Employment and Monetary Policy: The Role of Relative Price Distortions

Merton D. Finkler
Professor of Economics
Lawrence University

Prepared for Liberal Arts College Macro Workshop
Claremont McKenna College
August 7, 2013

Abstract

The economic recovery from the recession of December 2007 to June 2009 featured real GDP returning to its pre-recession level while employment continues to lag behind to its pre-recession level. One possible reason is that employment patterns contain both cyclical and structural components. In this paper, changes in the price of labor, unit labor costs, and the cost of equipment and software are studied as key structural components. Separate regressions with changes in employment as the dependent variable are performed for goods producing, service producing, and manufacturing sectors. In each case, explanatory power is increased with the inclusion of a representation of the cost of labor and the cost of equipment and software; thus, macroeconomic policy that seeks to stimulate employment growth should consider the effects of the chosen policy on the relative cost of labor and not just on aggregate demand.

Employment and Monetary Policy: The Role of Relative Price Distortions

The economic recovery from the recession of December 2007 to June 2009 features real GDP returning to its pre-recession level much more quickly than employment will eventually returning to its pre-recession level. Thus, the most recent U.S. recession, as well as the previous one in 2001, has been described as a jobless recovery. Figure 1, based on data from the Bureau of Economic Analysis (BEA) and the Bureau of Labor Statistics (BLS), displays the pertinent details. These observations suggest that employment has both cyclical and structural components to it. In this paper, the influence of changes in the price of labor relative to that of capital will be explored as one such structural component.

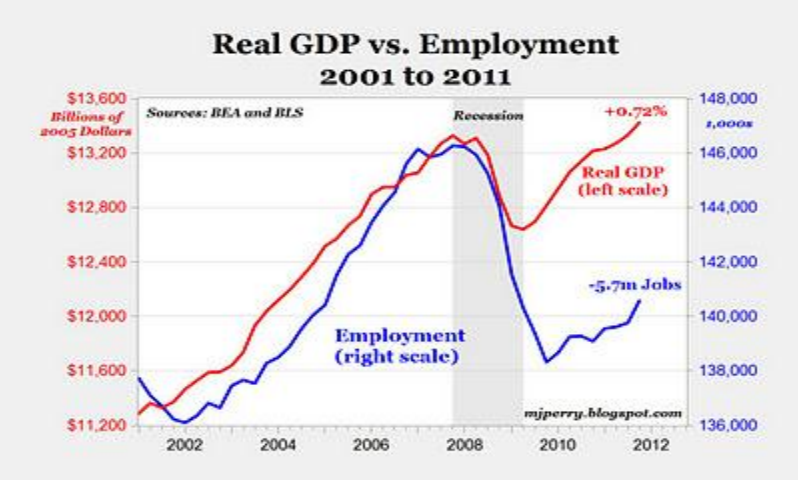

Figure 1 – Real GDP vs. Employment

Figure 2 displays one facet of such a change in relative prices as equipment and software prices fell from the economic trough while total labor compensation (which includes wages, salaries, and benefits) continued to rise. It's, therefore, not surprising that the recovery from the most recent recession in the U.S. has been an unbalanced one with expenditures on equipment and software rising markedly, and private employment rising only modestly, since the trough of the business cycle in June 2009 (See Figure 3).

In a recent National Bureau of Economic Research (NBER) working paper, Nir Jaimovich and Henry Siu (2012) stress the relationship between jobless recoveries, such as been the case in recent U.S. recessions, and job polarization. They emphasize that job polarization tends to take place during such recoveries and that the deeper the recession the larger the amount of job polarization. They

Merton D. Finkler, Ph.D
Lawrence University

remark, in particular, that jobs classified as routine – in contrast with those that are labeled non-routine and cognitive or non-routine and manual – fell markedly in recent decades. Consistent with Figures 1–3 and Autor *et al*. (2003), technologies, especially as they become relatively cheaper than labor (as indicated above), substitute for routine tasks and, thus, for the laborers who perform them.

