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Another Look at Our Unemployment/Recession Rule of Thumb

- We expect US growth to average just over 2% in the second half of 2012, which would be a touch faster than in the first half. By and large, the US data have improved slightly and financial markets have scaled back their concerns about the global economy in recent weeks.
- But the poor July durable goods report released on Friday was a reminder that forecasters should always be on the lookout for early signs of another downturn. One of our favorite yardsticks is based on the observation that every persistent 1/3-point rise in the unemployment rate—perhaps the most basic of all US economic indicators—has historically indicated a recession.
- Today we recapitulate the remarkable performance of this rule of thumb. We then look for a timelier version of the rule using recent academic research showing that worker flows between different labor market states predict subsequent changes in the overall unemployment rate. If worker flows predict unemployment, and unemployment indicates a recession, can we use worker flows to predict a recession at an earlier stage?
- The answer is yes in a statistical sense, but only at the cost of sharply increasing the number of "false positives." Echoing Paul Samuelson's famous quip about the predictive power of the stock market, we might say that worker flows have predicted 23 of the 11 postwar recessions.
- We conclude that the slight recent deterioration in both the actual unemployment rate and worker flows does raise a yellow flag. But barring a more substantial deterioration in coming months, we still expect sluggish, yet positive, growth in output and employment.

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Another Look at Our Unemployment/Recession Rule of Thumb

We expect US growth to average just over 2% in the second half of 2012, which would be a touch faster than in the first half. By and large, the US data have improved slightly and financial markets have scaled back their concerns about the global economy in recent weeks.

That said, this week's durable goods report showing a sharp decline in core capital goods orders in July was a reminder that the US economic recovery remains sluggish at best, the downside risks continue to loom large, and forecasters should always be on the lookout for early signs of another downturn. One of our favorite yardsticks for identifying such downturns has long been based on the observation that over the postwar period, every 1/3-point rise in the 3-month average of the unemployment rate—perhaps the most basic of all US economic indicators—has historically indicated a recession.¹ This rule of thumb is illustrated in Exhibit 1 below, which identifies recessions by a shaded area and the point at which the 3-month average of the (unrounded) unemployment rate had risen 35 basis points (bp) by a vertical line. The key point to note is that every vertical line occurs near the start of a recession, and that the rule has never set off a false recession alarm.

One reason why we find this rule so useful is that the unemployment rate is about as close as economic data get to a "real time" measure. It is released quickly after the end of each month and is never revised except for (usually small) updates to the seasonal factors. Our unemployment/recession rule of thumb is therefore more useful than other historical regularities that are based on data that become available long after the fact and/or are heavily revised. Indeed, the fact that the unemployment rate had tripped the threshold as of the December 2007 employment report helped us identify the start of the 2007-2009 recession well before most other forecasters.



Exhibit 1: The 1/3-Point Unemployment Recession Rule

Source: Department of Labor. NBER.

For earlier <u>analysis</u> of this rule see Andrew Tilton, "What Turns a Stall into a Slump?" US *Economics Analyst*, August 12, 2011.

Can We Improve on the Rule by Using Worker Flows?

Given the usefulness of the unemployment/recession rule of thumb, a method for *forecasting* the unemployment rate with a high degree of accuracy could in principle be very valuable. We therefore devote this week's note to the recent academic literature showing that worker flows between different labor market states predict subsequent changes in the overall unemployment rate. After all, if worker flows predict unemployment and unemployment indicates a recession, we may be able to use worker flows to predict a recession at an earlier stage.

The starting point for this research is the evolution of unemployment inflows and outflows.² Intuitively, we can think of the unemployment rate as the amount of water in a bathtub which is determined by the rate at which water pours into the tub (the rate of inflow) relative to the rate at which it drains out (the outflow). When the inflow of new water equals the outflow, the amount of water in the tub is unchanged. But when the rate of inflow into the tub exceeds the outflow, the amount of water in the bathtub will increase. A similar mechanism is at play in the labor market: the unemployment rate rises during recoveries, when unemployment outflows exceed inflows.³

Economists Regis Barnichon and Christopher Nekarda have recently taken this analysis a step further and show more rigorously that worker flows are quite valuable for forecasting near-term unemployment dynamics.⁴ Following Barnichon and Nekarda, we measure the unemployment rate flows using a methodology derived by Robert Shimer.⁵ These flows are constructed from employment, unemployment and short-term unemployment statistics provided in the household survey of the monthly jobs report.

