation would be to remove the security, since no robberies have ever occurred. Once the security is removed, however, the U.S. loses all of its gold.

Lost gold is the right thought for last year's stimulus.

A sign of how far off the CBO analysis is comes from the comparison of their "broad range" to the analysis in a Wall Street Journal article also written this week, by Robert J. Barro of Harvard University.[2] Professor Barro has been one of the primary contributors to the macroeconomic time series literature that has tried to estimate effects from observed economic data, rather than assume affects, as is done by the Keynesian models. I should note that Barro, perhaps Harvard's most famous macroeconomist, is a virtual lock to win a Nobel Prize. His work is not out of the mainstream, and has been followed by the work of many others who have made similar findings. Barro estimated that the government spending multiplier for the first year of the stimulus (2009) was .4 percent, and the multiplier for year two (2010) would be .6 percent. Both of these estimates fall well short of the CBO multiplier "broad" range of 1.0-2.0 percent for 2009 and 1.4-4.0 percent for 2010.

Barro's analysis is based on econometric evidence, a reliance on experience.[3] The CBO analysis is based almost exclusively on speculation within the context of Keynesian Macro models that were discredited decisively in the 1970s. The range of parameters explored seems to be just tinkering with the range of answers one can obtain within a model that assumes Keynesian effects. The fact that these effects are inconsistent with actual experience as characterized by analysis like Barro's is simply and inexcusably ignored.

The CBO's appendix specifically addresses why it mostly ignores the empirical evidence in work like Barro's, stating that "estimates of economic effects from this research vary widely and

[2] Barro (2010)

[3] Textbook Keynesian models suggest that government spending can increase aggregate output with a multiplier significantly greater than one; the neoclassical theory disagrees. This alternative theoretical argument is described in detail in Barro (2008), which draws heavily on Barro (1981). There he documents that the long-run effect in a neoclassical model of higher government spending is likely very close to zero, but that the short-run effect can be positive. He provides aggregate time-series evidence consistent with these two theories. Also, Barro (1981) distinguishes between the effects of spikes in military and non-military government spending on aggregate output. He finds that increases in military spending raise output, but with a multiplier that is less than one. When government spending was above trend, there were shortfalls in private investment and net exports (Barro 1981, p. 377). However, Barro (1981) does not find that non-military government spending has any positive effects on output. This suggests that, if past incidents are an indication of future results, the current wars may be more productive fiscal policy than the proposed stimulus package.

are sensitive to the time period and estimation strategy used." There are two obvious responses to this. First, ultimately, there is an empirical question about which approach works better to predict the future. Dating at least back to the seminal work of Nelson (1972), economists have known that the empirical time series approach significantly outperforms macroeconomic models in forecasting competitions. The exercise has been repeated almost continuously since then. Ashley (1988) compares data based time series forecasts to those from the large macro forecasters and concludes not only that the time series approach is superior, but that the macro forecasts were so bad that, "most of these forecasts are so inaccurate that simple extrapolation of historical trends is superior for forecasts more than a couple of quarters ahead." More recently, Lees, Matheson and Smith (2007) find that simple time series forecasts outperform those of the New Zealand central bank.

To be sure, some time series papers support larger multipliers than those used by Barro, and others do not. In a recent review, I discussed why the literature is leaning more in the direction of Barro.[4] But, and here is the second response, even if there is a wide variation in the best estimates of what actually happens when you pursue Keynesian policies, the correct conclusion is not to rely more heavily on models that assume large effects, but rather, to conclude that there is a great deal of uncertainty about whether policies like those adopted last year work.

That is, the correct position for policymakers to adopt is one of skepticism concerning these effects, and openness to trying different approaches. This was not the perspective that governed the design of the stimulus, which barely reduced any marginal tax rate at all, and was designed as if we know that the myopic Keynesian models are God's truth.

It is worth adding that one should be particularly wary of big job creation estimates precisely at this moment. One reason job creation lags the cycle is that businesses "hoard" labor and have excess capacity when times turn sour. As the economy recovery, they are able to ratchet up production without making new hires. Even if the stimulus did have an outsized effect on output, one would not expect to see a large impact on hiring at the beginning of the recovery. The large job creation claims seem to ignore this point.