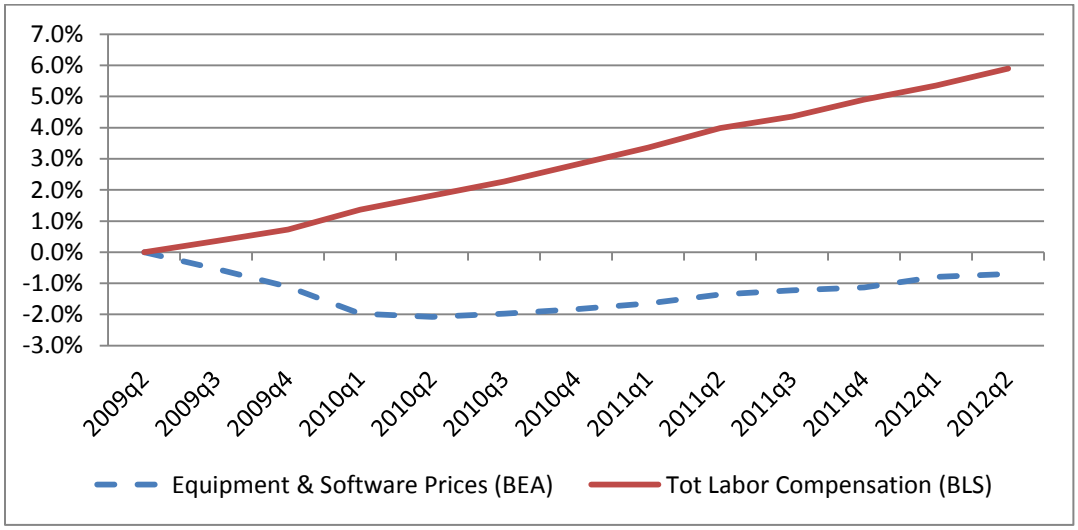

Figure 2–Sources: Bureau of Labor Statistics & Bureau of Economic Analysis

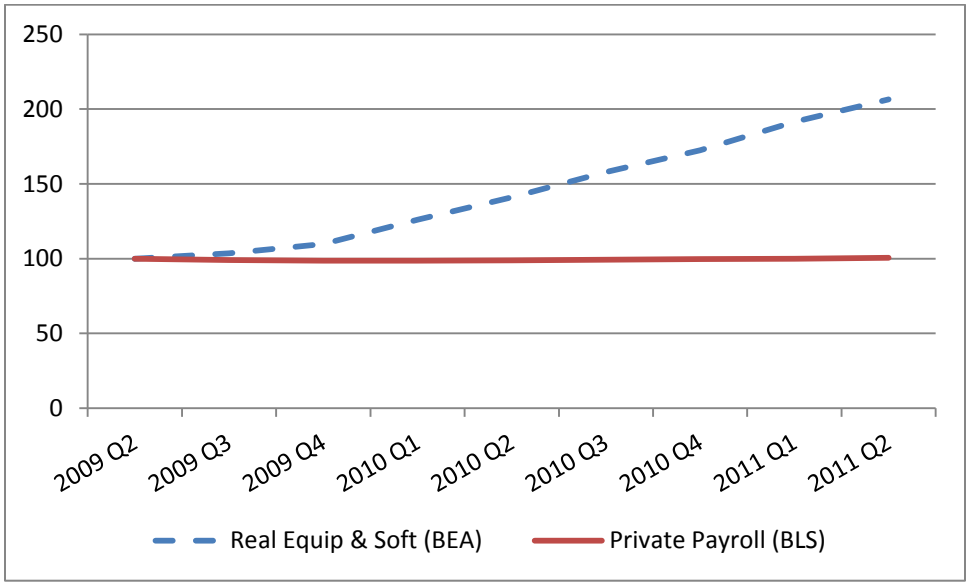

Figure 3 – Post-Recession Growth in Employment and Equipment

Based on the above observations, this paper argues that policy makers should not assume a fixed relationship between GDP improvement and increases in employment or reductions in the unemployment rate as posited under Okun's Law. One implication of the analysis conducted here is that monetary policy may not only have less impact on employment (and unemployment) than on GDP but that exceptionally expansionary monetary policy may inhibit employment growth and generate structural unemployment, or at least delay employment growth, by altering the price of capital relative to labor, which would encourage substitution of the former for the latter.

In a recent paper (2013), Federal Reserve Bank of St. Louis economist William T. Gavin addressed this theme. He noted that the employment to population ratio has barely changed since it hit 58.3% in December 2009. Furthermore, he identified a positive co-movement between the Federal funds rate target, set by the Open Market Committee of the Federal Reserve Board, and the employment-population ratio.

These patterns suggest a research question that deserves attention: To what degree do employment patterns depend upon changes in relative factor prices as opposed to those factors that target aggregate demand?

The Dual Mandate

In the first of his four George Washington University lectures (2012), Federal Reserve Board Chair Ben Bernanke made the case for two missions a central bank should fulfill: to provide macroeconomic stability and to provide financial stability. For the former, he argued that "all central banks strive for low and stable inflation; most also try to promote stable growth in output and employment." For financial stability, he posited that "central banks try to ensure that the nation's financial system functions properly; importantly, they try to prevent or mitigate financial panics or crises."

The most formal statement of the dual mandate comes from the 1977 Congressional amendment to the Federal Reserve Act. "The Board of Governors of the Federal Reserve System and the Federal Open Market Committee (FOMC) shall maintain long run growth of monetary and credit aggregates commensurate with the economy's long run potential to increase production, so as to promote effectively the goals of maximum employment, stable prices and moderate long-term interest rates." In a statement of principles released on January 25, 2012 (Federal Reserve Bank of Chicago), the FOMC included the following observation: "The maximum level of employment is largely determined by nonmonetary factors that affect the structure and dynamics of the labor market."

This paper begins to address such factors by arguing that attempts to increase employment through monetary policy will generate a decline in the price of capital relative to that of labor and, thus, place a drag on employment expansion. Consequently, monetary policy is limited in its ability to respond to changes in labor demand.

Since decisions about how many workers to hire and how many hours to have them work depend upon a variety of factors posited in production theory, that is a constructive place for inquiry. Of course, there are many different production functions that might be employed, but for well-behaved functions, such as the Cobb-Douglass and Constant Elasticity of Substitution (CES) functions, with only labor and capital as inputs, profit-maximizing producers would substitute capital for labor when labor compensation rises relative to the cost of capital.[1] Based on the empirical observations above, price information related to equipment and software will be considered, rather than all capital, as changes in physical structures tend to be based on long term considerations whereas equipment and software have a much shorter useful economic life and typically require much smaller capital expenditures. A fall in interest rates makes the purchase of such capital items more attractive.

Consistent with this argument, Gavin (2013) points out that in a competitive economy, a decline in real interest rates must be matched at some point by a decline in the marginal productivity of capital. Such a result can be reached by either increases in the stock of capital, given diminishing returns to capital, or by decreasing in the amount of labor employed, as capital and labor are complements over time. Thus, a very low cost of capital makes it cheaper for firms to purchase capital even if they choose not to fully use it; that is, they might not hire labor to take advantage of the added capital stock until either demand rebounds or inventories fall below the desired levels. In short, both substitution of capital for labor and decreased employment of labor can result from having a very low cost of capital.