We then obtain the co-called "flow-consistent" rate of unemployment, which is the rate at which the unemployment rate eventually would settle if the rates of inflow and outflow stayed constant at their current levels.⁶ The flow-consistent unemployment rate is a useful concept because the actual unemployment rate will tend to converge to the flow-consistent rate of unemployment over time.

Finally, we relate the flow-consistent unemployment rate to future movements in actual unemployment. Exhibit 2 shows that there is a statistical relationship between the latest gap between the actual and flow-consistent rate of unemployment and the change in the actual unemployment rate over the subsequent three months. A simple regression for a monthly sample since 1948 confirms this link: the estimated coefficient is highly significant with a t-statistic of 9.7 and the R-squared for the relationship is 0.11. Adding further lags of the gap between the actual and flow-consistent rate of unemployment and recent changes in initial jobless claims—which can be thought of as providing information for the evolution of future inflows into unemployment—improves the fit to 0.51.

² See Aysegul Sahin and Christina Patterson, "The Bathtub Model of Unemployment: The Importance of Labor Market Flow Dynamics," <u>http://libertystreeteconomics.newyorkfed.org/2012/03/thebathtub-model-of-unemployment-the-importance-of-labor-market-flow-dynamics.html</u>.

³ Specifically, the model explains the evolution of the unemployment rate (u) with the inflow rate (s) and the outflow rate (f) using u(t+1) = u(t) + s(t)*(1-u(t)) - f(t)*u(t), where u(t) denotes the rate of unemployment this month and u(t+1) next month. This simple model does not distinguish between outflows from unemployment into employment and out of the labor force.

See "Using Labor Force Flows to Forecast the Labor Market," available at http://chrisnekarda.com/papers/forecast-ur.pdf.

⁵ See "Reassessing the Ins and Outs of Unemployment," *Review of Economic Dynamics*, 15(2), 2012.

The flow-consistent unemployment rate is defined as $u^{*}(t) = s(t)/(s(t)+f(t)))$.



Exhibit 2: Flows Hold Information about Future Unemployment Dynamics...

Source: GS Global ECS Research.

Barnichon and Nekarda show formally that the flow-consistent unemployment rate is a good predictor of future unemployment rates, outperforming real-time forecasts by private economists and the Federal Reserve staff. Specifically, the worker flow model improves forecasting performance—measured by the so-called root mean square error—by 40% for same-quarter forecast and by about 30% for a one-quarter-ahead forecast. At longer forecast horizons, the difference is less notable, but this might not be surprising given that the unemployment flow model is a simple statistical model that incorporates no information other than labor market data.

From Averages to Turning Points

This improvement in forecasting performance over the cycle as a whole is certainly useful. How much of it occurs around business cycle turning points? To assess the value of worker flows for predicting the actual unemployment rate at the onset of recessions, we construct a "cycle" chart of unemployment rate dynamics in the run-up to recessions in Exhibit 3. That is, we index all eleven post-war recessions at zero on the horizontal axis and show the average dynamics of the actual and flow-consistent unemployment rates around this date. Exhibit 3 shows that the flow-consistent unemployment rate clearly leads the actual unemployment rate at the onset of the recession (although we have to keep in mind that the flow-consistent rate is only available with a one-month lag).





Source: Department of Labor. GS Global ECS Research.

Flows are Helpful...but No Perfect Recession Mousetrap

Does this mean that we can combine our 1/3-point recession rule with the flow-based forecast for the unemployment rate to construct a perfect mousetrap for recessions? We proceed in a number of steps to explore this question. First, we use the flow-consistent unemployment rate to construct historical unemployment rate forecasts 1, 3, 6, 9 and 12 months ahead.⁷ Second, we track the date when the forecasts pointed to a breach of the 1/3-point threshold and calculate how early or late this was relative to the actual start of the recession. Finally, we count the number of times when the unemployment rate forecasts triggered a false alarm (i.e. how many times the forecast for the three-month moving average of the unemployment exceeded 1/3 point but no recession followed).

Exhibit 4 presents our results. First, we include our existing 1/3-point rule as a benchmark. As discussed above, our 1/3-point rule has captured the eleven post-war recessions with an average lag of 0.3 months (grey bars) without any false alarms (black line). Second, we show how the timing and accuracy of the rule are improved when we use the flow-based forecasts for the unemployment rate. We see that these have, on average, warned of a recession earlier, with a *lead* of 1-4 months. For example, the 9-months-ahead forecasting rule has, on average, warned of a recession 4 months before the actual start of the recession. However, the exhibit also shows that this predictive power has come at the cost of significantly lower accuracy: the 9-months-ahead model has wrongly warned of a recession 12 times since 1948 and thus has an accuracy of less than 50%. Echoing Paul Samuelson's famous quip that the stock market has predicted 9 of the last 5 recessions, we could say that worker flows have predicted 23 out of the last 11 recessions.

