8 August 2014 | 15 pages

North America

U.S. Economics Weekly:
Market and Policy Comments

The Impending Acceleration in U.S. Business Investment

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- We bring a wide array of data sources and methodologies to bear on the question: Is a speedup in private nonresidential fixed investment imminent? Three different perspectives argue that the answer is 'yes.' First, acceleration of U.S. GDP growth through 3 percent is typically accompanied by faster subsequent BFI growth. Second, a multitude of individual firms spanning most sectors in the economy have announced their intentions to intensify capex this year. And third, notwithstanding some softness in the responses of small firms, a diverse mix of private surveys is sounding harmoniously positive notes.

- These findings are buttressed by an even wider constellation of indicators from across the spectrum of economic data; indicators such as slowly but steadily increasing capacity utilization and suggestions that the current levels of IT capex growth are just barely enough to cover depreciation on existing capital.

- One's enthusiasm about near-term BFI growth prospects might only be tempered by the fact that previous momentum in fixed investment spending during this recovery has been short-lived, as the long shadow cast by the Great Recession has repeatedly proven to be even longer than expected.

- Taken together, though, our results form a compelling narrative suggesting that BFI growth will continue to rise through mid-2015, providing a 'missing middle' between consumption growth and hiring, and solidifying the incipient normalization of monetary policy.

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See Appendix A-1 for Analyst Certification, Important Disclosures and non-US research analyst disclosures.

The Impending Acceleration in U.S. Business Investment

The importance of a recovery in private nonresidential fixed investment (henceforth business fixed investment (BFI)) for the U.S. economic outlook is difficult to overstate. Faster BFI growth in the near-term will validate the recoveries already underway in the consumer sector and labor market. As a matter of arithmetic, it is necessary for the above 3 percent GDP growth in our forecast through yearend and the continuing robust growth thereafter. Stronger investment growth would also resolve one of the long-standing puzzles of this recovery; namely, that in spite of strong profits, ample cash, high returns to physical capital and favorable financial tailwinds, many U.S. firms remain hesitant to deploy financial resources for capital expenditure at home.

Implications of BFI for the future path of U.S. interest rates are equally important. The FOMC's forecasts for GDP growth and their projections of the path of the policy rate already incorporate an implicit acceleration in BFI.[1] Therefore, as the uptick occurs this year, it will serve to validate the long-held views of policymakers of an imminent period of above-trend output growth, a view upon which the normalization of policy rates starting in Q3 2015 is conditional.

That said, there remain important downside risks to the outlook for BFI and rates. Similar recovery predictions have been wrong over recent years. So persistently wrong, in fact, that market sentiment about the resilience of investment demand, potential GDP growth and equilibrium neutral interest rates has been depressed lately. In our view, this downgrade to neutral rates may well be overdone; our baseline estimate of the equilibrium policy rate is closer to 3.5 percent than 2.5 percent. Thus, a recovery in BFI growth would go a long way to prop up estimates of potential GDP growth and to disabuse some market participants of their belief in the lower neutral rate.

In the remainder of this report, we present a wide array of empirical evidence implying that acceleration in nonresidential fixed investment is underway.

On the Threshold of Faster BFI Growth

Among the positive news in the first reading of second-quarter GDP was an upswing in BFI growth. After emerging as a beacon of light in the early days of the recovery – driven by sequential rebounds in equipment purchases and investment in nonresidential structures – BFI growth has been disappointingly slow for much of the past year and a half (**Figure 1**).

What are the telltale signs that faster investment growth is coming? Our first clue comes from the historical behavior of investment: investment growth tends to rise when it crosses certain thresholds. The intuition for the periodic acceleration and deceleration of investment spending is rooted in early business cycle theory. In Paul Samuelson's seminal contribution (1939), investment in the economy is some multiple of the change in real output. It follows directly that the growth rate of investment rises and falls with the acceleration of real output.[2]