Some economists and policy analysts interpret the dual mandate in terms of a particular unemployment rate, and, in December 2012, the Federal Reserve Open Market Committee declared a 6.5% national unemployment rate as a target for the duration of expansionary monetary policy. The generation of unemployment rates, however, requires theory and evidence regarding how many people enter and exit the labor force as well as on the character of offers of employment and acceptance of such offers. The dynamics of the former are complex and beyond the scope of this paper; so as reflected in Figure 1, only

[1] Only the polar case of fixed factor production functions would be inconsistent with this result.

changes in levels of employment rather than unemployment rates will be considered. For detailed discussion of the dynamics of employment and unemployment, see Shimer (2012).

Methods and Data

Narayana Kocherlakota (2012), president of the Federal Reserve Bank of Minneapolis, has argued that macroeconomic stabilization policy should respond to both labor demand and product demand shocks and that monetary policy, by itself, can only be responsive to product demand shocks. In this section, labor demand is posited to be a direct function of both labor and capital prices, and an indirect function of value added, through product demand. Initially, the intent here was to estimate, based on factor aggregates, the elasticity of substitution between capital and labor to gain a sense of the magnitude of how much a change in the relative price of labor affects employment. Problems with capital stock measurement, both in the aggregate and at industry levels, however, led to a focus on the quantity of labor demanded at a disaggregated level as a function of factor prices and industry demand. Furthermore, Chirinko (2008) argues that attempts to estimate short run elasticities of substitution are fraught with measurement and aggregation problems.[2]

The following specification will serve as the base model for empirical investigation.

$$\text{Net Job Gains}_{it} = \text{constant} + \alpha*(\text{Price of Labor}_{it}) + \beta*(\text{Price of Capital}_{t}) + \gamma*(\text{Value Added}_{it}) + \delta*(\text{Fed Funds}_{t}) + \varepsilon_{it}$$

where i stands for the industry in question and t reflects the specific time period.

In the results section, separate regression analyses are conducted for private goods producing, private service producing, and manufacturing industries. All of the estimated equations include non-linear effects through a term in which monetary policy and labor costs interact. Although, the above specification does not arise from a particular production function, one might view the factor price terms as reflecting the cost of adjustment required to change the level of employment.

In order to capture the dynamics of employment, data on job gains and job losses from the Business Employment Dynamics Survey are used. These are

[2] In both the 2008 paper and through direct communication, Chirinko suggested that a disaggregated approach to estimation would be more informative than one based on national aggregates for prices and quantities.

available on a quarterly basis beginning with the third quarter of 1992 and represent approximately 98 percent of employment on private, non-farm payrolls, a much more comprehensive representation than provided in the monthly Current Employment Statistics Survey, also conducted by the Bureau of Labor Statistics. Given the argument made in the initial section of this article, the relevant price of capital would be for equipment and software, assumed to be the same across industries. The Bureau of Economic Analysis produces such a price index (**esoftpi**) as an implicit deflator, also available quarterly. As an index of the cost of labor, the Bureau of Labor Statistics provides total labor compensation (**laborcost**) on a monthly basis for many industries.[3] The middle month in each quarter will be used in this analysis. Finally, value added for a number of industries (**valueadded**) has been calculated by the Bureau of Economic Analysis on an annual basis. These data have been interpolated to generate a smoothed quarterly series between the annual rates. An interaction term between the cost of labor and the Federal funds rate (**lab_fed**) has been included to reflect joint effects of the two variables.

Results

First, consider goods producing sectors, which account for 20.8% of all private non-farm value added (BEA – 2011 valued added by industry, release date November 13, 2012) and 16.7 % of private non-farm employment (BLS Table B-1, October 2011 report). The dependent valuable is the net number of jobs created each quarter (**G_NJOBCH**); labor cost and value added are specific to this sector and, thus, have a G designation for each independent variable. Since the dependent variable provides the difference between jobs added and jobs lost relative to the level of employment the previous quarter, it has the character of a first difference.

[3] Modest changes in the calculation of this index took place between 2000 and 2001. These changes do not affect the overall series in a substantive way.

Table 1 Goods Producing Sectors

Linear regression

Number of obs	62
F(5, 56)	26.87
Prob > F	0.0000
R-squared	0.7475
Root MSE	90.27

G_NJOBCH	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
Glaborcost	-55.85385	11.94873	-4.67	0.000	-79.79004	-31.91766
Gvalueadded	2.620646	.3658581	7.16	0.000	1.887744	3.353548
fedfunds	219.279	68.63238	3.19	0.002	81.7918	356.7661
esoftpi	21.33686	3.805318	5.61	0.000	13.71389	28.95983
lab_fed	-3.708887	.7671333	-4.83	0.000	-5.24564	-2.172134
_cons	-2734.893	793.0772	-3.45	0.001	-4323.618	-1146.169

The robust estimators illustrated in Table 1 account for 75% of the quarterly employment changes. All of the specified drivers of employment change are statistically significant with the expected sign; the positive coefficient on the Fed funds rate term is consistent with Gavin's argument noted above and not with the intent of rapidly expansionary monetary policy. The negative coefficient on the interactive term leads to the inference that when labor cost and the Fed funds rate are both rising or falling, fewer jobs will result; when they are moving in opposite directions then employment rises. A one percent increase in value added in goods production (**Gvalueadded**), roughly equivalent to $27 billion in 2011, would lead to a net increase in employment of roughly 71 thousand jobs. A one percentage point rise in the price of labor (**Glaborcost)** yields a decline of over 56 thousand jobs. A 1% rise in labor cost along with a 1 percentage point decline in the Fed funds rate would lead to a reduction of almost 4 thousand jobs; thus, though the interactive term (**lab_fed**) is statistically significant, its influence is small relative to its component factors.