⁷ Specifically, we run a simple regression in which we explain the observed change in the unemployment rate over the past *n* months with the gap between the actual and flow-consistent unemployment rate *n* months ago (and earlier).



Exhibit 4: No Perfect Mousetrap

Source: GS Global ECS Research.

Using worker flows to forecast the unemployment rate for the 1/3-point rule therefore entails a trade-off between an earlier and noisier signal. Although some improvements in the trade-off might be attainable with more sophisticated methods, it seems that worker flows provide no free lunch relative to the 1/3-point rule and a trade-off between timing and accuracy remains.⁸

A (Pale) Yellow Flag for the Cycle

So what are worker flows telling us at the moment? To answer this question, Exhibit 5 plots the actual unemployment rate against the flow-consistent rate for the period since 2007. There is a clear lead-lag relationship, and the flow-consistent rate was particularly useful for gauging the depth of the labor market deterioration in late 2008 and early 2009. (although we need to keep in mind that the flow-consistent rate is only available with a one-month lag).

⁸ We see two approaches to improving the signal-to-noise ratio. First, one can attempt to optimize the 1/3-point threshold. Setting a 1/2-point threshold, for example, improves the signal-to-noise ratio slightly but not significantly. Second, worker flows can be used in a more elaborate forecasting model. Barnichon and Nekarda, for example, use a vector-autoregression to forecasts the worker flows themselves using other labor market information (such as initial jobless claims and online job advertising). Our preliminary results, however, suggest that the gains from using this more elaborate model are likely to be limited.





Source: Department of Labor. GS Global ECS Research.

At present, the flow-consistent rate is sending a slightly negative signal, pointing to a stable or slightly higher actual unemployment rate over the next few months. Thus, both the slight increase in the actual unemployment rate and the slight deterioration in worker flows over the past few months raise a yellow flag about the US economic outlook. But barring a more substantial deterioration in coming months, we still expect sluggish, yet positive, growth in output and employment.

Jan Hatzius & Sven Jari Stehn

The US Economic And Financial Outlook

(% change on previous period, annualized, except where noted)

	2010	2011	2012	2013	2012			2013				
			(f)	(f)	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
OUTPUT AND SPENDING												
Real GDP	2.4	1.8	2.3	2.0	2.0	1.5	2.4	2.0	1.5	2.0	2.5	2.5
Year-to-year change					2.4	2.2	2.5	2.0	1.9	2.0	2.0	2.1
Consumer Expenditure	1.8	2.5	1.9	1.6	2.4	1.5	2.2	1.5	1.0	1.5	2.0	2.0
Residential Fixed Investment	-3.7	-1.4	10.9	10.7	20.5	9.7	7.7	7.5	10.0	12.5	15.0	15.0
Business Fixed Investment	0.7	8.6	8.7	7.1	7.5	5.3	5.0	5.0	7.5	7.5	10.0	10.0
Federal Government	4.5	-2.8	-2.8	-2.4	-4.2	-0.4	-2.5	-2.5	-2.5	-2.5	-2.5	-2.5
State and Local Government	-1.8	-3.4	-1.5	0.0	-2.2	-2.1	-0.2	0.0	0.0	0.0	1.0	1.0
Net Exports (\$bn, '05)	-420	-408	-420	-423	-416	-424	-422	-420	-419	-419	-424	-428
Inventory Investment (\$bn, '05)	51	31	73	85	57	66	78	90	88	90	85	78
Industrial Production, Mfg	5.7	4.3	4.9	3.5	9.6	1.1	4.0	3.0	3.0	4.0	4.5	4.5
INFLATION (% ch, yr/yr)												
Consumer Price Index (CPI)	1.6	3.1	2.1	2.1	2.8	1.9	1.5	2.2	2.1	2.3	2.3	1.8
Core CPI	1.0	1.7	2.1	1.6	2.2	2.3	2.1	2.0	1.8	1.6	1.5	1.5
Core PCE*	1.5	1.4	1.8	1.4	1.9	1.8	1.7	1.7	1.5	1.4	1.4	1.4
Unit Labor Costs	-1.1	1.9	0.8	0.8	0.0	0.8	0.9	1.3	0.7	0.8	0.8	0.7
LABOR MARKET												
Unemployment Rate (%)	9.6	8.9	8.2	8.0	8.2	8.2	8.2	8.1	8.1	8.1	8.0	8.0
FINANCIAL SECTOR												
Federal Funds** (%)	0.18	0.07	0.10	0.10	0.13	0.16	0.10	0.10	0.10	0.10	0.10	0.10
3-Month LIBOR (%)	0.30	0.56	0.25	0.25	0.47	0.47	0.30	0.25	0.25	0.25	0.25	0.25
Treasury Yield Curve** (%)												
2-Year Note	0.62	0.26	0.50	1.00	0.34	0.29	0.40	0.50	0.50	0.60	0.75	1.00
5-Year Note	1.93	0.89	1.10	1.60	1.02	0.71	0.90	1.10	1.20	1.30	1.40	1.60
10-Year Note	3.29	1.98	2.00	2.50	2.17	1.62	1.80	2.00	2.10	2.20	2.30	2.50
30-Year Bond	4.42	2.98	2.90	3.25	3.28	2.70	2.70	2.90	2.95	3.05	3.05	3.25
Profits*** (% chg, yr/yr)	23.9	8.9	7.4	5.7	9.2	4.5	8.0	8.0	5.0	5.0	5.0	7.5
Federal Budget (FY, \$ bn)	-1,294	-1,296	-1,200	-1,000	-	-	-	-	-	-	-	-
FOREIGN SECTOR												
Current Account (% of GDP)	-3.0	-3.1	-3.4	-3.5	-3.5	-3.3	-3.3	-3.4	-3.4	-3.5	-3.5	-3.6
Euro (\$/€)**	1.32	1.32	1.33	1.40	1.32	1.25	1.25	1.33	1.37	1.40	1.40	1.40
Yen (¥/\$)**	83	78	76	74	83	79	77	76	75	74	74	74