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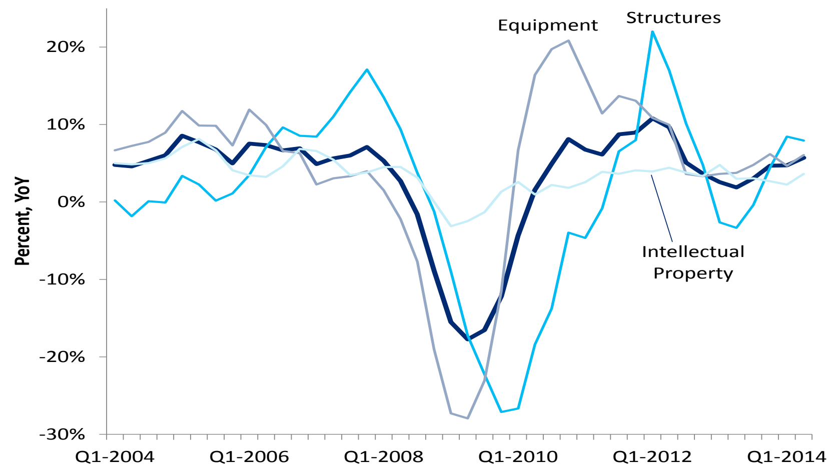
[1] For example, in a speech last quarter, Bill Dudley affirmed that, "Business fixed investment and housing are two key areas where activity has been disappointing. They need to kick in more forcefully for the economy to grow at an above trend rate for a sustained period." (The Economic Outlook and Implications for Monetary Policy, May 20, 2014).

[2] A recent post on FEDS notes that the current low levels of BFI growth are not surprising in the context of an accelerator-type model (see 'Perspectives on the Recent Weakness in Investment,' Eugenio Pinto and Stacey Tevlin, Federal Reserve Board, May 21, 2014).

Figure 1. Growth of Private Nonresidential Fixed Investment (Real)



Source: Bureau of Economic Analysis and Citi Research.

Strictly speaking, the accelerator model's characterization of output and investment dynamics is that *accelerating* output spurs *growth* in investment. But more generally, it is surely the case that fluctuations in GDP growth are an integral part of the growth process for investment, a link which we quantify in the data. To find empirical support for our hypothesis, we use econometric techniques to search for inflection points in investment growth.[3] The basic idea is to search for numeric thresholds which, when crossed from below, are followed by a statistically significant increase in BFI growth over the following 4 quarters.[4]

Our general result is that business fixed investment growth in the U.S. economy has recently crossed several of these historical thresholds, indicating a likely rise (in growth) in coming quarters. The estimated thresholds for nominal BFI acceleration are illustrated in **Figure 2**.[5] Over the period Q1 1960 - Q2 2014, when nominal BFI growth rose above 7 percent (YoY) in a given quarter, growth tended to rise by 3.5 percentage points cumulatively over the next 4 quarters. Similar results hold for the 8 percent and 9 percent growth thresholds. Therefore, after actual nominal BFI

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[3] The estimates of each threshold are obtained from the following regression of investment growth (denoted i) on lags of itself, plus indicator variables for whether a specific threshold was crossed (denoted CROSS):

$$i_t = \alpha_0 + \sum_{n=1}^{4} \alpha_n i_{t-n} + \sum_{n=0}^{3} \beta_n CROSS_{t-n} + \varepsilon_t$$

For example, if the threshold being tested is 5 percent, than $CROSS_t$ would be defined as 1 in periods when growth moved from below to above 5 percent and zero otherwise. We report the sum of the β coefficients, which provide an estimate of the increase in investment growth in the four quarters following a breach of the threshold.

[4] We note the analogy with the literature on stall speeds, which documents the existence thresholds for the acceleration in real GDP. See, for example, Jeremy Nalewaik, "Forecasting Recessions Using Stall Speeds," Finance and Economics Discussion Series, Federal Reserve Board, April 2011, and Nathan Sheets and Robert Sockin, "Stall Speeds and Spillovers: Some New Evidence for the Global Economy," Empirical and Thematic Perspectives, Citi Research, September 6, 2012.

