

Global Economics View

The Long-Run Decline in Advanced-Economy Investment

- Nominal gross fixed capital formation has been on a downward trend relative to GDP in the advanced economies since at least the 1970s.
- In the context of this decline, four characteristics are relevant:
 1. Higher depreciation rates for non-construction investment imply that net investment (i.e. net of depreciation) has fallen *even more* than gross investment.
 2. Construction investment has accounted for a major share of the decline in total investment shares. Non-construction investment shares (i.e. the share of investment in equipment and intangibles in GDP) have not fallen much, if at all.
 3. The price of investment has fallen relative to the price of other forms of spending, implying that investment has fallen much less in real terms than in nominal terms.
 4. Realised total factor productivity (and GDP) growth in the advanced economies has fallen over the past several decades, which – if expected – would have weakened investment incentives. Real capital-output ratios have, on average, remained relatively stable for a broad sample of advanced economies.
- Public investment has fallen disproportionately, but still only accounts for a small share of the decline in total investment, and declines in infrastructure investment account for even less. At least in the US, there has also not been a general shift in the composition of output away from higher-investment sectors toward lower-investment sectors.
- There are growing signs of a cyclical rebound in investment: by late 2013, average growth in advanced-economy investment was in line with the long-term average growth rate. We expect 3.3% growth in real gross fixed capital formation in 2014 and 4.2% growth in 2015, motivated by pent-up demand for investment after years of underinvestment, benign external funding conditions and the receding of some uncertainties.
- However, the rebound is very much cyclical, in our view. Continued declines in labour force growth (and in a number of countries, outright declines in the labour force) and a high level of (public and private sector) debt are likely to weigh on future investment shares. Should average total factor productivity growth continue to fall, it would further lower future investment incentives. On the other hand, it is possible that the recent technological advances in information and communications technology may boost total factor productivity growth in the future.

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The Long-Run Fall in AE Investment

Nominal investment shares have been subject to a long-term decline in the advanced economies.

The decline in investment shares should be seen in the context of four characteristics:

- As average depreciation rates have increased, net investment trends are even weaker than gross investment trends
- The bulk of the decline in investment shares is due to a secular fall in construction investment
- The price of investment goods has fallen relative to other goods
- Declining growth expectations likely contributed to the long-term decline in realised investment

Nominal investment shares (i.e., nominal gross fixed capital formation as a percentage of nominal GDP) have been subject to a long-term decline in the advanced economies (AEs).¹ In fact, the last five years (2008-13) were the five years with the lowest shares of nominal investment in GDP for a GDP-weighted advanced-economy average since 1970.

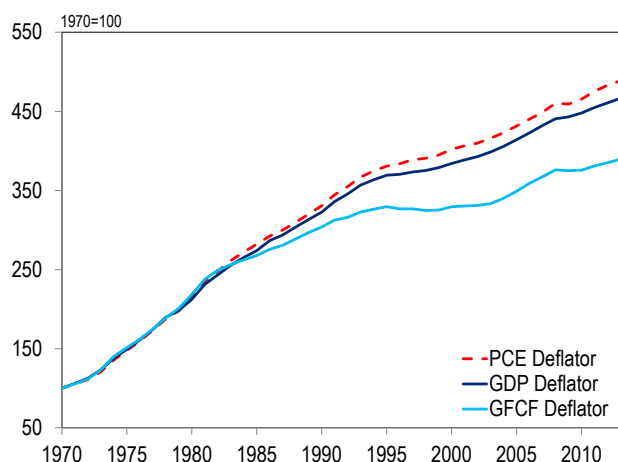
In this note, we argue that the long-term decline in the share of investment should be seen in the context of four characteristics.

First, depreciation rates have risen, implying that net investment shares (i.e. the share of net fixed capital formation in GDP) have fallen even more than gross investment shares. Average AE net investment since the 2000s has been around 5% of GDP compared to almost 10% in the 1970s.

Second, the bulk of the fall in nominal and real investment shares has been due to a fall in the share of total construction investment, which may have less of an impact on the growth potential of the advanced world than other types of investment. This is most clearly seen in the case of residential construction, as the capital there is a consumer durable producing future housing services that enhance household utility but not necessarily the conventionally defined productivity of the household (i.e. measurable output of goods and services for given inputs). The higher share of non-construction investment also explains rising depreciation rates.

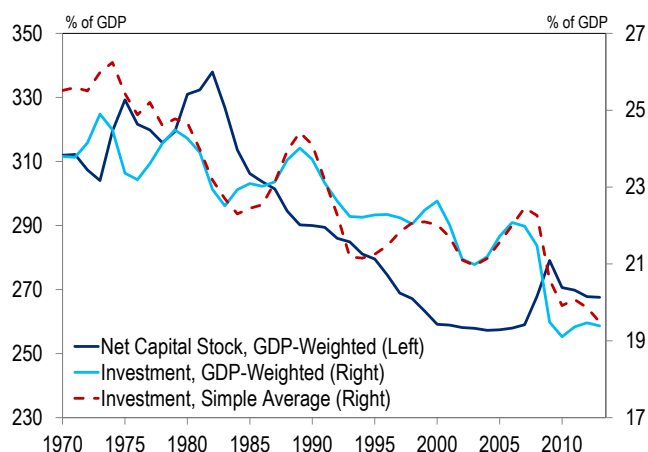
Third, investment has become cheaper relative to other types of spending (Figure 1). Since 1970, the average price of a unit of investment has fallen by roughly 17% relative to the price of a unit of GDP and by 20% relative to a unit of personal consumption (as measured by the PCE deflator).²

Figure 1. Advanced Economies – Average Price Deflators (1970=100), 1970-2013



Note: GDP-weighted averages for 18 AEs (see footnote 4). GFCF and PCE are gross fixed capital formation and private (final) consumption expenditure.
Sources: European Commission, World Bank and Citi Research

Figure 2. Advanced Economies – Average Nominal Investment and Capital-Output Ratio (% of GDP), 1970-2013



Note: Averages are computed for 17-18 AEs (see footnote 4). Investment refers to gross fixed capital formation.
Sources: European Commission, World Bank and Citi Research

Fourth, growth rates of output have fallen over the last few decades, from more than 3% pa in the 1970s and 1980s to less than 2% pa since 2000. Even though, to our knowledge, no robust evidence on growth expectations are available, it is plausible

¹ We use the terms 'investment' and 'gross fixed capital formation' interchangeably throughout this study. We exclude inventories unless indicated and note explicitly when depreciation is reflected (i.e. when *net investment* is considered).

² Or 31% relative to a weighted-average consumer price index.

that expectations of future drivers of capital expenditure in AEs (such as labor force growth, total factor productivity growth and other factors boosting potential and actual future output growth taken as exogenous by those making capital expenditure decisions) have weakened, also weakening the incentives to add to the capital stock.

Falling population growth may have played an important role in the decline in construction investment.

Demographics may be one reason why construction investment shares (notably housing investment) have fallen. Population growth and the growth in household formation fell in most advanced economies in recent decades. On the other hand, at least for the US, we do not find evidence that a change in the sectoral composition of production of the economy (e.g. from more capital-intensive sectors to less capital-intensive sectors) can explain the fall in (gross or net) investment shares.³ Neither, moreover, can declining investment by the public sector explain the decline in total fixed investment shares; although public-sector investment as a share of GDP in the US has been on a 50-year-long downward trend, this decline accounts for only a small portion of the drop-off in total investment shares.

A cyclical rebound in advanced-economy investment is underway, which could continue for some time.

Past performance is not necessarily a guide for future performance. The collapse of investment in the global financial crisis was brutal (by far the largest decline in investment on record for the advanced world since at least the 1970s), and current gross and net investment shares remain low by historical comparison – even though for real non-construction investment, they are close to historical norms. A cyclical rebound of investment in AEs (including the euro area) appears underway, and this rebound should have quite a bit further to run.

Nevertheless, it is very possible that structural factors will weigh on investment growth.

A cyclical rebound, even one that continues for another few years, however, does not mean that the entire decline in investment in recent years has been cyclical. Excessively easy financial conditions in the pre-crisis years may have boosted investment artificially. Average gross debt of households and non-financial corporates in the advanced economies was 196% of GDP in 2013 compared to 172% of GDP in 1995 and 125% of GDP in 1980, while the increase in public (general government gross) debt was even more dramatic (111% of GDP in 2013 vs. 87% of GDP in 1995 and 44% of GDP in 1980). With such high debt levels, it is clear to us that investment growth needs to be less credit-intensive than it has been in the past (which in turn may constrain investment). Factors including elevated policy uncertainty, greater income and wealth inequality and associated political risks, geopolitical uncertainties and worsening demographics may also suggest relatively weak trend growth rates for investment in the future.