When the two terms involving labor cost are removed from the specification, R-squared drops from .7475 to .3544 and the root mean squared error rises from 90.27 to 141.87. A Dickey-Fuller test indicates that one can reject the non-stationarity hypothesis with a MacKinnon approximate probability of 11% for Type I error.

In contrast with goods production, the service producing sector accounts for 79.2% of all value private non-farm value added (BEA – 2011 valued added by industry, release date November 13, 2012) and 83.3 % of private non-farm employment (BLS Table B-1, October 2011 report). In the specification in Table 2, the dependent valuable is the net number of service sector jobs created each quarter (**S_NJOBCH**); labor cost and value added are specific to this sector and, thus, have an S designation for the independent variable.

Table 2 Service Producing Sectors

Linear regression

Number of obs = 62
F(5, 56) = 7.46
Prob > F = 0.0000
R-squared = 0.4893
Root MSE = 229.57

S_NJOBCH	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
SLaborCost	-325.5514	68.68338	-4.74	0.000	-463.1407	-187.962
Svalueadded	3.03226	.6168666	4.92	0.000	1.796527	4.267992
fedfunds	743.3177	206.9299	3.59	0.001	328.7873	1157.848
esoftpi	40.22124	11.95809	3.36	0.001	16.2663	64.17618
slab_fed	-10.24077	2.610168	-3.92	0.000	-15.46956	-5.011973
_cons	3480.026	2242.498	1.55	0.126	-1012.238	7972.289

The robust estimators in Table 2 account for almost half of the variation in employment changes in service producing sectors (49%); all coefficients except for the constant term are statistically significant and, as above, have the expected signs; that is, the Fed funds term has the above noted effects. A one percent increase in value added (**Svalueadded**), roughly equivalent to $104 billion in 2011, would lead to a net increase in employment of 315 thousand jobs. A one percentage rise in the price of labor (**Glaborcost)** yields a decline of 326 thousand jobs; thus, cyclical and structural effects are of similar magnitudes. Again the interactive term, though statistically significant, is small in size.

When the two labor cost related terms are dropped from the specification, R-squared drops from .4893 to .1769, and the root mean squared error rises from 229.57 to 286.36. A Dickey-Fuller test indicates that one can reject the non-stationarity hypothesis with a MacKinnon approximate probability of 2% for Type I error.

Now, consider manufacturing employment, the primary sub-sector for goods production. It accounts for 13.2% all private, non-farm value added and 10.7 % of private, non-farm employment (BLS Table B-1, October 2011 report). Regressions using the same specification as above were not informative, as the coefficient on the cost of labor was statistically insignificant. Such a result, however, is not hard to explain when productivity growth is taken into account. Hiring decisions are based on a comparison of labor compensation increases relative to labor productivity increases not just on labor compensation alone. Figure 4 shows an index of unit labor costs for non-farm business overall (ULC-NFB). Clearly, an upward trend dominates, and this is consistent with the results shown above which feature a significant role for labor compensation. In contrast, Figure 5 highlights significant downward movement in unit labor costs in manufacturing (ULC-M) in the latter half of the 1990s, consistent with rapid employment growth, and rapidly rising unit labor costs in the most recession

period. Thus, unit labor costs are substituted for the labor compensation index employed in the previous two regressions.

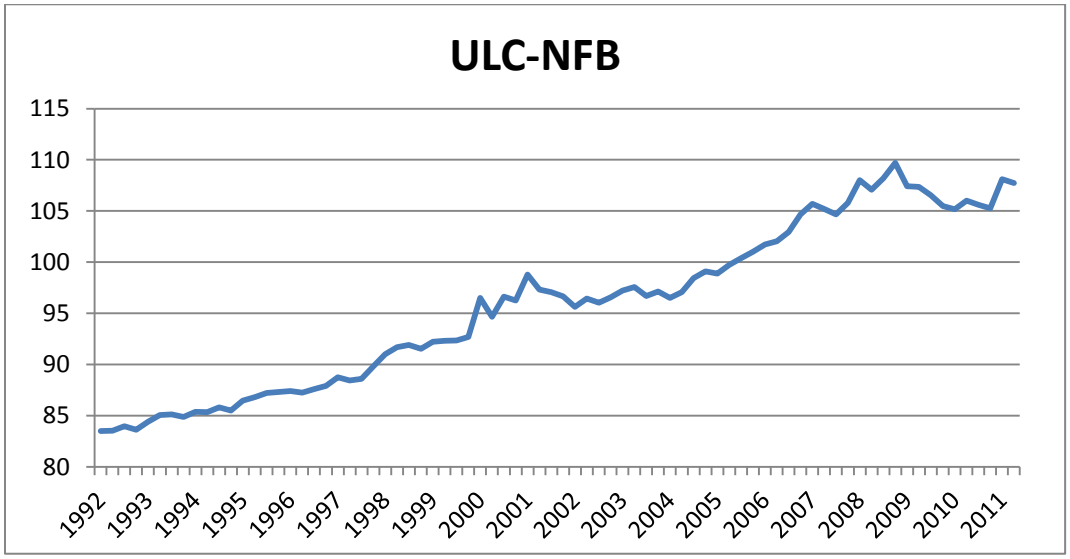

Figure 4 Unit Labor Cost in the Nonfarm Business Sector 1992 – 2012 (www.bls.gov)