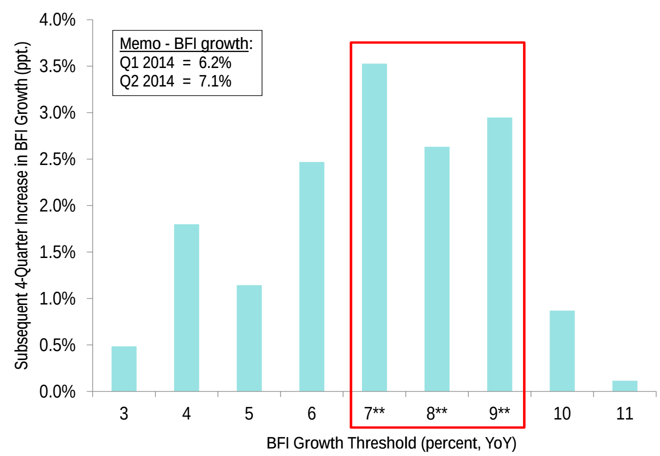
[5] Throughout our analysis we report results for nominal measures of BFI growth. In part, this is to maintain consistency across our large set of leading indicators, some of which are only reported on a nominal basis. We also note that the threshold analysis did not yield precise estimates for real nonresidential fixed investment. This has to do with the fact that real year-over-year growth was more volatile, crossing each threshold numerous times and making it difficult to ascertain a clear signal of future growth from any given crossing.

growth crossed 7 percent in Q2 2014, our estimates imply that year-over-year BFI growth four quarters later will be roughly 10.5 percent growth. Putting this into context, the previous occurrence of BFI growth crossing 7 percent was in Q4 2010; subsequently, year-over-year growth grew to 10.7 percent in Q4 2011.

Returning to the link between output and investment growth dynamics suggested by the Samuelson accelerator model, we also define an alternative set of thresholds for nominal BFI growth based on the evolution of real GDP growth. Our results using GDP growth thresholds paint a more nuanced picture (**Figure 3**). Typically, BFI growth accelerates most strongly when the economy is coming out of recession — i.e., our estimates for investment acceleration thresholds are significant when real GDP growth crosses -1, 0 and 1. However, there is also a second wave of acceleration that occurs once the economy steps into high gear with a growth rate of real GDP above 3 percent. Consistent with the investment-based thresholds, the U.S. economy's real GDP acceleration to above 3 percent at the end of 2013 implies a 3.5 percentage point increase in year-over-year BFI growth through 2014.

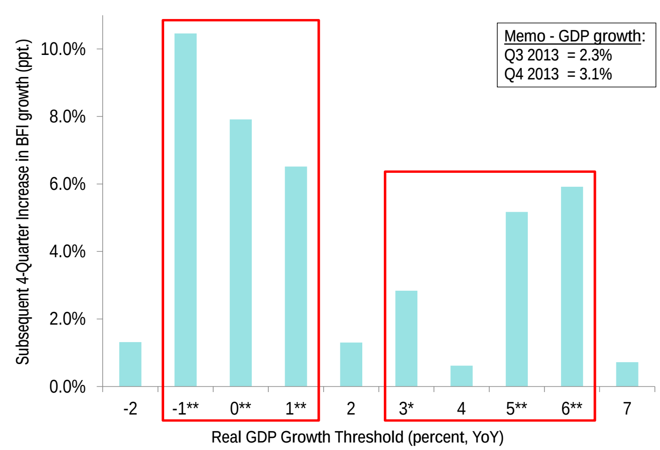
What are the theoretical underpinnings for these threshold effects? They involve the wide array of frictions in the economy, such as inertia in spending decisions, the need to strengthen balance sheets following a boom and bust episode and informational asymmetries, which imply that business investment spending takes time to gather pace. These frictions manifest as a nonlinear time path for investment. Also, the uncertainty faced by firms about the durability of economic recoveries and prospective economic policies influence the timing of investment.[6] Firms need to be sure that demand is there before making long-term irreversible investment decisions and are thus willing to transition to higher investment growth rates only gradually, with a temporary layover in low to moderate growth ranges.

Figure 2. Acceleration Thresholds in BFI Growth



Source: Bureau of Economic Analysis and Citi Research.
Note: ** denotes statistically significant at 5 percent; * at 10 percent.

Figure 3. GDP-Based Acceleration Thresholds for BFI Growth



Source: Bureau of Economic Analysis and Citi Research.
Note: ** denotes statistically significant at 5 percent; * at 10 percent.

Finally, we note an important caveat to our methodology. The Great Financial Crisis that triggered the Great Recession was an exceptional event — without precedent since the 1930s and in many ways quite unlike post World-War II recessions. This suggests caution in applying historical acceleration thresholds to the current recovery. For instance, historically the thresholds tend to be breached rapidly and with gusto, rather than incrementally and lethargically. The recent relatively slow

[6] See William Lee, "Policy Uncertainty and Investment—How Much Lower Must Real Interest Rates Go?, Global Economics View, February 14, 2014.

pace of improvements in BFI may thus be more prone to stalling than previous experiences. We take comfort in the fact that our threshold predictions of BFI acceleration are supported by a battery of additional measures discussed below.