* PCE = Personal consumption expenditures. ** Denotes end of period. *** Profits are after taxes as reported in the national income and product accounts (NIPA), adjusted to remove inventory profits and depreciation distortions.

NOTE: Published figures are in bold

Source: GS Global ECS Research.

+0.9% 65.9 -17

+1.5% -1.4%

+0.5% Flat +0.2%

5

53.7 73.6 -0.5%

US Calendar

Focus for the Week Ahead

- Fed Chairman Bernanke's Jackson Hole speech will be the major event of the week (August 31). We expect the • Chairman to signal a strong possibility of additional easing without committing to its form or timing.
- Weak regional manufacturing surveys point to a softening in the Chicago PMI survey in August (August 31). ٠
- We expect that consumer sentiment remained broadly unchanged in August (August 28, 31). .
- The latest retail sales report suggests that personal spending showed decent nominal gains in July (August 30). •
- The Case-Shiller house price index should show another firm gain in June (August 28). .

		Time	Estir		
Date		(EST) Indicator	GS	Consensus	Last Report
Tue	Aug 28	9:00 S&P/Case Shiller Home Price Index (Jun)	+0.5%	+0.4%	+0.9%
	-	10:00 Consumer Confidence (Aug)	66.0	66.0	65.9
		10:00 Richmond Fed Survey (Aug)	n.a.	-10	-17
Wed Aug 29	8:30 Real GDP— Q2 Annualized (Second)	+1.7%	+1.7%	+1.5%	
		10:00 Pending Home Sales (Jul)	n.a.	+1.0%	-1.4%
		12:15 Cleveland Fed Pres Pianalto spks on economy; Newark, OH			
Thu	Aug 30	8:30 Personal Income (Jul)	+0.5%	+0.3%	+0.5%
		8:30 Personal Spending (Jul)	+0.4%	+0.5%	Flat
		8:30 Core PCE Price Index (Jul)	+0.16%	+0.1%	+0.2%
		14:00 Fed's Beige Book			
		8:30 Initial Jobless Claims	n.a.	370,000	372,000
		8:30 Continuing Claims	n.a.	3,307,000	3,317,000
		11:00 Kansas City Fed Survey (Aug)	n.a.	2	5
Fri	Aug 31	9:45 Chicago Purchasing Managers' Index (Aug)	52.5	53.5	53.7
		9:55 Reuters/U. Mich Consumer Sentiment—Final (Aug)	72.5	73.6	73.6
		10:00 Factory Orders (Jul)	+2.3%	+1.9%	-0.5%
		10:00 Bernanke spks at annual KC Fed Conf; Jackson Hole, WY			

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Disclosure Appendix

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We, Jan Hatzius, Alec Phillips, Jari Stehn, Andrew Tilton and Shuyan Wu, hereby certify that all of the views expressed in this report accurately reflect our personal views, which have not been influenced by considerations of the firm's business or client relationships.

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