Future growth in total and working-age population in the advanced economies is likely to be very low. TFP growth may also remain weak, unless it is belatedly boosted by recent advances in information and communications technologies.

To this list of potential drags on capital expenditure, our paper adds potentially two more: downward trends in long-term population (and labour force) growth and potential downward trends in total factor productivity growth. According to the UN population statistics, working age population growth will be negative in the coming decades for the ‘more developed regions’ (which is similar to our measures of ‘advanced economies’), and total population growth will continue to slow. TFP growth has also been trending down, from 1.5% pa on average for the AEs in the 1970s to barely half that since 2000. It is possible that recent advances in information and communications technology will belatedly and substantially boost TFP growth, but most of the above trends suggest that underlying investment shares in the future will be low and could fall further. On the other hand, if – as we expect – current trends continue, investment shares should remain higher in real

³ This is not quite the same as saying that the shift from manufacturing to services doesn't explain the decline in investment shares, as a number of service industries (including most forms of transportation) are very capital intensive.

terms than in nominal terms (but for non-construction investment rather than construction investment).

The long-run fall of nominal investment shares

A long-run chart (Figure 2) of the share of gross investment spending in GDP for a GDP-weighted advanced economy average of 18 countries seems to paint a clear picture: since 1970, every local trough and every local peak in the share of nominal investment in nominal GDP has been lower than the previous ones.⁴

Since 1970, every local trough and every local peak in the share of nominal investment in nominal GDP has been lower than the previous one.

Over the period since 1970, nominal investment in the advanced economies on average grew by 0.6% pa less than nominal GDP (the former grew by 6.2% pa on average vs. 6.8% pa for GDP). The last local trough for investment shares was reached in 2010, when investment was just above 19% of GDP in nominal terms, a record-low since 1970. The average share from 1970-2009 was 22.8% and the average share of local troughs (excluding the most recent) was 22.2%. Since then, the recovery has also been sub-standard, with the investment share rising cumulatively by only 0.3pp over the last three years, roughly half the average rise in the three years after reaching the local trough in the previous five cycles. Net (i.e. net of depreciation) nominal investment shares have fallen even more than gross fixed investment shares, contributing to a fairly consistent fall in nominal net capital-output ratios in AEs from 3.0-3.4 on average in the 1970s and early 1980s to 2.6 before the global financial crisis (Figure 2).⁵

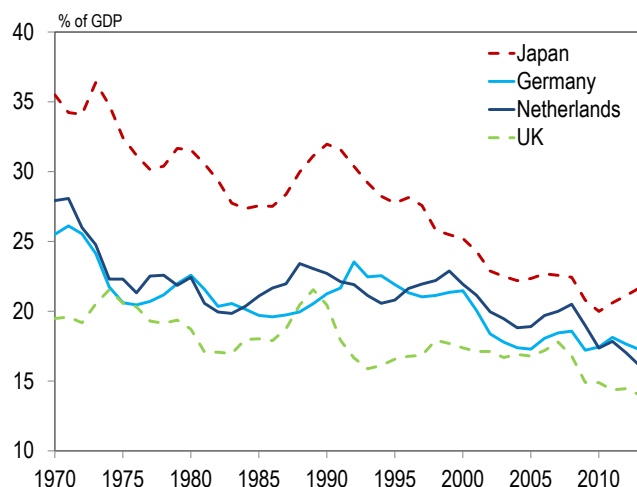
Tendencies toward a long-term decline in investment shares are quite common across AEs.

Tendencies toward a long-term decline in investment shares are quite common across AEs. Investment was below its historical average share in GDP in 16 AEs (out of our sample of 18) in 2013. In countries including Japan, the United Kingdom, Germany and the Netherlands (Figure 3), even in 2006 (the timing of the local peak in average investment shares across AEs, if not for each individual AE), the investment share was below the long-term (1970-2005) average. And the decline is not disproportionately driven by the larger AEs (notably the US); a simple (unweighted) average of nominal investment shares shows a similar, and in fact slightly larger, decline (again see Figure 2).

⁴ The 18 countries included in our AE average series are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, Korea, Netherlands, Norway, Portugal, Spain, Sweden, the United States and the United Kingdom (for the capital stock data we present, the average includes 17 AEs, as Korea is dropped due to missing data). Throughout most of our report, we rely on data from the European Commission's AMECO database on these 18 AEs. The data from AMECO extend up to 2013 for each of these AEs except Australia, Canada and Korea. For these three, we extended the data up to 2013 using OECD data. Together, our sample of 18 AEs accounted for 91% of the nominal GDP of the IMF AE aggregate in 2013 and 56% of global GDP at market exchange rates.

⁵ The rise in capital-output ratios since the financial crisis (shown in Figure 2) may be somewhat counterintuitive, as investment fell even more sharply than output did. But note that the capital-output ratio is the ratio of the capital *stock* to the *flow* of output. Even though we saw a sharp fall in the flow of investment, the stock of capital remained quite stable. Barring physical capital destruction through natural disasters, wars or Luddism, the decline in the capital stock cannot exceed capital depreciation.

Figure 3. Selected Advanced Economies – Nominal Investment (% of GDP), 1970-2013

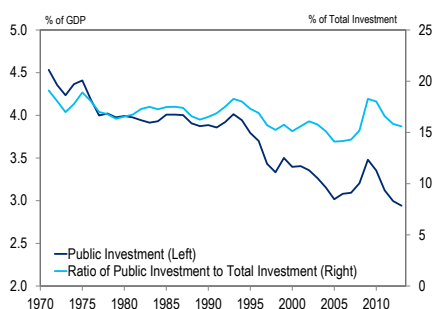


Note: Investment refers to gross fixed capital formation.
Sources: European Commission and Citi Research

However, in Australia and Canada, gross investment shares are not below their long-term averages.

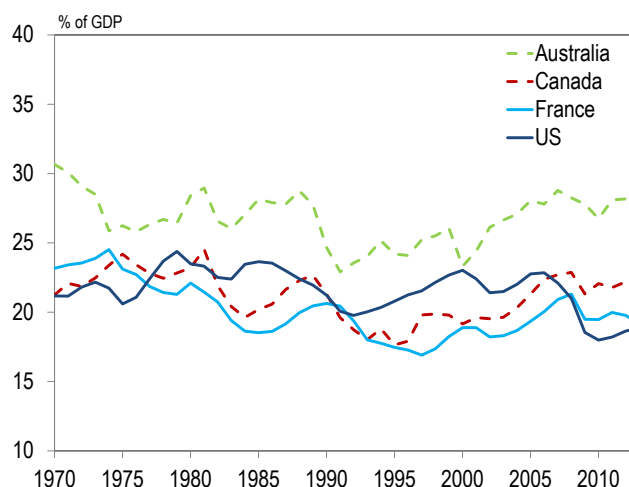
Public investment in AEs has been on a long-term decline, but it accounts for only 20% of the decline in total AE investment.

Figure 5. Advanced Economies – Average Nominal Public Investment (% of GDP and % of Total Investment), 1970-2013



Note: GDP-weighted average for 16 AEs (see footnotes 4 and 6). Investment refers to gross fixed capital formation.
Sources: European Commission, World Bank and Citi Research

Figure 4. Selected Advanced Economies – Nominal Investment (% of GDP), 1970-2013



But there are still a few exceptions. In Australia and Canada, investment shares were above their long-term averages in both 2006 and 2013 (Figure 4). Prior to the global financial crisis, the investment share in the United States also held up relatively well. In Greece and Spain, there was no discernible long-term downward path prior to 2006, even though their trends were buoyed by probably unsustainable construction booms. Korea also has not seemed to exhibit any long-term trend decline in investment shares if we disregard the construction boom ahead of the Asian financial crisis in 1997.

Public investment in AEs has also been on a long-term decline (Figure 5).⁶ Since the 1970s, public investment as a share of GDP declined from around 4.5% to just below 3% in 2013. The decline in public sector investment was therefore proportionally even sharper than that for total investment. However, since public investment is a relatively small share of total investment (only around 15% in 2013), it accounts for only roughly 20% of the decline in total investment in AEs over the same period.

AEs are no longer under construction

There is no shortage of candidates for why investment in AEs may have fallen. Perhaps societies as a whole were becoming (more) myopic, with a consequent tendency to over consume rather than invest. Short-termist capital markets, and managerial performance incentives geared to satisfy them, may have led managers to prioritise dividends and equity buybacks over productive long-run investment. Uncertainty about government policy or about growth prospects may have acted as an impediment to investment. Or companies may have preferred to shift their investment to EMs, where labor costs were lower, regulatory standards (including environmental and safety standards) were looser and where local demand was growing fast.