Capex Plans of Public Companies on the Rise

We augment the above top-down approach with detailed data collected from individual U.S. firms on how much they plan in capital expenditures this year. Consistent with our threshold results, the microdata suggest a step up in the growth rate of BFI compared to 2013, a phenomenon that is broad based across sectors.

Citi's equity research analysts poll the management of more than 700 nonfinancial public companies to obtain measures of planned capex (summarized in **Table 1**). The U.S. equity strategy team has made the case that the outlook for capex in 2014 is improved relative to 2013.[7] Here, we use the same data to argue that brighter capex plans for this sample also provide a signal for aggregate BFI. Indeed, excluding the energy sector, the contours of aggregate capex plans by the 700 surveyed firms correspond well to BFI growth in the national accounts (**Figure 4**).[8] These survey estimates have, if anything, been on the low side of where actual capex growth by those companies ended up over the past few years (**Figure 5**).[9]

Table 1. Capex Spending by Sector (Mil. of USD), as of Q2 2014

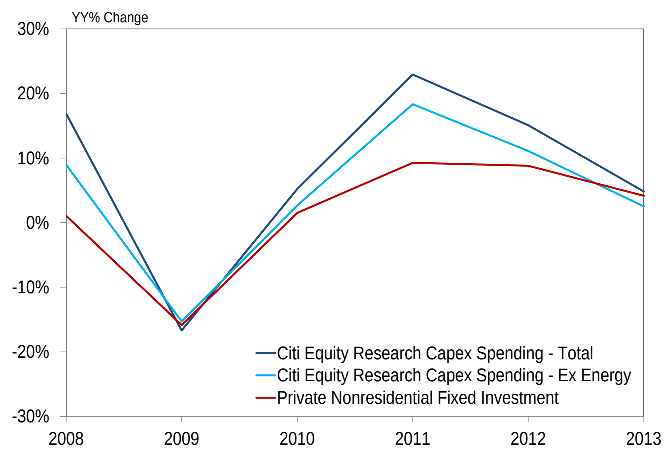
	2007	2008	2009	2010	2011	2012	2013	2014E
Consumer Discretionary	71,006	73,106	54,548	50,016	55,755	67,192	69,131	75,865
Consumer Staples	19,129	20,819	20,246	21,312	21,476	21,759	21,543	23,348
Energy	99,556	151,778	126,404	138,330	170,971	218,382	237,418	255,607
Health Care	18,109	19,789	16,959	18,140	22,286	25,090	26,219	28,251
Industrials	32,369	37,282	27,769	31,843	39,378	43,272	43,063	44,792
IT	36,018	41,308	32,444	41,838	55,034	58,369	61,904	68,231
Materials	21,888	24,934	17,616	17,959	24,712	30,444	31,134	35,222
Telecom Services	48,770	51,040	45,210	47,994	50,909	52,552	56,804	58,151
Utilities	16,289	42,977	55,498	55,303	62,132	69,754	67,941	67,754
Total	363,134	463,034	396,694	422,736	502,653	586,814	615,156	657,220

Source: Citi Equity Strategy.

Systematic upward revisions to expectations were possibly driven by the high degree of uncertainty about the strength of the U.S. recovery; that is, firms have been loosening the capex purse strings as economic data has gradually improved. Another part is undoubtedly driven by the high incidence of confidence-damaging events over this period — the U.S. debt ceiling crises, the Continuing Resolution threats to close down the Federal government, the budget sequestration in 2013, repeated escalations of the Eurozone debt crisis, among others — causing firms to begin each year on a cautious note.[10]