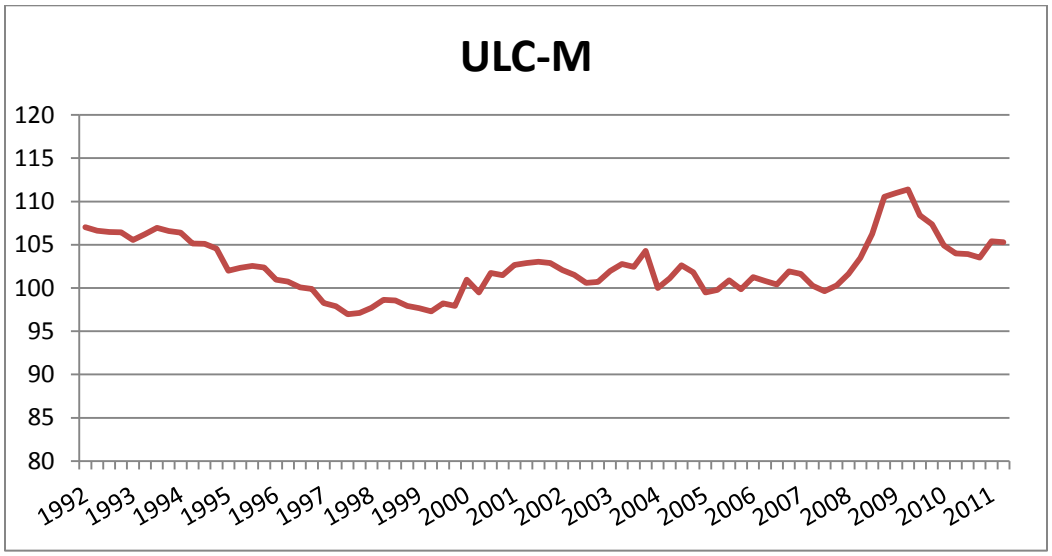

Figure 5 Unit Labor Cost in the Manufacturing Sector 1992 – 2012 **(www.bls.gov)**

Table 3 Manufacturing Sectors

Linear regression

Number of obs	62
F(5, 56)	17.12
Prob > F	0.0000
R-squared	0.6951
Root MSE	71.5

M_NJOBCH	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
ULC_M	-59.8232	13.77433	-4.34	0.000	-87.4165	-32.22991
Mvalueadded	1.66054	.2735601	6.07	0.000	1.112533	2.208547
fedfunds	-391.0782	132.0404	-2.96	0.004	-655.5868	-126.5695
esoftpi	1.993894	3.155087	0.63	0.530	-4.326504	8.314293
ULCM_FFR	3.823038	1.369552	2.79	0.007	1.079495	6.566581
_cons	3183.57	1299.49	2.45	0.017	580.3788	5786.761

The robust estimators in Table 3 explain almost 70% of the variation in changes in employment in manufacturing. For manufacturing, all of the coefficients have the expected sign, and all but the software and equipment price index are statistically significant. In contrast with the above two cases, however, the Fed funds rate coefficient has a negative sign, consistent with the Federal Reserve Open Market Committee's intent. A one percent increase in unit labor cost (**ULC_M**) would lead to a net decrease in employment of roughly 60 thousand jobs. A one percentage point increase in value added in manufacturing (**Mvalueadded**), about $17 billion, would yield roughly 28 thousand jobs. A one percentage point fall in the Fed funds rate (**fedfunds**) would generate an increase of 391 thousand jobs.

When the unit labor cost terms are dropped from the specification, R-squared drops from .6951 to .5490, and the root mean squared error rises from 71.5 to 85.5. A Dickey-Fuller test indicates that one can reject the non-stationarity hypothesis with a MacKinnon approximate probability of 9% of Type I error.

Discussion

During the recession, from the fourth quarter of 2007 through the second quarter of 2009, the decline in employment in in goods producing sectors was similar in magnitude to that for service producing sectors (see Figure 6). Since service sector employment is more than 3.5 times that of goods producing sectors, the percentage decline was much greater in the later sector. Clearly, the recovery for goods sector employment was smaller than for the service sector.