Finally, one should note that this literature, combined with an earlier public finance literature, raises questions concerning the welfare gain associated with short-term increases in spending. Ballard et al. (1985), for example, find that the marginal cost of US$1 of public expenditure is about 17 cents. Browning (1987) finds that the marginal cost ranges widely, between 10% and 300%. Thus, the welfare costs of paying the bill may be greater than the short-term boost to the economy from the most optimistic estimates. This literature would be consistent with Barro's analysis that suggests the stimulus makes us worse off in the long run.

[4] Hassett (2009)

What Should Be Done?

Given the fiscal pressures, another large stimulus package would be a very bad idea, requiring even more ambitious moves by future policymakers. Instead, we should focus short run efforts on targeted programs to improve the labor market. In addition, we should address convincingly our long run problems, focusing on policies that would eliminate harmful policy uncertainty, and give firms a reason to be optimistic about investments located in the United States. I would ask that you consider four measures.

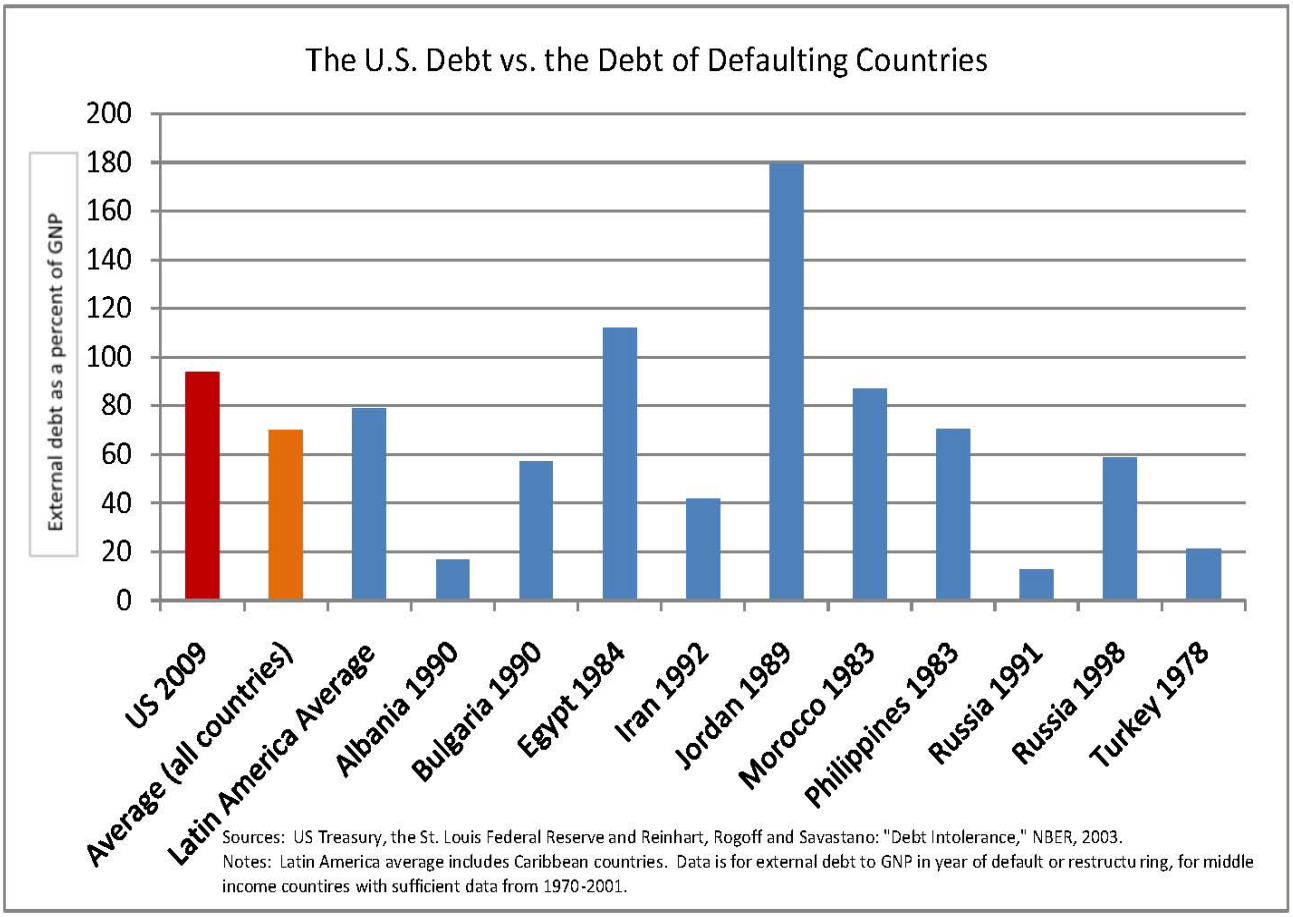
Fiscal Consolidation

As we look to new policies, we must keep in mind the current fiscal situation, and the risks that the situation imposes. Many Americans probably think that it is impossible for the U.S. government to reach the point where its checks start to bounce. The massive expansion of U.S borrowing, both public and private, that has occurred in the past year suggests otherwise.

The nagging problem is that interest payments to our overseas creditors subtract from our ability to consume and invest. Periodically, this debt must be rolled over, with the government and citizens alike borrowing from new lenders to pay off the old. As a nation gets overextended, red flags go up, and lenders take their business elsewhere, and default becomes a real risk. Figure 2 compares the external debt (debt held by foreigners) of the U.S. to the external debt of middle-income countries that experienced default (or restructuring) between 1970 and 2001. U.S. debt is now higher relative to our national income than it was for the typical middle-income country that defaulted on its debt in the 31 years of this sample. This year, our total external debt has reached 94 percent of GNP. There were so many Latin American defaults in our sample (Argentina twice, Brazil, Chile twice, Ecuador twice, etc.) that the chart aggregates all Latin American countries into a single category. The shocking news is that the U.S. is now in worse shape than was the typical Latin American country that defaulted.