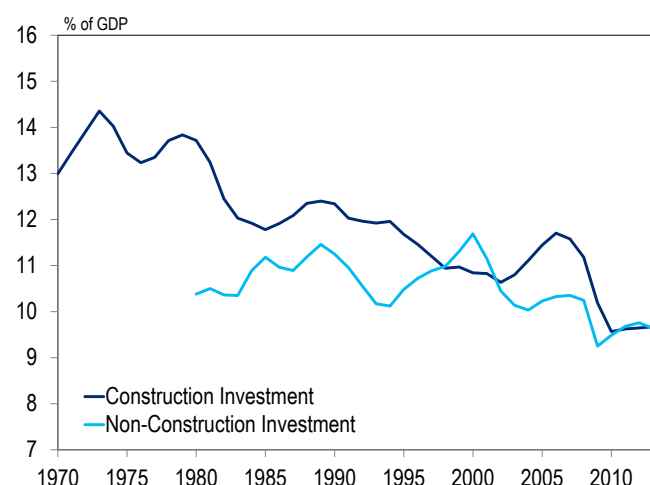
We emphasize three other drivers the fall in investment shares. The first is the decline in construction investment over the past few decades.

⁶ Due to data limitations, our GDP-weighted average of AE public investment (Figure 5) excludes Australia and Korea.

Construction investment has fallen much further than non-construction investment.

As Figure 6 shows, the construction investment share in GDP (investment in structures, including both residential and non-residential construction) has fallen sharply in recent decades. Construction investment accounted for 13-14% of GDP in the 1970s but less than 10% currently. Construction investment used to consistently exceed non-construction investment (the latter comprising of equipment investment and 'other investment', which consists mostly of intangibles such as computer software) until the late 1990s, but now the two are roughly of the same size in the AE average.⁷ Only in the late 1990s and early 2000s, when the tech bubble was inflating and when equipment spending was very strong, did non-construction investment noticeably exceed construction investment.

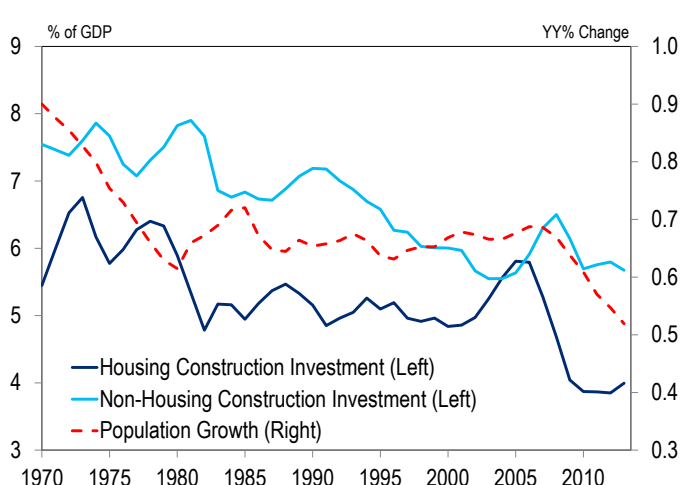
Figure 6. Advanced Economies – Average Nominal Investment (% of GDP), 1970-2013



Note: GDP-weighted averages for 18 AEs (see footnote 4). Investment refers to gross fixed capital formation.
Sources: European Commission, World Bank and Citi Research

Construction investment has been declining since at least the 1970s, while non-construction investment didn't start falling consistently until the early 2000s.

Figure 7. Advanced Economies – Average Nominal Investment (% of GDP) and Average Population Growth (YY% Change), 1970-2013



Note: GDP-weighted averages for 18 AEs (see footnote 4). Investment refers to gross fixed capital formation.
Sources: European Commission, World Bank, United Nations and Citi Research

Non-construction investment is also low by historical standards. In 2013, it was 1.1pp below the 1980-2005 average share.⁸ Moreover, 2009 had the lowest share of non-construction investment in GDP since at least 1980. Nevertheless, the longer-term trend for non-construction investment in the AEs does not exhibit the same downward trend seen in the construction investment series. Indeed, it wasn't until the early 2000s that non-construction investment began its descent, following the collapse of the dot-com bubble.⁹

⁷ The AE average hides noticeable cross-country differences here. For example, non-construction investment in the US in 2013 was 4pp of GDP larger than construction investment, and 1.4pp larger in Japan. Conversely, in each of the UK, France, Germany, Italy and Spain, the construction investment share still exceeded the non-construction share in 2013.

⁸ For non-construction investment, we only consider data for the AE average from 1980, as the European Commission's AMECO database misses data for a number of countries prior to 1980 and features irregularities in a number of others.

⁹ We caution against interpreting a fall in non-construction investment shares as de facto evidence in favour of 'secular stagnation', as stated by former US Treasury Secretary Larry Summers (and Paul Krugman). The secular-stagnation story rests on the idea that ex ante saving has exceeded ex ante planned investment for at least the past decade, driving the short-term risk-free equilibrium real interest rate below zero at some time during the previous cycle. Here, we consider only realised investment rather than ex ante planned investment. Realised investment does not tell us much about whether secular stagnation is true; the hypothesis could be true even if realized investment rates were rising (provided ex-ante saving went up by enough). For more discussion, see: [Secular Stagnation: Only If We Really Ask For It](#) by Buiter, Rahbari and Seydl (January 2014).

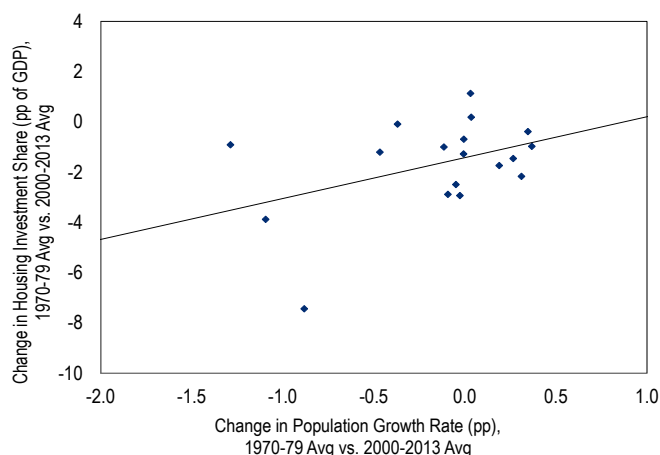
Both housing- and non-housing construction appear to be in long-term decline.

Lower population and household formation growth probably lowered housing investment shares.

Of the roughly 5pp of GDP drop in average investment shares between the 1970s and 2013, roughly four-fifths is accounted for by the fall in construction investment shares. Of that, roughly half was in housing construction and the other half in non-housing construction. Non-housing construction exceeded housing construction during every year since 1970 except for 2004 and 2005, the peak of the housing bubble in many AEs (Figure 7). At around 4% of GDP, investment in housing in AEs is still near all-time lows back to 1970, despite the recent pickup in some countries (including the US, the UK, Germany and Japan). At nearly 5.7% of GDP, investment in non-housing construction is also low historically, but investment rates in the early 2000s were even weaker than the current investment rate for non-housing construction (whereas the same is not true for housing investment).¹⁰

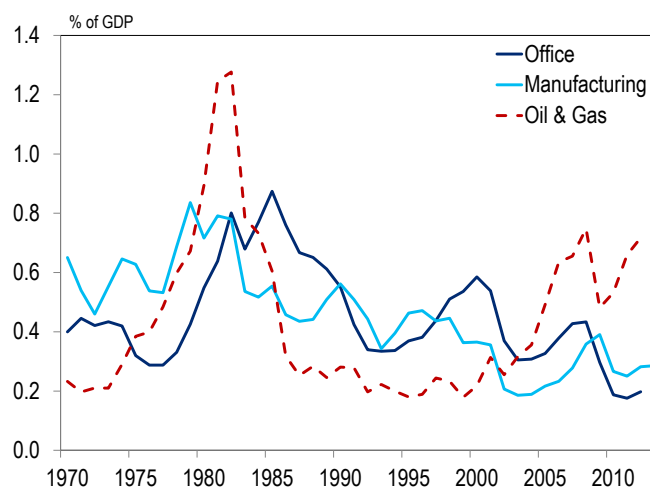
In our view, there are several reasons for the long-term downward trend in construction investment. Regarding housing, demographics have likely played a role. Population growth has slowed in recent decades for our 18 considered AEs on average from 0.77% in 1970-9 to 0.64% in 2000-13. The slowdown in population growth seems to correlate with the fall in housing investment shares across AEs (Figure 8).¹¹ And although average household size across AEs had fallen prior to the global financial crisis, growth in household formation has also trended down.¹²

Figure 8. Advanced Economies – Change in Population Growth Rate (pp) vs. Change in Nominal Housing Investment (pp of GDP), 1970-2013



Note: Scatter plot includes 18 AEs. Investment refers to gross fixed capital formation.
Sources: European Commission, United Nations and Citi Research

Figure 9. US – Nominal Private Non-Residential Construction Investment by Sector (% of GDP), 1970-2012



Note: Investment refers to gross fixed capital formation.
Sources: BEA and Citi Research

¹⁰ There is some variability in the relative decline between housing and non-housing construction investment shares across AEs. For instance, in the US, Denmark, France, Germany, the Netherlands, Sweden, Japan, Greece, Ireland, Portugal, Spain and Korea, the peak-to-trough decline in housing investment was greater than the decline in non-housing construction investment, while the reverse was true for the UK, Austria, Italy, Norway, Canada and Australia.