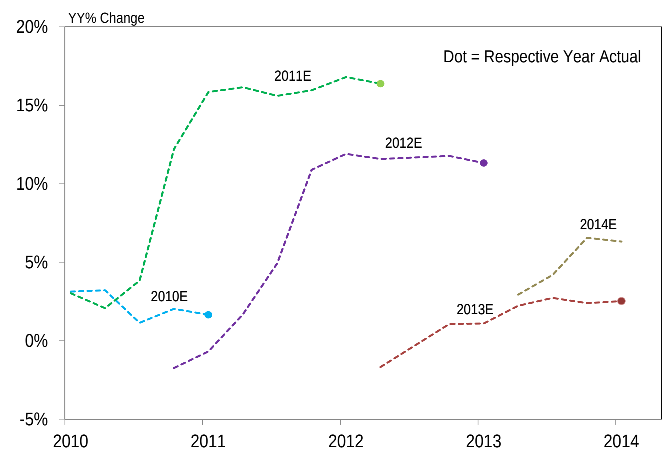
[7] See Tobias Levkovich, Lorraine Schmitt and Christina Wood, The Weak Capex Myth Demolition Derby, Citi Equity Strategy, March 2014.
[8] We exclude capex in the energy sector due to overrepresentation in public companies relative to overall U.S. capex – at nearly 40% of total capex in 2013 – as well as high volatility.
[9] The figure shows how the expectations of capex for each of 2010 through 2013 converged to the actual value of capex for each year, with the actual value indicated by a dot.
[10] There may also be a systematic bias, as company management initially may have little insight into how capex plans will actually unfold throughout the year, thus giving conservative initial estimates.

Figure 4. Equity Research Capex Spending (Actual) vs. BFI



Source: BEA and Citi Equity Strategy.

Figure 5. Equity Research Capex Spending (Planned and Actual) Excluding Energy, Q2 2010 to Q2 2014



Source: Citi Equity Strategy.

Importantly, **Figure 5** shows that expectations of capex have noticeably improved this year relative to actual spending last year, suggesting that BFI growth may also be on the rise. As illustrated in **Table 2**, as of Q2 2014, it is IT, materials and consumer goods that are leading growth in planned capex and, with the exception of IT, the outlook for growth in every sector has improved since mid-2013. Overall, total capex growth in the sample is expected to be 6.8 percent in 2014 (6.3 percent excluding the energy sector), virtually identical to year-over-year growth in nominal BFI in the second quarter. Moreover, this acceleration of capex is broad based. Seven of nine sectors have faster expected 2014 growth relative to actual 2013 growth.

Table 2. Planned Capex Spending by Sector for 2014 (Percent, YoY)

	Q3 2013	Q4 2013	Q1 2014	Q2 2014	2013 Actual
Consumer Discretionary	2.7%	4.9%	9.5%	9.7%	2.9%
Consumer Staples	1.0%	4.9%	6.7%	8.4%	-1.0%
Energy	-4.8%	-4.2%	2.7%	7.7%	8.7%
Health Care	4.6%	5.2%	9.4%	7.7%	4.5%
Industrials	3.4%	4.9%	5.3%	4.0%	-0.5%
IT	12.6%	13.2%	12.4%	10.2%	6.1%
Materials	5.5%	7.7%	15.0%	13.1%	2.3%
Telecom Services	-1.1%	-2.9%	2.0%	2.4%	8.1%
Utilities	-2.6%	-0.7%	-1.6%	-0.3%	-2.6%
Total	0.2%	1.1%	5.0%	6.8%	4.8%
Total Excluding Energy	2.9%	4.2%	6.6%	6.3%	2.5%

Source: Citi Equity Strategy.

Survey Says…

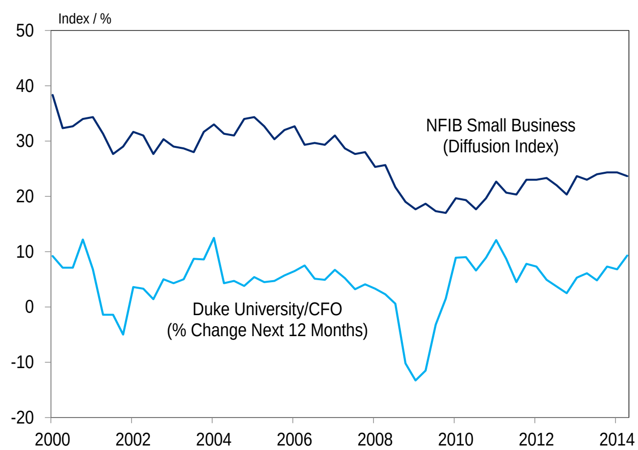
We conclude with further evidence of improved near-term prospects for BFI by aggregating the plethora of private survey data related to capex — and investment more generally — into a coherent narrative.