And yet it is important to note that even with our unsustainable fiscal situation, default is not necessarily imminent. Countries with deficits this high have historically proceeded down three divergent paths. Some have chosen fiscal consolidation, others have chosen to attempt to inflate away the debt, and others have simply defaulted, if not intentionally, because of the failure to pursue either of the first two strategies.

Figure 2.



In a recent paper with my AEI colleagues Aparna Mathur and Desmond Lachman, we find that the most successful policy responses to high deficits have mimicked that adopted by the U.S. following World War II. That is, successful consolidations have generally reduced spending. Failure to do so exposes the U.S. government to significant default risk that could, if history is a guide, emerge as a factor in financial markets without significant notice. It is my belief that there will be increasing pressure on the U.S. to engage in a fiscal consolidation. It is likely that many firms share that belief, creating an enormous amount of uncertainty regarding future policy. This uncertainty doubtlessly is undermining current activity.

Giavazzi and Pagano (1990) began an enormous literature when they studied the impact of fiscal contractions. They found that in some cases--the first identified were Ireland and Denmark--a country can have a dramatic reversal in economic growth when it achieves a successful fiscal consolidation; that is, when it cuts rather than increases government spending, and raises rather

than lowers taxes.[5] Similar results have been found for other countries by Alesina and Perotti (1997), Alesina and Ardagna (1998), and Alesina, Perotti, and Tavares (1998).[6]

Reading through the literature, it is clear that fiscal consolidations can be stimulative. We should also not underestimate the possible current gains from phasing in long run changes that restore fiscal sanity to our budgetary outlook. We could do so either with a specific bill, or by appointing a commission to make the difficult choices for us.

Job Sharing

I encourage Congress to consider a specific economic policy that has been adopted by German policymakers, known as "Kurzabeit" or "short work."

That policy enables firms that face a temporary decrease in demand to avoid shedding employees by cutting hours instead. If hours and wages are reduced by 10 percent or more, the government pays workers 60 percent of their lost salary. This encourages firms to use across-the-board reductions of hours instead of layoffs.