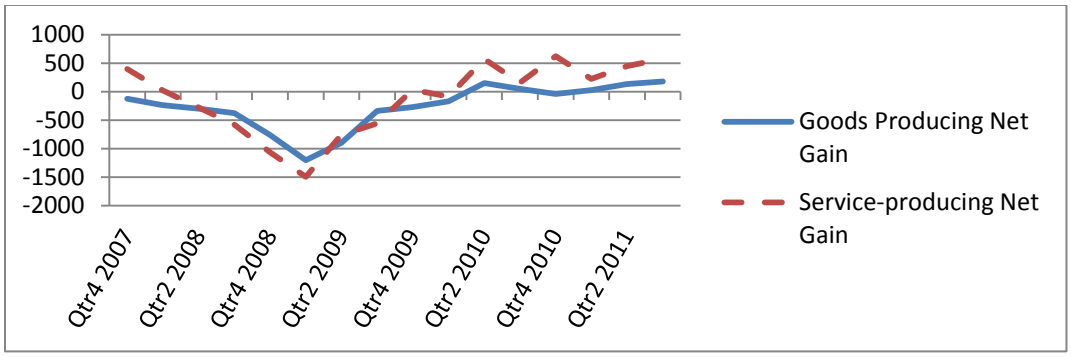

Figure 6 **Net employment changes in goods and service producing industries**

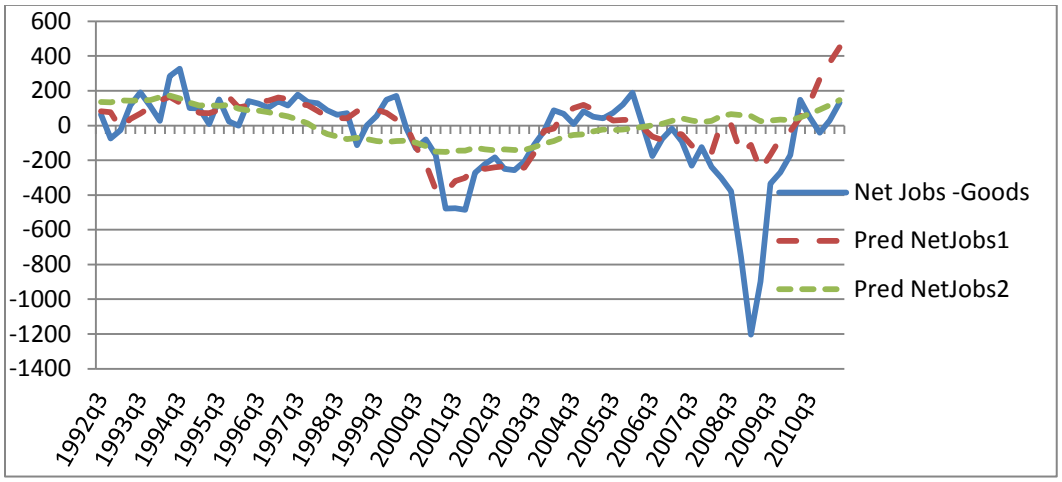

Figure 7 **Net Jobs & Predicted Net Jobs Added With & Without Labor Cost – Goods Sector**

Figure 7 displays the three different patterns for goods sector employment: the observed changes in net jobs per quarter (**Net Jobs-Goods**), the predicted net job change per quarter based on the specification provided in Table 1 (**Pred NetJobs1**) and the predicted net job change per quarter when the two terms that involve labor costs are removed from the specification (**Pred NetJobs2**).[4] The unrestricted model does a better job capturing the changes in employment in for virtually all periods; however, neither model performs well for the most recent recession and recovery periods.

[4] Specifications and results not provided in the text are available by request from the author.

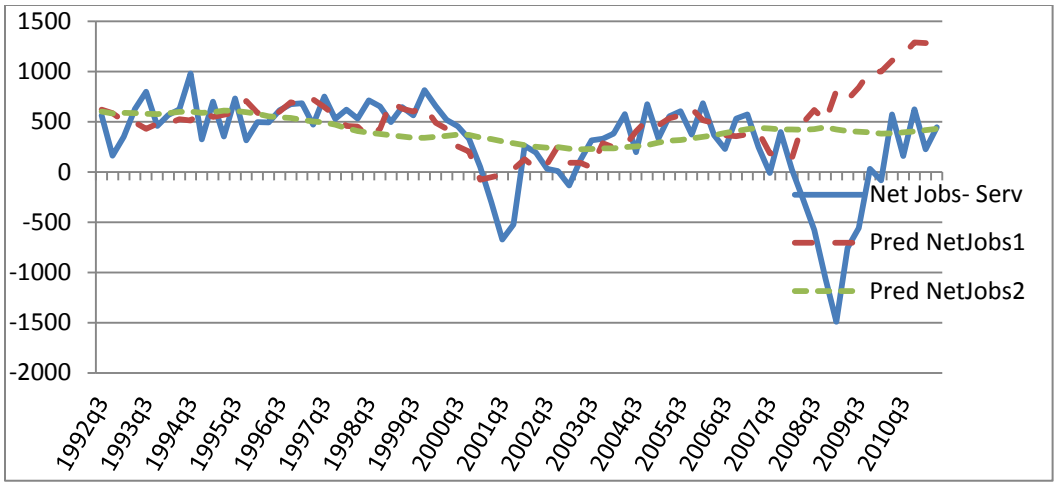

Figure 8 **Net Jobs & Predicted Net Jobs Added With & Without Labor Cost – Service Sector**

Figure 8 displays the three different patterns for service sector employment: the observed changes in net jobs per quarter (**Net Jobs-Services**), the predicted net job change per quarter based on the specification provided in Table 2 (**Pred NetJobs1**) and the predicted net job change per quarter when the two terms that involve labor costs are removed from the specification (**Pred NetJobs2**). Clearly, the more limited specification captures little of the variation in employment patterns. Surprising, neither model suggests a negative value for job changes during the most recent recession.

Figure 9 displays the net changes in manufacturing employment during the recession and post- recession periods. During the recession, from the fourth quarter of 2007 through the second quarter of 2009, employment declined by over 2.1 million jobs. During the recovery period employment in manufacturing has shown only very modest increases (of less than 100,000 jobs per quarter.)