Perhaps the most explicit survey of corporate capex plans and the closest analogue to year-over-year BFI growth is the Duke University CFO Business Outlook survey. Here, the CFO's of a range of companies are asked their expected growth in capital outlays over the next 12 months (**Figure 6**). As of Q2, this measure stood at 9.3 percent, roughly in line with the projections of our threshold analysis above and

comparable to CFO survey levels in Q4 2010 which immediately preceded an actual surge (albeit a temporary one) in BFI spending growth.

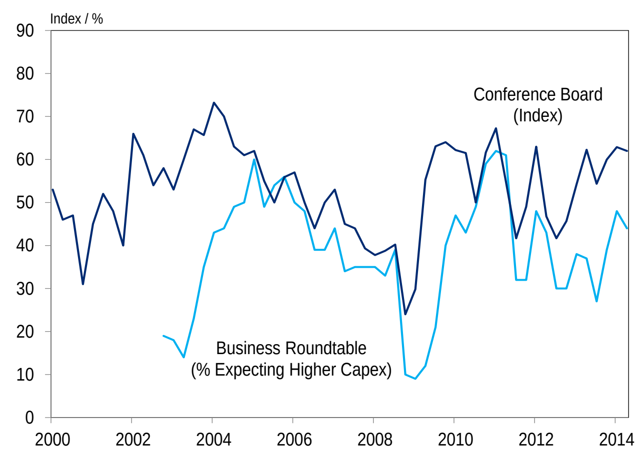
These positive signals are tempered somewhat by the apparent differences between large and small firms. The Conference Board and Business Roundtable produce measures of confidence and capex plans, respectively, constructed by polling large-cap CEOs (**Figure 7**). Notably, both of these measures have been strengthening over recent quarters. In contrast, the NFIB Small Business Optimism Index includes a measure of the percent of firms planning capital expenditures over the next 3-6 months (net of firms not planning), which is currently slightly lower than its reading in June 2013.

Figure 6. Capex Plans for Large and Small Firms



Note: The NFIB series measures the net percent of firms planning to increase capex in the next three to six months; the Duke University series measures the expected growth in capex spending, in percent terms, over the next 12 months, as reported by company CFOs.
Source: NFIB, Duke University and Citi Research

Figure 7. CEO Confidence and Capex Plans



Note: The Business Roundtable series measures the percent of CEOs that expect higher capital spending in the next six months.
Source: Conference Board, Business Roundtable and Citi Research

We formalize the relationship between these private surveys and BFI by estimating a simple statistical model, regressing historical nominal BFI growth on lagged values of the survey predictions. Due to the relatively short history of the Duke CFO and Business Roundtable CEO surveys, we include only the NFIB and Conference Board measures.[11] Our results indicate that these two indicators are in fact positively correlated with subsequent changes in BFI growth and produce predictions, both in- and out-of-sample, which closely track the actual path of BFI growth (**Figure 8**).[12]

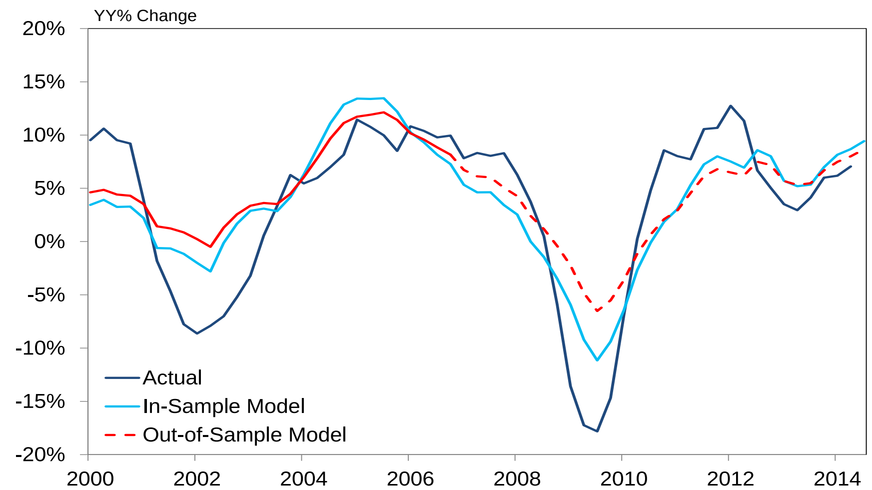
[11] Specifically, the statistical model we estimate is as follows:

$$BFI_t = c + \alpha * BFI_{t-1} + \beta_1 * NFIB_{t-1} + \beta_2 * CB_{t-2} + \varepsilon_t$$

where BFI is the YoY percent change in nominal private nonresidential fixed investment, NFIB is a differenced and smoothed transformation of the NFIB's data on planned capital expenditures, CB is the Conference Board's measure of CEO confidence, c is a constant and ε is an error term with mean zero. The model is estimated with OLS, applying the HAC estimator to correct for autocorrelation in the error term. All estimated coefficients are statistically significant at the 5 percent level.

[12] The in-sample model is estimated using quarterly data from 1987 to Q2 2014 whereas the out-of-sample model is estimated through Q4 2006.

Figure 8. Survey-Implied BFI Growth Forecasts



Note: Out-of-sample outputs are produced dynamically, beginning in 2007. The estimate for Q3 2014 is produced dynamically by both specifications.
Source: BEA, NFIB, Conference Board and Citi Research.

The model provides a forecast for Q3 2014 BFI growth based on the current measures of small business capex plans and CEO confidence. Notwithstanding the fact that the NFIB measure has been relatively flat, the model still implies an acceleration of near-term BFI; applying the model's growth prediction suggests that the year-over-year growth rate of nominal BFI will rise from 7.1 percent in Q2 to about 7.7 percent in Q3.[13]

Concluding Thoughts

Accelerating fixed investment by U.S. firms is a linchpin for the current economic recovery. Its materialization would also be a forceful signal that potential output growth is not as persistently depressed as market participants have priced into the expected path of interest rates.

We bring a wide array of data sources and methodologies to bear on the question: Is a speedup in business fixed investment growth imminent? Three different perspectives argue that the answer is 'yes.' First, the acceleration of U.S. GDP growth through 3 percent is typically accompanied by faster investment growth. Second, a multitude of individual firms have announced their intentions to step up capex. And third, notwithstanding some softness in the responses of smaller firms, a diverse mix of private surveys is sounding harmoniously positive notes.

These findings are buttressed by an even wider constellation of indicators from across the spectrum of economic data; indicators such as slowly but steadily increasing capacity utilization and suggestions that the current levels of IT capex growth are just barely enough to cover depreciation on existing capital.[14]

[13] The estimated coefficients of the in-sample model suggest a slightly more prominent role for the Conference Board Survey in explaining the variation in year-over-year BFI growth. A one standard deviation increase in the Conference Board index corresponds to a 1.0 percentage point increase in YoY BFI growth 2 quarters later, compared to a 0.85 percentage point increase for a one standard deviation increase in the lagged difference of the NFIB measure. The out-of-sample estimates are both slightly lower with the NFIB measure relatively smaller.

[14] See Tobias Levkovich, Lorraine Schmitt and Christina Wood, Capital Investment Gets a Bit Less Energetic, Citi Equity Strategy, September 2013.

One's enthusiasm about near-term BFI growth prospects might only be tempered by the fact that previous momentum in fixed investment spending during this recovery has been short-lived as the long shadow cast by the Great Recession has repeatedly proven to be even longer than expected.

Taken together, though, our results form a compelling narrative suggesting that BFI growth will continue to rise through mid-2015, providing a 'missing middle' between consumption growth and hiring, and solidifying the incipient normalization of monetary policy.