The economic argument in favor of such a policy is powerful. When a recession strikes, firms are faced with a dilemma: sales and profits are down, and many workers are idle. But finding skilled workers is costly and time-consuming, involving large fixed costs. If a firm fires workers, it may incur large hiring and training costs when the recession ends and sales turn back up. Thus, a firm would prefer, all else equal, to hoard labor during a recession.

Firms might well prefer to respond to a 20 percent cut in sales by reducing everyone's work by 20 percent. That way, employees remain part of the firm, and ramping up production is less costly down the road.

A number of factors discourage American firms from making that choice. The biggest is government policy. If a firm lays off workers, the government mails the unemployed a check. If the firm reduces work-hours, there is no government assistance, and employees are left to face the entire decrease in wages on their own.

A U.S. program based on Germany's would be attractive to firms, workers and taxpayers.

It would subsidize firms as they hoard labor, enabling them to keep the best parts of their team even when sales dip. As the economy expands, firms will then be able to expand rapidly too, without sinking tons of time and resources into costly search.

[5] Giavazzi and Pagano (1990)
[6] Alesina and Perotti (1997), Alesina and Ardagna (1998), and Alesina, Perotti and Tavares (1998)

In the U.S., this sort of hour-trimming is most commonly known as work-sharing, and 17 states utilize it in some form to make up part of employees' reduced wages. But few companies are participating because the government's contribution is not large enough to make work-sharing attractive. If the U.S. is to share in the labor-market success of its German friends, it needs a significant expansion of subsidies for work-sharing. Compared with the $787 billion economic stimulus, the costs would be low.

In work in progress, Economist Dean Baker co-director of the Center for Economic and Policy Research and I are working on quantifying the possible benefits of such a program in the U.S. Even at this late stage, the potential benefits seem quite impressive.

For example, the 20,000 job-loss figure for the economy in January was a net number. Every month there is a huge amount of churning with firms adding and subtracting millions of jobs. We don't have data yet for January, but for November the Labor Department reported that a total of 4,176,000 jobs were "created," while 4,340,000 jobs were "destroyed." Roughly half of the lost jobs were due to people voluntarily leaving their jobs. The other half, almost 2 million lost jobs, were cases where people were either laid off or fired.

The November data are typical. The net monthly job gain or loss conceals a huge amount of churning that produces this figure. This is an important policy opportunity, because there is already a massive amount of job creation out there. If we can slow job destruction even a little bit, then we will have set the stage for big increases in net job creation. If the rate of involuntary job loss can be reduced by 10 percent, then it would have the same effect on employment as if the economy generated an additional 200,000 jobs a month. Given the astonishing performance of German labor markets, such a change is not beyond the realm of the possible.

Work-sharing bills have been introduced in both the House and the Senate (H.R. 4135 and S. 2831) based on the programs in the several states. It is my opinion that these bills should be made stronger, with increased incentives for employers and employees to utilize the program. Support for this program comes from both sides of the aisle and we should move forward with it immediately.

For me, the strongest argument for work sharing is that blacks bear a disproportionate share of layoffs, so slowing layoffs through expanded work sharing will benefit them the most. Given their high unemployment, this seems especially important at this time.

Create Jobs Directly

The literature is clear. Someone separated from the labor force runs the real risk of permanently separating from the normal economy. It is crucial that we reconnect as many people as possible before it is too late. The good news is that a lifeline now could easily start a worker back on a

positive career track, making the lifeline a much more cost effective policy than years of welfare support.

Direct jobs programs could be a much more powerful way to get this process going than last year's stimulus. If the economic stimulus moneys were spent directly hiring individuals, they would have created 21 million jobs.

The Emergency Contingency Fund (ECF) provides funding for states to temporarily cover a portion of workers' wages in both public and private sector jobs. I believe that Republicans and Democrats should be able to come together and accept a major expansion of this program if it focuses as much as possible on private sector jobs.

Here is how it would work. If a firm sends out a lifeline to a currently unemployed worker, government funds help cover some of the costs. Through the program, federal funds reimburse states 80 cents for each additional dollar they spend getting people back to work. Over time, as the worker's reattachment to the labor force becomes stronger, the federal monies are gradually taken away.