¹¹ The correlation between the change in the average population growth rate from 1970-79 to 2000-2013 and the change in average housing investment shares over the same period across our sample of AEs is 0.42.

¹² For example, growth in household formation in the US slowed from around 2% pa in the 1970s to 0.5% pa today, from 1% pa to 0.5% pa in Germany and from 1.5% pa to 1% pa in France.

Within non-housing construction investment, indicative evidence for the US suggests that declines have been concentrated in the office, manufacturing and oil and gas sectors.

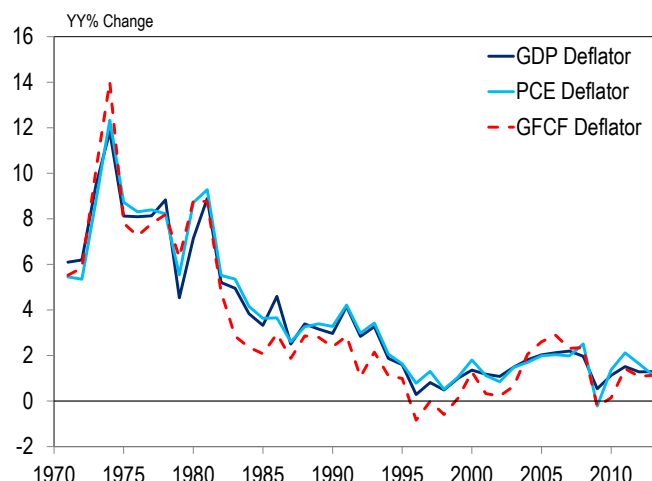
Private non-housing construction includes a range of investments, including the construction, maintenance or alteration of non-residential buildings (factories, offices, schools, jails, etc.), non-building construction such as infrastructure investment (e.g., pipelines, railroad tracks, power lines and plants, dams and levees), as well as the digging and shoring of mines and the drilling for the exploration of natural resources. We have not found sufficiently granular information on the composition of private non-housing construction investment for our sample of AEs. However, for the US, BEA data suggest that most of the decline in non-housing construction was due to a fall in investment in commercial offices, even though a fall in investment in manufacturing structures and oil and gas structures also accounted for some of the decline (Figure 9).¹³ Notably, the fall in infrastructure investment as well as declines in investment in power stations and warehouses played only a minor role in the overall decline in US private non-housing construction shares.

The decline in construction investment does not appear to be driven disproportionately by the public sector.

Just as the public sector accounted for only a small share of the total fall in investment, so it is for construction investment, at least in the US: only 11% (not pp) of the decline in the share of construction investment relative to GDP was due to the public sector and of that fall 70% was concentrated in defense construction (rather than, say, infrastructure intended primarily for private use).¹⁴

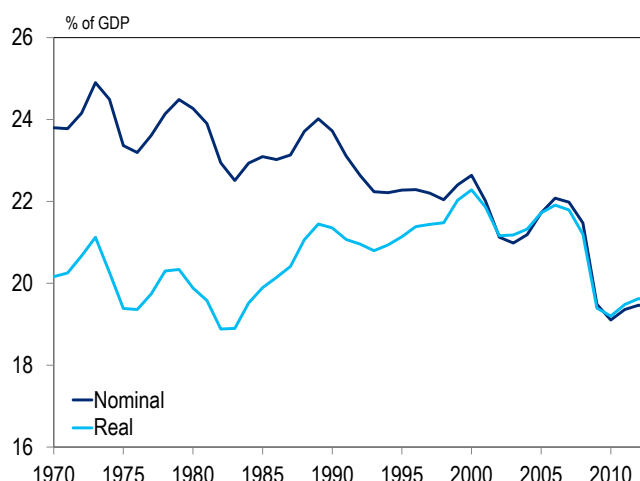
The capital goods 'glut'

Figure 10. Advanced Economies – Average Price Deflators (YY% Change), 1970-2013



Note: GDP-weighted averages for 18 AEs (see footnote 4). GFCF and PCE are gross fixed capital formation and private (final) consumption expenditure.
Sources: European Commission, World Bank and Citi Research

Figure 11. Advanced Economies – Average Investment (% of GDP), 1970-2013



Note: GDP-weighted averages for 18 AEs (see footnote 4). Investment is gross fixed capital formation. Real data are measured in constant 2005 prices.
Sources: European Commission, World Bank and Citi Research

¹³ More recently, however, investment in oil and gas structures has picked up to account for a growing share of US GDP, due to the natural gas exploration boom in the US that began around 2005-06.

¹⁴ To be sure, the share of public investment in infrastructure fell too: public investment in non-defense structures fell from around 0.25% of GDP in the 1970s to less than 0.1% in the 2000s.

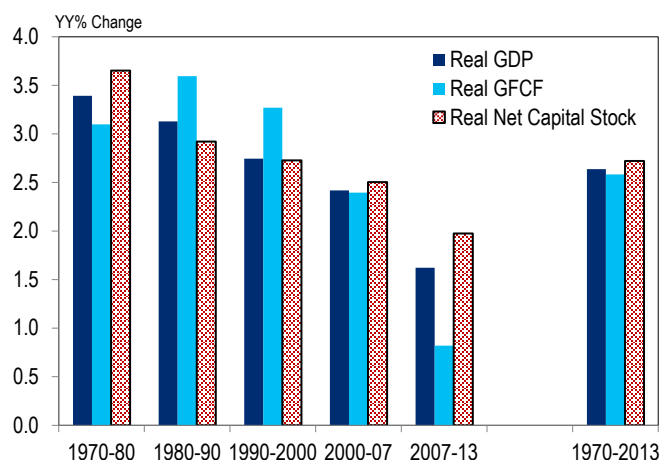
The relative cheapness of investment goods has accounted for some of the decline in long-term nominal investment shares.

A second reason nominal investment shares may have declined is that investment has become cheaper (relative to other types of spending), and, descriptively, the elasticity of real investment with respect to its relative price seems to be below unity.¹⁵ The fall in the relative price of investment goods could perhaps be explained by more rapid productivity growth in the capital-goods producing sectors, not least as many Asian countries became major producers and exporters of capital goods over the last few decades. Over the period of 1970-2013, the GDP-weighted AE average gross fixed capital formation deflator rose by 3.3% pa on average, compared to 3.8% pa for the PCE deflator and 3.7% pa for the GDP deflator. While these appear to be relatively small differences, they imply that a unit of real investment is now 17% cheaper relative to a unit of GDP than in 1970 and 20% cheaper relative to a unit of consumption goods. As Figure 10 shows, increases in the gross fixed capital formation deflator have been persistently below those of the GDP or consumption deflator in most years since 1970.

Real gross investment in AEs has grown at roughly the same rate as real GDP since 1970.

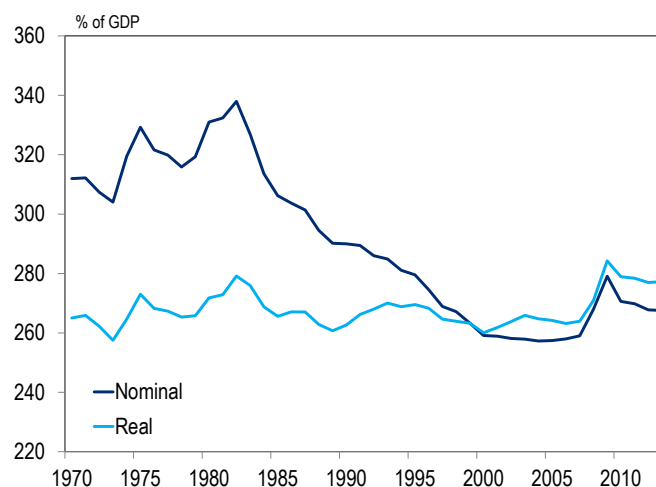
The different evolution of prices for investment relative to the prices of other GDP components has an important implication: in real terms, investment spending has not been nearly as weak as in nominal terms. If we divide average AE real (constant 2005 currency) investment by real (constant 2005 currency) GDP, its current share is still low, but less so in comparison with the nominal investment shares, and with little evidence of a long-term slowdown (Figure 11).¹⁶ If anything, the period of the early 1980s until the early 2000s saw a fairly steady rise in real investment shares. In 2013, the average real AE investment share stood at 19.6%, 6% (1.1pp) below the 1970-2005 average; but no lower than in the early 1980s, when the investment ratio fell below 19%. In 1970-2013, both real investment and real GDP grew at 2.6% pa on average in AEs (Figure 12), as opposed to the differential growth rates of the two variables in nominal terms, as highlighted earlier.