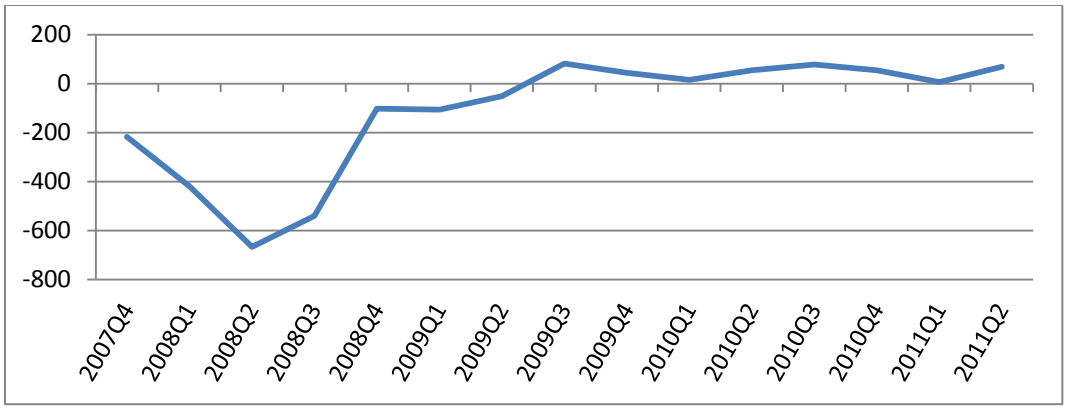

Figure 9 Net Change in Manufacturing Employment (www.bls.gov)

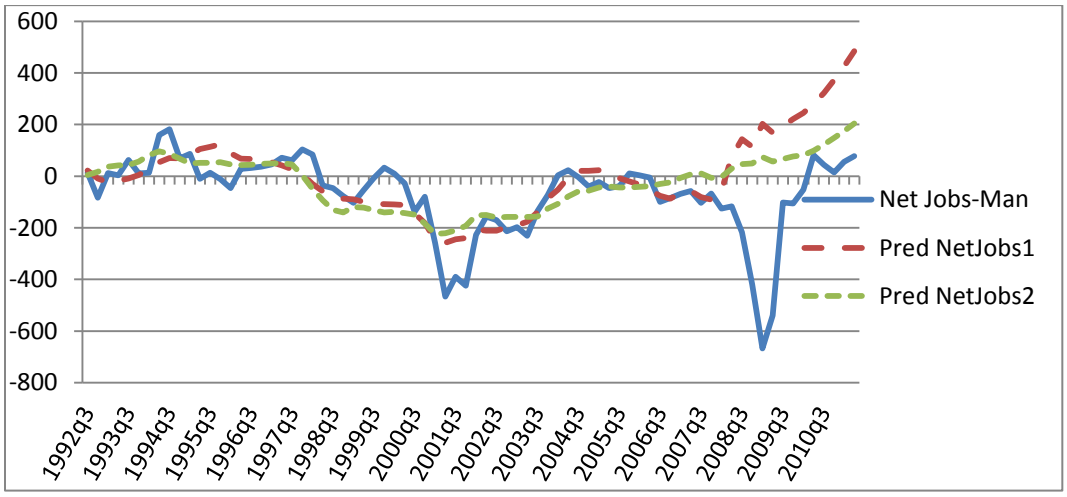

Figure 10 Net Jobs & Predicted Net Jobs Added With & Without Labor Cost – Manufacturing

Figure 10, not surprisingly, is consistent with the regression results. The unrestricted model (**Pred NetJobs1**) fits better than the restricted model (**Pred NetJobs2**) except for the mid 1990s. Neither model captures the sharp declines in employment during the two most recent recessions. The labor cost term, however, does play the role theory suggests; that is, when unit labor costs rise, employment falls.

Multicollinearity may be problematic in each of the three regression equations. For example, labor cost and value added are strongly and positively correlated for both the goods and service sectors, while unit labor cost and value

added are strongly correlated for the manufacturing sector. Typically, one might drop one of these variables from the specification. Additionally, the value added variables for each sector are, as expected, negatively correlated to the Federal funds rate. Given the purposes of this paper and the high values for "t" statistics on the relevant variables, however, it makes little sense to drop one or more of these variables from the analysis.

The results in this paper are consistent with those presented in a recent Congressional Research Service report by Linda Levine (2013) regarding to what degree the increases in unemployment since 2007 are structural. Table 2 in that report displays the results from six studies regarding the rate of structural unemployment for the post 2007 period. Of the 5 percentage point rise in the unemployment rate from 2007 to 2010, 1.0 to 2.5 percentage points – or 20 to 50% of the rise – can be attributed to structural unemployment.

Conclusion

The historically strong relationship between output growth and employment growth (sometimes characterized by Okun's Law) depends upon a stable relationship between the cost of labor and the cost of capital. The relative cost of capital, however, can change markedly during periods of rapid technological innovation, especially if it is of a labor saving character. Furthermore, public policy that affects the cost of labor or capital can distort the nature of any economic recovery. Recent rises in the cost of labor, as well as uncertainty[5] about future costs related to the Affordable Care Act of 2010, make decisions about hiring additional laborers problematic, especially when the cost of capital, and new technology in particular, are falling in price relative to productivity. This is particularly marked in the manufacturing sector where technological innovation – and creative destruction - has been prevalent in the past 20 years. Furthermore, aggressive monetary policy on the part of the Federal Reserve Bank has markedly lowered the cost of capital.

Recent economic history in the United States has featured both cyclical and structural volatility. Aggregate demand management, through counter-cyclical fiscal and monetary policy is appropriate for managing the cyclical aspects of both GDP and employment. Many economists including Paul Krugman (2011), Christina Romer (2012), and current Federal Reserve Chair Ben Bernanke (2012) strongly believe that the most recent U.S. recession should be managed as if cyclical components are predominant; thus, given the large drop in

[5] Inclusion of the Index of Economy Policy Uncertainty, developed by Bakes, Bloom, and Davis (2012), into the specifications did not change the character of the results, though some of the magnitudes were affected.