As many as 29 states have or are developing employment programs funded through the ECF, and some estimates show as many as 120,000 subsidized jobs could be created at a cost of only $10,000 to $20,00 per job.

House Democrats have correctly judged this program positively. H.R. 4564, would make funds available for an additional year and presumably provide the publicity needed to increase the reliance of states on direct hiring incentives. Republicans should support such a program too, especially if the program is redesigned to send most of the money to workers employed in the private sector.

After all, a worker participating in the program gets a job. A firm gets an extended period of production from the worker at a heavily subsidized cost. This low cost input should increase the firm's profits, and increase the chances that they will lift their capital investments. It is like an indirect tax cut from the perspective of the firm.

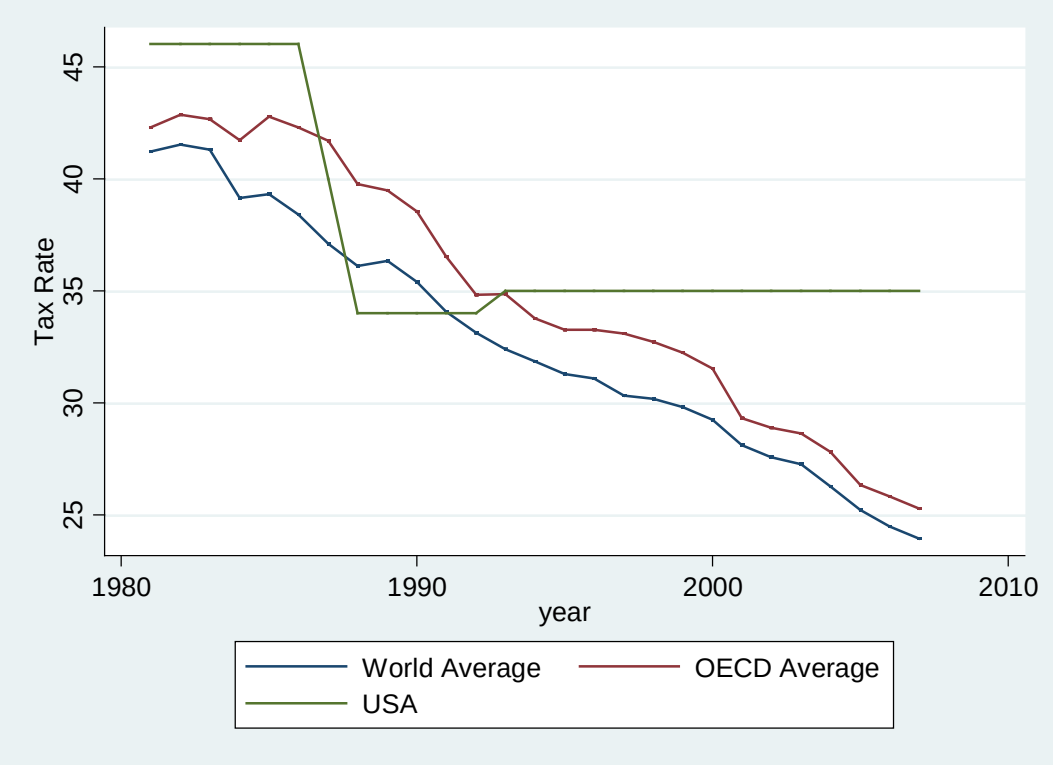
Reduce Corporate Tax Rates

If we want firms to create jobs again in the U.S on net, then we should not underestimate the importance of creating an attractive climate in which firms can operate. The sad fact is, the U.S. is about the least hospitable climate for corporate investment on earth, with the second highest corporate tax rate among developed nations. We should not be surprised that such a statistic accompanies disappointing wage and job growth. The U.S. is increasingly becoming a radical outlier in this dimension. Congress must act to address this before we wake up one day to find that every business that could has decided to locate itself offshore.

The good news is that there are a number of recent studies that have suggested that the U.S. rate is so out of line with the rest of the world that we are on the wrong side of the corporate tax Laffer curve. A phased in reduction of the corporate tax rate, perhaps to something like the OECD average rate of around 25 percent, would likely cost very little revenue, and likely would induce an investment and hiring boom of the first order immediately.