Figure 12. Advanced Economies – Average Real GDP, Investment and Net Capital Stock Growth (YY% Change), 1970-2013



Note: GDP-weighted averages for 17-18 AEs (see footnote 4). Investment refers to gross fixed capital formation. Real data are measured in constant 2005 prices. Data shown are average pa growth rates.
Sources: European Commission and Citi Research

Figure 13. Advanced Economies – Average Net Capital-Output Ratios (% of GDP), 1970-2013



Note: GDP-weighted averages for 17 AEs (see footnote 4). Real data are measured in constant 2005 prices. Real data are deflated using the gross fixed capital formation deflator.
Sources: European Commission, World Bank and Citi Research

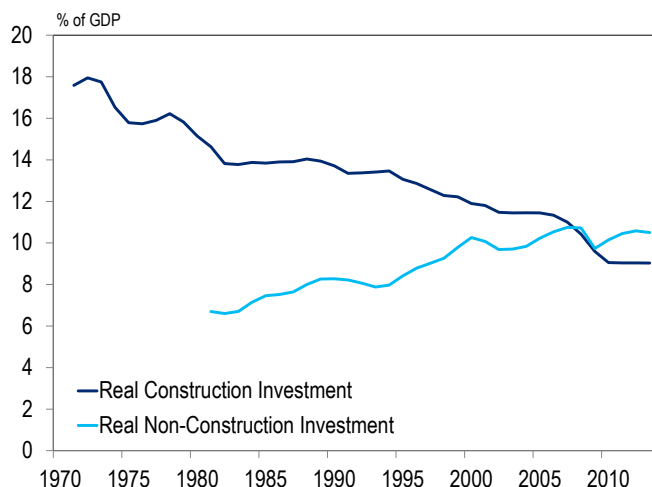
¹⁵ See also IIF, "Business Investment in the G7: Coming out of the Doldrums?" (May 2014).

¹⁶ Due to the method of deflating GDP and investment, dividing the constant price investment series by constant price GDP cannot strictly be interpreted as real investment shares, but the implied approximation errors should in general be small.

Real non-construction investment shares have risen noticeably since the 1980s.

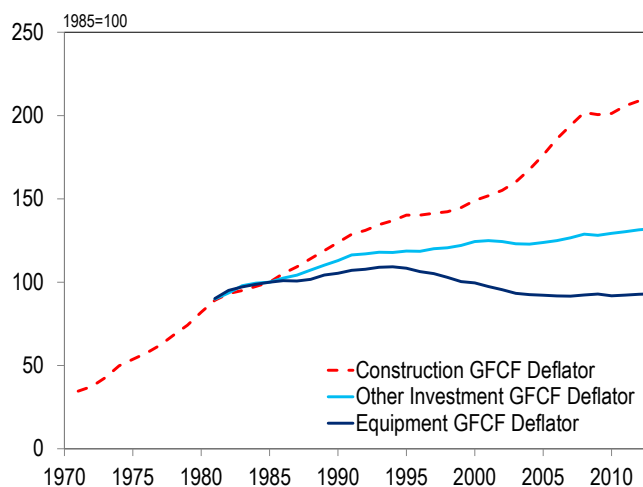
Considering real investment spending, the distinction between construction and non-construction investment not only survives, but becomes even starker (Figure 14). Construction investment shares in real terms have fallen even more than in nominal terms (by 7.6pp since the 1970s in real terms vs. 4.0pp in nominal terms). The share of real non-construction investment (mostly equipment investment and intangibles) on the other hand has, somewhat surprisingly, increased for most of the past four decades.¹⁷ Indeed, at its current level of 10.5% of real GDP, the real non-construction investment share is well above the 1980-2005 average share of 8.5%.

Figure 14. Advanced Economies – Average Real Investment (% of GDP), 1970-2013



Note: GDP-weighted averages for 18 AEs (see footnote 4). Investment refers to gross fixed capital formation. Real data are measured in constant 2005 prices.
Sources: European Commission, World Bank and Citi Research

Figure 15. Advanced Economies – Average Price Deflators (1985=100), 1970-2013



Note: GDP-weighted averages for 18 AEs (see footnote 4). GFCF stands for gross fixed capital formation.
Sources: European Commission, World Bank and Citi Research

Net investment shares and the fall in growth

Net (as opposed to gross) investment shares appear to have fallen in both nominal and real terms.

Even though gross fixed investment shares in real terms have remained relatively stable and in fact have risen for non-construction investment, net investment shares (i.e. net of depreciation) have fallen both in nominal and in real terms. The real net investment share fell from 9% of GDP on average in the 1970s to only 5% in the 2000s (Figure 16). This is because the depreciation rates are higher for the components of investment that have grown faster (notably for non-construction investment relative to construction investment). A much slower level of (nominal and real) net investment relative to GDP also means that the growth in the capital stock has slowed for the advanced economies. Average growth in the AE real capital stock was 2.0% in 2000-13 compared to 3.7% in 1970-1980, 2.9% in 1980-90 and 2.7% in 1990-2000.¹⁸

¹⁷ Furthermore, the data we use probably understate the increase in real non-construction investment shares; as the latest vintage of the AMECO data still relies on SNA1993/95, which does not yet classify certain types of investment spending as research and development expenditures, as the SNA2008 does.

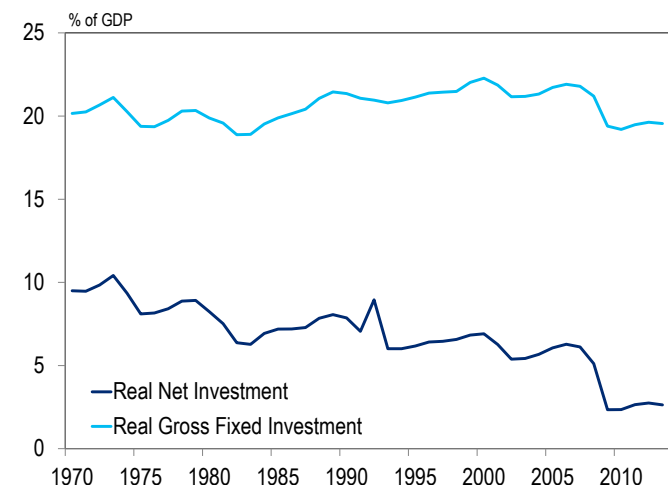
¹⁸ The capital stock data we consider from AMECO are measured using the perpetual inventory method (PIM). That is, for each type of asset, the PIM calculates the net stock in each year as the cumulative value of gross investment through that year (measured at current or replacement costs), less the cumulative value of depreciation through that year. Depreciation rates depend on the ages of assets, usually geometrically. Nominal data are converted into real terms by deflating by the appropriate GFCF deflators.

The weakness in net real investment shares can perhaps be attributed to a weakening of growth expectations in the advanced world.

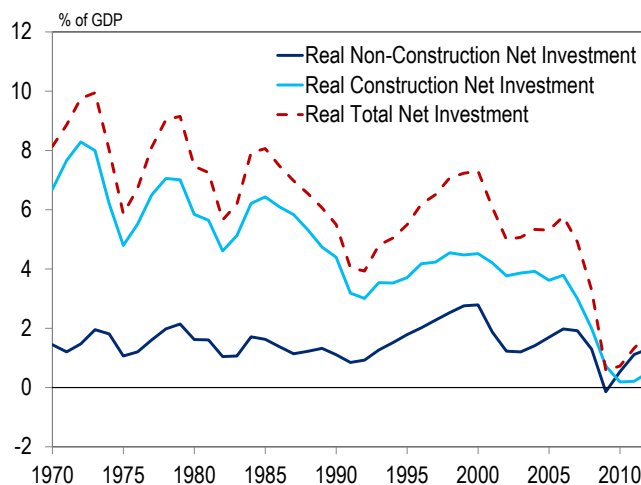
However, one of the reasons why net investment rates and the growth of the capital stock have fallen may be that labor force growth and total factor productivity, and expectations of future labor force growth and total factor productivity growth, have fallen. TFP growth has fallen from 1.5% pa on average in the 1970s to roughly half that since 2000. The growth of the working-age population has fallen from around 1% pa in the 1970s to around a third of that since 2000. By depressing the expected rate of return on capital investment, the fall in labour force and TFP growth also resulted in lower growth of actual and potential GDP. Realised real GDP growth fell persistently with the fall in the growth of the real capital stock (Figure 18). Thus, despite the fact that net investment shares fell, the average capital-output ratio in real terms remained relatively constant for the AE average (see Figure 13).¹⁹ In fact, assuming a constant real capital-output ratio (of, say, 260%), a 6% depreciation rate (as in the recent AE average) and the latest 19.6% real (gross) investment share, we can back out an implied AE growth rate of 1.7%. Even though this is somewhat lower than our forecast for 2014-15 average AE growth of 2.2% pa, it is probably not totally implausible as a rough estimate for AE potential growth. Conversely, a 2.2% growth rate would imply a real (gross) investment share of almost 21%.