August 2014

Monday	Tuesday	Wednesday	Thursday	Friday
4 Auction 3 & 6 Mth. Bills: $53.0B	5 ISM Non-Manufacturing PMI: Jun 56.0, Jul 58.7 Prices: Jun 61.2, Jul 60.9 Factory Orders Ord: May -0.6%, Jun 1.1% Inv: May 0.8%, Jun 0.3% Auction 1 Mth. Bill: $40.0B	6 Mortgage Applications International Trade Balance May -$44.7B, Jun -$41.5B Ann. 3-Yr. Note: $27.0B Ann. 10-Yr. Note(r): $24.0B Ann. 30-Yr. Bond(r): $16.0B	7 Jobless Claims 8/2 289 Thous Consumer Credit May $19.6B, Jun $17.3B	8 Nonfarm Productivity Prod: 1QP -4.5%, 2QP 2.5% ULC: 1QP 11.8%, 2QP 0.6% Wholesale Inventories May 0.3%, Jun 0.3%
11 Auction 3 & 6 Mth. Bills: $55.0B(E)	12 Small Business (Jul) Federal Budget Balance Jul 13 -$97.6B, Jul 14(E) Auction 3-Yr. Note: $27.0B(E) Auction 1 Mth. Bill: $40.0B(E)	13 Mortgage Applications Retail Sales Total: Jun 0.2%, Jul(E) 0.3% ExAuto: Jun 0.4%, Jul(E) 0.3% Business Inventories May 0.5%, Jun(E) 0.3% Auction 10-Yr. Note: $24.0B(E)	14 Jobless Claims 8/9 290 Thous(E) Import Price Index Total: Jun 0.1%, Jul(E) -0.5% ExPetro; Jun -0.2%, Jul(E) Ann. 5-Yr. TIPS(r): $16.0B(E) Auction 30-Yr. Bond: $16.0B(E)	15 Empire State Manufacturing Jul 25.6, Aug(E) Producer Price Index Final Demand: Jun 0.4%, Jul(E) 0.2% ExF&E: Jun 0.2%, Jul(E) 0.2% Industrial Production Jun 0.2%, Jul(E) 0.0% Capacity Utilization Jun 79.1%, Jul(E) 79.0% Reuters/Michigan Sentiment Jul F 81.8, AugP(E) 82.0
18 Housing Market Index (Aug) Auction 3 & 6 Mth. Bills: $54.0B(E)	19 Consumer Price Index Total: Jun 0.3%, Jul(E) ExF&E: Jun 0.1%, Jul(E) Real Earnings (Jul) Housing Starts Jun 893K, Jul(E) Permits Jun 973K, Jul(E) Auction 1 Mth. Bill: $45.0B(E)	20 Mortgage Applications FOMC Minutes Released	21 Jobless Claims 8/16 Leading Indicators Jun 0.3%, Jul(E) Existing Home Sales Jun 5.04M, Jul(E) Philly Outlook Survey Jul 23.9%, Aug(E) Ann. 2-Yr. FRN: $13.0B(E) Ann. 2-Yr. Note: $29.0B(E) Ann. 5-Yr. Note: $35.0B(E) Ann. 7-Yr. Note: $29.0B(E) Auction 5-Yr. TIPS: $16.0B(E)	22
25 New Home Sales Jun 406K, Jul(E) Auction 3 & 6 Mth. Bills: $54.0B(E)	26 Durable Goods Total: Jun 0.7%, Jul(E) 1.7% ExTrans: Jun 0.8%, Jul(E) 1.9% S&P/CaseShiller (May) FHFA (Jun) Consumer Confidence Jul 90.9, Aug(E) Auction 2-Yr. Note: $29.0B(E) Auction 1 Mth. Bill: $45.0B(E)	27 Mortgage Applications Auction 2-Yr. FRN: $15.0B(E) Auction 5-Yr. Note: $35.0B(E)	28 Jobless Claims 8/23 GDP 2Q14A 4.0%, 2Q14P(E) Chain Price Index 2Q14A 2.0%, 2Q14P(E) Corporate Profits (2QP) Pending Home Sales (Jun) Auction 7-Yr. Note: $29.0B(E)	29 Personal Income Jun 0.4%, Jul(E) Consumption Jun 0.4%, Jul(E) Chicago Barometer PMI: Jul 52.6, Aug(E) Prices: Jul 59.0 , Aug(E) Reuters/Michigan Sentiment AugP(E) 82.0, AugF(E) Farm Prices (Aug)

(E) Indicates Citigroup estimates. (A) Advance. (P) Preliminary. (F) Final. (UNCH) Unchanged. (R) Revised. Contributors: Martha Berasain and Cathy Gaeta.

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Fed Chiefs Debate Monetary Normalization While Yellen Passes Off Financial Stability	11 July 2014
Bright Outlook Leaves Fed On Schedule Despite Dark Q1	27 June 2014
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Labor Costs Put a Floor Under Inflation	11 April 2014
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