GDP and employment during the 2007-2009 recession, these economists continue to push for aggressive aggregative demand management as the primary employment growth strategy. Among others, Eric Brynjollson and Andrew McAfee (2011), Raghuram Rajan (2011), and Federal Reserve Bank of Dallas President Richard Fisher (2013) beg to differ. They argue that monetary policy is limited in its ability to expand employment. This paper identifies changes in both the price of labor and unit labor costs in our most recent recessions as one such limitation, and that an understanding of structural labor market components is central if public policy is to be effective in increasing employment.

Expansionary monetary policy, by reducing the cost of capital, makes equipment and software purchases relatively more attractive than expansion through hiring. Therefore, expansionary monetary policy for purposes of achieving lower unemployment rates may not be the most effective method for bringing employment growth back to its traditional path or the unemployment rate close to its benchmark rate. Consequently, central bank mandates to achieve particular employment levels or especially unemployment rates, such as those proposed by Federal Reserve Bank of Chicago President Charles Evans (2012) and included in the Federal Reserve Board Open Market Committee's statement on December 12, 2012 (http://www.federalreserve.gov), should be implemented with great caution.

Based on the evidence presented in this paper, policies that increase employment require making hiring more attractive. Short term policies to increase employment should focus on reducing the cost of hiring (*e.g.*, reduced payroll taxation) and increasing the incentives for workers to accept jobs (*e.g.*, restructured unemployment compensation or disability insurance.) Expansionary monetary policy can help only up to the point that liquidity constrains aggregate demand. The large magnitude of excess reserves held by banks suggests that liquidity per se is not the reason for slow employment growth. When monetary policy becomes too aggressive for too long, it not only becomes ineffective; it distorts decision-making. If relative factor prices matter, as shown above, then monetary policy is not an efficient way to increase employment. At some point, however, as the marginal product of capital falls from significant expansion (of equipment and software), labor productivity rises to the point where increased hiring again makes sense. That may be why private employment growth finally started to expand in 2011 and 2012.

References:

Autor, D. H., Levy F., and Murnane R. J. (2003). The skill content of recent technological change: An empirical exploration. *Quarterly Journal of Economics*, 118 (4), 1279-1333.

Baker, S., Bloom N., Davis, S.J. (2013). Has Economic Policy Uncertainty Hampered the Recovery? retrieved February 3, 2013, from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2000734.

Bernanke, Ben S. (March 26, 2012). Recent Developments in the Labor Market. National Association for Business Economics Annual Conference, retrieved January 28, 2013 from http://www.federalreserve.gov/newsevents/speech/bernanke20120326a.htm.

Brynjolfsson, Erik and McAfee, Andrew. (2011). *Race Against the Machine*. Digital Frontier Press, October 17, 2011.

Chirinko, Robert. (2008). Sigma, The Long and Short of It. *Journal of Macroeconomics*, 30(2), 671-86.

Evans, Charles. (March 16, 2012). Monetary Policy Communication and Forward Guidance. International Research Forum on Monetary Policy, Frankfurt Germany, retrieved January 28, 2013 from http://www.chicagofed.org/webpages/publications/speeches/2012/03_16_12_frankfurt.cfm

Federal Reserve Bank of Chicago (December 13, 2012). The Federal Reserve's Dual Mandate, retrieved January 28, 2013 from http://www.chicagofed.org/webpages/publications/speeches/our_dual_mandate.cfm.

Fisher, Richard (June 4, 2013), The Status of the U.S. Economy and a Perspective on 'The Modern Monetarism', speech given in Toronto, retrieved June 17, 2013 from http://www.dallasfed.org/assets/documents/news/speeches/fisher/2013/fs130604.pdf

Gavin, William T. (April 2013). Low Interest Rates Have Yet to Spur Job Growth, *The Regional Economist*, Federal Reserve Bank of St. Louis.

Jaimovich, Nir and Siu, Henry E. (August 2012). The Trend is the Cycle: Job Polarization and Jobless Recoveries. NBER working paper retrieved January 28, 2013 from http://www.nber.org/papers/w18334.pdf.

Kocherlakota, Narayana. (March 20, 2012). On the Limits of Monetary Policy. 2nd Annual Hyman P. Minsky Lecture, Washington University retrieved January 28, 2013 from http://www.minneapolisfed.org/news_events/pres/nrk03-20-12.pdf.

Krugman, Paul. (October 19, 2011). Getting Nominal. *New York Times*, The Opinion Pages, retrieved January 28, 2013 from http://krugman.blogs.nytimes.com/2011/10/19/getting-nominal.

Levine, Linda (January 24, 2013). The Increase in Unemployment Since 2007: Is It Cyclical or Structural? Congressional Research Service Report, R 41785 retrieved June 6, 2013 from http://www.fas.org/sgp/crs/misc/R41785.pdf

Rajan, Raghuram. (June 8, 2011). Money Magic. Project-Syndicate, retrieved January 28, 2013 from http://www.project-syndicate.org/commentary/money-magic

Romer, Christina. (February 18, 2012). Learning from the Great Depression. *Economist's View*, retrieved January 28, 2013 from http://economistsview.typepad.com/economistsview/2012/02/christina-romer-on-learning-from-the-great-depression.html

Shimer, Robert (2012). Reassessing the Ins and Outs of Unemployment. *Review of Economic Dynamics*, 15(2), 127-148.