Of course, lower investment is, when output is demand-constrained, also a reason for lower economic activity and output. But it is unlikely that over a period of decades that included both Keynesian (demand-constrained) and Classical (supply-constrained or capacity-constrained) sub-periods, the causation went only in one direction. More likely, an anticipation that (TFP, labour force and ultimately GDP) growth would be lower probably contributed to a reduction in investment shares.

Figure 16. Advanced Economies – Average Real Investment (% of GDP), 1970-2013 **Figure 17. US – Real Net Investment Shares (% of GDP), 1970-2012**



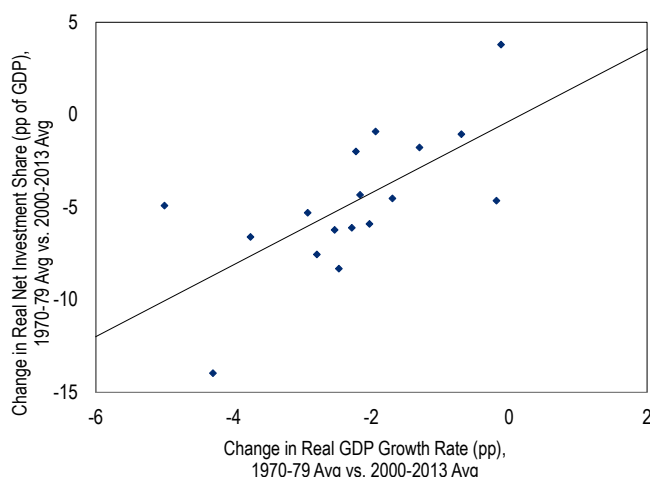
Note: GDP-weighted averages for 17-18 AEs (see footnote 4) in constant 2005 prices.
Sources: European Commission, World Bank and Citi Research



Note: Real data are measured in constant 2009 prices. Investment refers to fixed capital formation.
Source: BEA and Citi Research

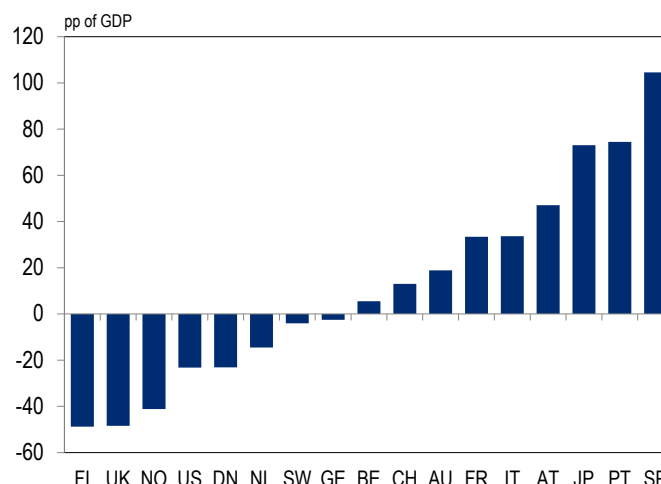
¹⁹ However, there is plenty of cross-country variation, as Figure 19 shows. In particular, the real capital-output ratio fell in the US and UK, but rose in France, Italy, Japan and Spain (and remained relatively stable in Germany).

Figure 18. Advanced Economies – Change in Real GDP Growth Rate (pp) vs. Change in Real Net Investment (pp of GDP), 1970-2013



Note: Scatter plot includes 17 AEs. Real data are measured in constant 2005 prices.
Sources: European Commission and Citi Research

Figure 19. Advanced Economies – Difference in Average Real Net Capital-Output Ratio (pp of GDP), Between 2000-2013 Average and 1970-1979 Average



Note: Real data are measured in constant 2005 prices.
Sources: European Commission and Citi Research

Net investment shares have probably fallen more for construction than for non-construction expenditures.

Even though we have not systematically investigated the differences between the evolution of real net investment shares for our broad sample of AEs, it is likely that a similar pattern as for gross investment applies: namely, that the bulk of the fall in real net investment rates was driven by a fall in real net construction investment shares. For the US, this is clearly true, as real net construction investment shares have fallen strongly whereas real net non-construction investment shares have remained relatively stable (Figure 17).

What about all the other reasons why investment might have fallen?

Above we argued that construction investment accounts for much of the fall in investment shares in advanced economies, that the fall in investment shares is more dramatic in nominal terms than in real terms and that weaker growth expectations may have played a role in lowering investment shares. But that does not mean that the hypothesis that myopia/offshoring/uncertainty/financial constraints had lowered investment is necessarily wrong. Rather, it may well be that in the absence of these drags, investment could have been less weak.

Indicative evidence from the US suggests that the drop in investment shares has not been due to the changing nature of production (namely, away from manufacturing toward services).

Assessing the validity of those hypotheses is beyond the scope of this paper. There is, however, one potentially plausible (really mechanical) hypothesis for a fall in investment shares that we do consider, even though only partially (i.e. for the US alone): namely, that sectoral change from more capital-intensive sectors towards less capital-intensive sectors may have led to lower total investment shares. To assess this claim we consider a standard shift-share analysis. We examine the nominal shares of different US sectors in total gross value added and their investment shares from 1970-79 and in 2012-13. The question then is whether on average the (GVA) weight of the sectors with low investment rates has grown over time. Interestingly, we find that the answer is no.²⁰

²⁰ Our analysis does not require the high-capital intensity sectors to be manufacturing and the low-capital intensity sectors to be services. All that is required is that the share in GVA of less capital intensive sectors has or has not grown, whatever those sectors are.

Figure 20. US – Shift-Share Investment Analysis

	(A) GFCF to GVA 1970-1979 Avg	(B) GFCF to GVA 2012	(C) GVA to Total GVA 1970-1979 Avg	(D) GVA to Total GVA 2013	(A) × (C)	(A) × (D)
Real Estate and Renting	54.2	24.0	12.4	14.9	6.7	8.1
Utilities	44.9	37.7	2.6	2.0	1.2	0.9
Mining	41.3	42.8	2.1	3.1	0.9	1.3
Information	36.3	32.6	4.3	5.5	1.6	2.0
Arts & Entertainment	27.1	14.4	0.7	1.1	0.2	0.3
Agriculture	27.0	25.6	3.4	1.8	0.9	0.5
Trans & Warehousing	21.6	18.5	4.5	3.4	1.0	0.7
Mgmt of Companies	15.8	17.8	1.6	2.2	0.3	0.4
Manufacturing	15.8	20.5	25.3	14.2	4.0	2.2
Healthcare	15.5	10.2	4.2	8.2	0.7	1.3
Education	14.5	18.2	0.8	1.3	0.1	0.2
Accommodation & Food Services	13.1	6.9	2.7	3.1	0.4	0.4
Finance & Insurance	12.4	13.4	5.2	7.6	0.7	0.9
Other Private Services	11.6	7.9	2.9	2.5	0.3	0.3
Admin & Waste Mgmt	8.4	8.2	1.3	3.5	0.1	0.3
Prof & Technical Services	7.6	9.7	3.3	8.0	0.3	0.6
Wholesale Trade	7.1	8.0	7.8	6.8	0.6	0.5
Construction	7.1	7.2	5.6	4.2	0.4	0.3
Retail Trade	6.2	8.4	9.2	6.5	0.6	0.4
Total Private	20.7	16.9	100.0	100.0	20.7	21.6

Note: GFCF stands for gross fixed capital formation; GVA stands for gross value added. Data are in nominal terms.