The alternative, continuing to tax firms heavily, but then contriving special provisions that return monies to firms if they create a job, is foolishly complex, and likely counterproductive. Occam's razor applies in this case.[7] If we want firms to create jobs, we should give them a reason to want to expand their U.S. operations.

Figure 3: Top Marginal Corporate Tax Rate – Central Government: Historical Trend: 1981-2007



[7] Clausing (2007)

References

Alesina, A., and S. Ardagna (1998), 'Tales of Fiscal Adjustments', Economic Policy, 27, 489–545.

Alesina, A., and R. Perotti (1997), 'Fiscal Adjustments in OECD Countries: Composition and Macroeconomic Effects', IMF Staff Papers, 44(2), 297–329.

Alesina, A., S. Ardagna, R. Perotti and F. Schiantarelli (1999), 'Fiscal Policy, Profits, and Investment', NBER Working Paper No. 7207, July.

Alesina, A., R. Perotti and J. Tavares (1998), 'The Political Economy of Fiscal Adjustments', Brookings Papers on Economic Activity, 1998(1), 197–266.

Ashley, Richard (1988), 'On the relative Worth of Recent Macroeconomic Forecasts', *International Journal of Forecasting* 4:363-76.

Ballard, C. L., J. B. Shoven and J. Whalley (1985), 'General Equilibrium Computations of the Marginal Welfare Costs of Taxes in the United States', American Economic Review, 75(1), 128–38.

Barrell, R., B. Becker, J. Byrne, S. Gottschalk, I. Hurst and D. van Welsum (2004), 'Macroeconomic Policy in Europe: Experiments with Monetary Responses and Fiscal Impulses', Economic Modeling, 21, 877–931.

Barro, Robert J. (1981), 'Output Effects of Government Purchases', *Journal of Political Economic Review*, 75(1), 128-138.

Barro, Robert J. (2008), *Marcroeconomics: A Modern Approach*. Mason, OH:Thompson/ South-Western.

Barro, Robert J. (2010). 'The Stimulus Evidence One Year On', *Wall Street Journal*, February 23. http://online.wsj.com/article/SB10001424052748704751304575079260144504040.html.

Blinder, Alan S. (1980). 'Inventories and the Structure of Macro Models', NBER Working Paper #515. July.

Browning, E. K. (1987), 'On the Marginal Welfare Cost of Taxation', American Economic Review, 77(1), 11–23.

CBO (2010). 'Estimated Impact of the American Recovery and Reinvestment Act on Employment and Economic Output From October 2009 Through December 2009', February. http://www.cbo.gov/ftpdocs/110xx/doc11044/02-23-ARRA.pdf.

Chauvet, Marcelle. 'Probabilities of Recession up to October 2009', CREFC and University of California Riverside. Available at http://www.faculty.ucr.edu/~chauvet/prob0110s.pdf.

Clausing, K. A. (2007). 'Corporate Tax Revenues in OECD Countries', *International Tax and Public Finance* 14:115-133.

Giavazzi, F., and M. Pagano (1990), 'Can Severe Fiscal Contractions Be Expansionary? Tales of Two Small European Countries', CEPR Discussion Paper No. 417, May.

Hassett, Kevin (2009). 'Why Fiscal Stimulus is Unlikely to Work', *International Finance*, 12:1, 2009: pp. 75-91.

Lees, Kirdan, Troy Matheson, and Kristie Smith (2007). 'Open economy DSGE-VAR forecasting and policy analysis: Head to head with the RBNZ published forecasts', *Reserve Bank of New Zealand Discussion Paper Series DP2007/01*. http://www.rbnz.govt.nz/research/discusspapers/dp07_01.pdf.

Nelson, C.R. (1972), 'The Prediction Performance of the F.R.B.-M.I.T.-Penn Model of the U.S. Economy', *American Economic Review*, 62, 902-917.

Roeger, W., and J. in 't Veld (2004), 'Some Selected Simulation Experiments with the European Commission's QUEST Model', Economic Modeling, 21, 785–832.