Sources: BEA and Citi Research

Column A of Figure 20 shows that the sectors with the lowest investment rates in 1970-79 were mainly service sectors, as one might expect. The share of total private GVA for some of these sectors, such as professional & technical services and finance & insurance, has increased since then, as shown by Columns C & D. What is more, the share of the manufacturing sector did fall (from 25.3% of GVA in 1970-79 to 14.2% in 2013). However, the share of several high-investment share sectors did in fact stay constant or even rose. This is notably true for the real estate & renting sector, which had the highest investment rate of all sectors and which has seen its share of GVA increase. Assuming unchanged sectoral investment shares, the evolution of the weights of different sectors would have implied a *rise*, not a fall, of total investment shares for the US private sector from 20.7% to 21.6% of total GVA from 1970-79 to 2013 (final two columns of Figure 20). This finding also implies that, on average, the investment share in each sector in the US must have fallen. And indeed they have, as Columns A & B show.²¹

The cyclical investment rebound in the advanced economies

Investment fell sharply during the Great Recession.

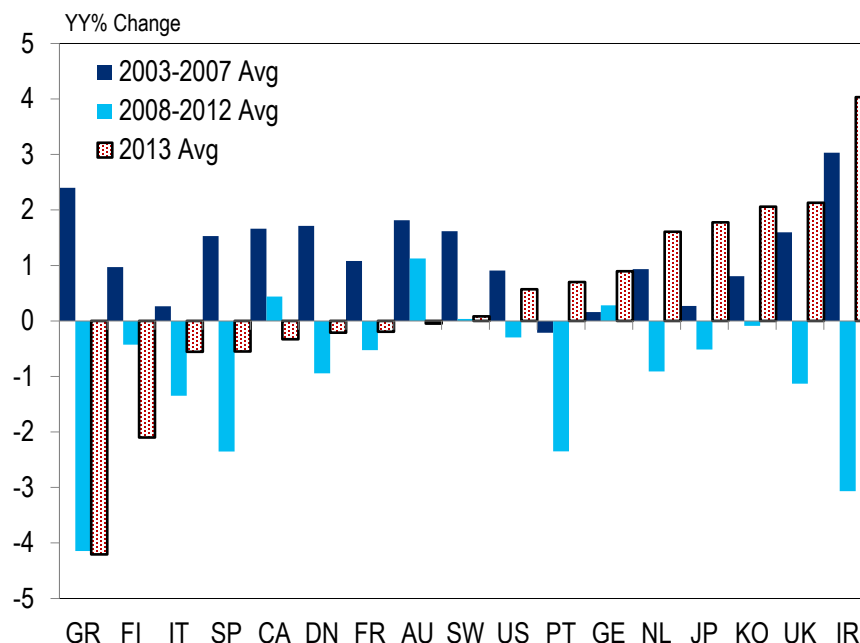
Above we discussed the nature of the secular decline in investment shares in the advanced economies and the importance of differentiating between gross and net investment, nominal and real, and construction and non-construction.

However, it is unlikely that the brutal slump in investment (both construction and non-construction) in the most recent recession was simply an intensification of this long-term decline. During 2009, average real investment in the AEs fell by nearly 12%, compared to 1.5% in the 2001-02 downturn, 0.9% in the early 1990s

²¹ We also performed the same shift-share analysis for net investment, and the story is quantitatively similar (see Figure 28 in the Appendix).

recession and 3.2% in 1982.²² Moreover, in terms of investment shares, average nominal AE investment shares fell by 2.5pp from 2007-2009 compared to average drops in nominal investment shares in previous recessions (excluding the Great Recession) going back to the 1970s of 1.7pp. The rebound from the trough has also been painfully slow. Since the trough in 2010, total real AE investment has only risen by 1.8% pa over the subsequent three years, compared to an average increase of 3.3% pa in the same period following previous recessions.

Figure 21. Advanced Economies – Real Investment Growth (YY% Change), 2003-2013



Note: Real data are measured in constant national-reference prices.
Sources: OECD and Citi Research

Recently, there has been growing evidence of rebound in AE investment, one that we expect to continue to for some time.

Recently, however, there has been growing evidence of *some* rebound in AE investment – a rebound that we expect to continue to for some time. In Q4 2013, real AE GDP-weighted investment growth was running at 3.4% annualised (0.8% YoY), close to the average growth rate in the previous cycle (2003-2007).²³ It would have been even higher had it not been for the large, mostly weather-induced, drops in US (5.3%SAAR) and Canadian (4.0%SAAR) construction investment that pulled AE real construction investment down to a -1.5% annualised growth rate in Q4 (-0.4%YY).²⁴ Non-construction investment, on the other hand, continued to make substantial gains, growing in Q4 at an annualised pace of 8.2% (1.8% YoY), above its 2003-07 pace of 6.6% pa and double its long-term (1980-2013) average growth

²² Of course, part of the reason why the fall in investment was so much larger in the latest slump than in previous ones is that 2009 was a truly global recession, with coincident output and investment falls across many countries.

²³ Our quarterly AE GDP-weighted average investment measure, which is constructed from OECD data, includes more AEs (21 in total) than does our annual AMECO measure referenced earlier. Added are Greece, Ireland, Luxembourg and New Zealand; dropped is Belgium.

²⁴ Our view is that the dip in building activity in North America was likely a temporary phenomenon. We expect trend growth in construction investment in North America to resume in Q2 2014, the first quarter in which the weather distortions will be behind us.

The recent pickup in the pace of investment is quite broad across AEs.

The fact that investment fell so far means that it probably has room to pick up as AE demand continues to improve.

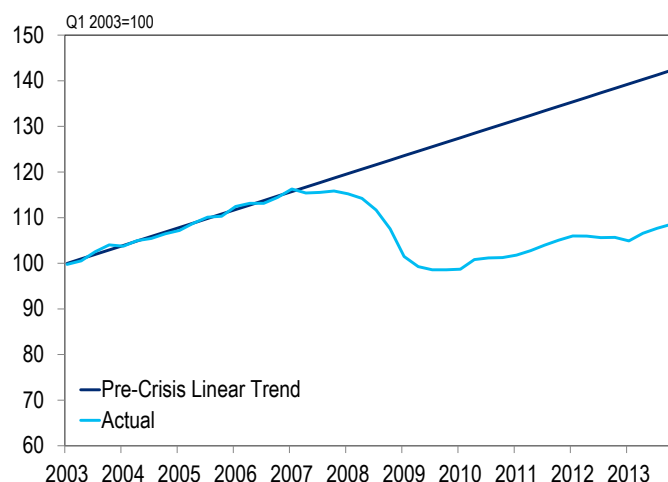
rate of 4.0% pa. Q1 growth was weighed down once more by the adverse impact of extreme weather conditions in North America, but growth continued to be positive.²⁵

The recent pickup in the pace of investment is quite broad across AEs (Figure 21). Of our sample of 21 AEs, the year-on-year pace of growth in real investment was higher in Q4 2013 than a year before in 13 countries. In six countries (Denmark, Canada, Finland, Greece, Australia and Korea), real investment was still falling YoY in Q4; but in three of these, growth was still positive in Q3, so the Q4 reading may have been an outlier.

In our view, there are several reasons for the rebound in investment.

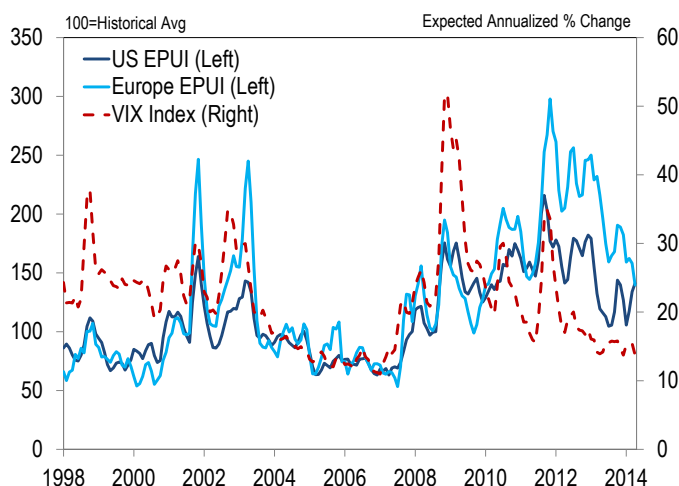
The first is the one we began this section with: investment had been extremely weak in previous years. In Q4 2013, the average level of real investment in AEs was still almost 7% below its pre-crisis peak in Q1 2007. Relative to the pre-crisis trend, real investment levels are roughly 24% lower (Figure 22). To us, it seems unlikely that these very low levels of investment present a new steady state. More likely, there is still significant cyclical upside no matter what one thinks of the long-term trend. Why? (1) In many countries output gaps are declining and capital utilisation rates are increasing, even if unemployment remains high. (2) One of the few robust empirical regularities in investment behaviour is the accelerator relationship, relating investment to the *change* in output. Now that output has stopped falling and has started to increase (albeit often at a disappointing rate), investment is picking up.

Figure 22. Advanced Economies – Average Real Investment (Q1 2003=100), 2003-2013



Note: GDP-weighted averages for 21 AEs (see footnote 23). Real data are measured in constant national-reference prices. Linear trend is based on 2003-2007 data.
Sources: OECD, IMF and Citi Research

Figure 23. US and Europe – Economic Policy Uncertainty (100=Long-Term Average) and VIX Index (Expected Annualized % Change), 1998-2014



Note: EPU stands for economic policy uncertainty index (see footnote 26). Europe refers to the simple average of Germany, UK, France, Italy and Spain. VIX refers to implied volatility of S&P 500 market prices. Data are 3-month moving averages.
Sources: Haver, Bloomberg and Citi Research

Perceived uncertainty likely held back investment early in the recovery, but uncertainty is now diminishing.

Second, perceived uncertainty (notwithstanding the ongoing Russian-Ukrainian tensions, the stand-offs in the South China and East China Seas and the Vox Populi risk in much of the EU) has fallen, and the liquidity situation of NFCs has improved substantially in recent years. According to measures of perceived economic policy uncertainty for the US and Europe, uncertainty levels have been on a downward (but volatile) trend since late 2011, when the euro crisis was in full flight and the

²⁵ For the 15 AEs which have reported Q1 GDP breakdowns, total real investment rose at an average (GDP-weighted) annualized pace of 1.2% (3.8% YoY) during the quarter.

fiscal cliff and a 'default born of insanity' threatened in the US, even though they still seem high compared to pre-crisis levels (Figure 23).²⁶ Statistical evidence suggests that economic policy uncertainty, induced by the increased usage of discretionary fiscal, monetary and regulatory measures, weighed heavily on AE investment following the global financial crisis, particularly in the US and Germany.²⁷ Financial market-based measures of uncertainty (e.g. the VIX Index) are often back to pre-crisis levels, even though they may now reflect some exuberance or even desperation to find positive safe yields anywhere.

Firms' liquidity positions have improved.

It is perhaps somewhat ironic that as perceived or 'priced-in' uncertainty seems to have declined, firms' balance sheet positions and in particular cash buffers have improved. In the euro area, the ratio of NFC currency and deposit holdings to gross debt is the highest since EMU creation; in the UK, this ratio is the highest since 2001; and in the US, it is also above its long-term average (Figure 24). NFC gross debt has also fallen in all three economies, even though it still remains high from a historical perspective.²⁸ Signs of financial froth have become evident again in the US and the UK. In the US, the issuance of high-yield and sub-investment grade corporate debt, payment-in-kind (PIK) bonds, covenant-lite loans, leveraged loans and a wide and growing variety of other leveraged instruments is booming. This suggests that we may (somewhat counterintuitively) be entering a period of greater corporate financial fragility without the benefit of a prior investment boom.

Corporate profits continue to grow in most AEs, boding well for near-term investment growth.

Third, profits are gradually rising. In the US, corporate profits grew at nearly 8%YY in Q4 2013, well above the rate of nominal GDP growth. Corporate profits as a percentage of GDP are near all-time highs of just over 10% (Figure 25). It is therefore little surprise that business investment in the US has outgrown investment in Japan, the UK or the Eurozone.²⁹ In Japan, corporate profit growth is up sharply (by 27%YY in Q4) and amply supported by a surge in profits earned abroad due to the sharp depreciation of the yen. In the UK and the Eurozone, corporate profits are also rising, but less strongly.

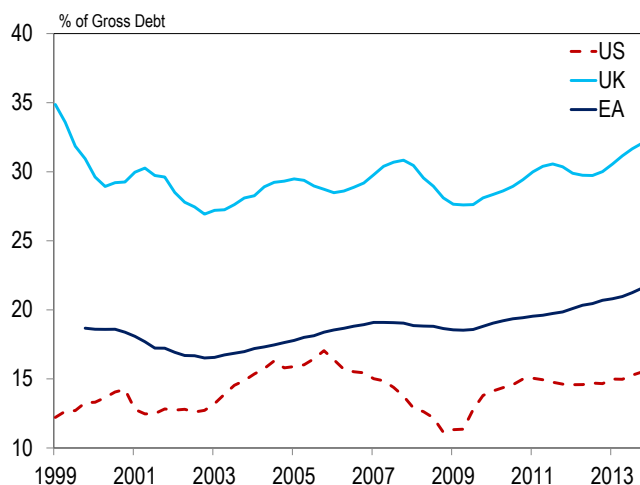
²⁶ See the work by Scott Baker, Nicolas Bloom and Steven Davis in "Measuring Economic Policy Uncertainty" (May 2013) and the related website, <http://www.policyuncertainty.com/>, which include data on economic policy uncertainty as well as other related items. The US Economic Policy Uncertainty Index is constructed from three components: (1) newspaper accounts of economic uncertainty; (2) the number of federal tax code provisions set to expire in the next three years; and (3) dispersions among economists' forecasts for key variables. The European Economic Policy Uncertainty Index is constructed solely from newspaper accounts of economic uncertainty.

²⁷ In [Policy Uncertainty and Investment—How Much Lower Must Real Interest Rates Go?](#) Lee and Seydl (February 2014) estimate that economic policy uncertainty statistically accounted for more than half of the decline in investment shares in the US from 2007-12, and roughly one-third of the decline over the same period in Germany, with uncertainty having a larger effect on investment than the cost of capital in both countries.

²⁸ In the UK, gross NFC debt relative to GDP was 62% in Q3 2013 according to BIS data, down from a peak of 78% in 2009, but still higher than at any time prior to 2005 (and may soon stop falling). In the US, gross NFC debt to GDP already has stopped falling and, at 67% of GDP, is still lower than the 2009 peak of 72% but higher than at any time prior to 2008. In the euro area, gross NFC debt to GDP fell from the peak of 83% of GDP to 79% most recently, also a pre-2008 high.

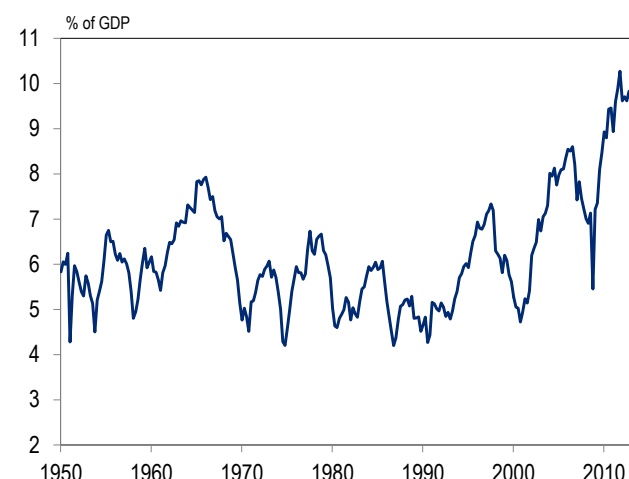
²⁹ For more information on capex in the US, see: [The Weak Capex Myth Demolition Derby](#) by Levkovich, Schmitt and Wood (March 2014). For global capex trends, see: [Capex or Payout? Avoiding the Capital Deconstruction Cycle](#) by Robert Buckland (March 2014).

Figure 24. Selected Economies – Ratio of Non-Financial Corporation Holdings of Currency and Deposits to Gross Debt (%), 1999-2013



Note: Data are measured as 4-quarter moving averages.
Sources: Federal Reserve, ONS, ECB and Citi Research

Figure 25. US – Corporate Profits (% of GDP), 1950-2013



Note: Profits series is adjusted for inventory withdrawals and depreciation and includes all corporations subject to federal corporate taxation.
Sources: BEA and Citi Research

The cost of capital for large corporates remains extraordinarily low, and cash reserves are high.

Fourth, the valuations of firm profits have risen recently, and external funding conditions for firms are generally much better than they were during the crisis years. The cost of capital remains extremely low for corporates (but not SMEs). In the US, the Citi financial conditions index is roughly one and a half standard deviations above its long-term average.³⁰ In both the US and Western Europe, price-to-book ratios on the stock market (a rough proxy for Tobin's Q) have risen noticeably in 2013 (Figure 26), suggesting greater incentives for firms to invest.³¹

Near-term growth expectations have improved.

Fifth, perceived growth prospects have improved, if only modestly. In 2014, the IMF's forecast for average real growth in AEs over the next three years is 2.3%, compared to 2.0% a year ago and slightly lower the year before that. Surveys, such as the Deloitte CFO survey in the UK or the Conference Board's measure of CEO confidence, signal increasing optimism; and surveys of investment intentions, such as the European Commission's or the Business Roundtable's, also suggest increasing investment activity in the near-term.

In sum, we believe there are ample reasons for the cyclical recovery in AE investment to continue for some time.

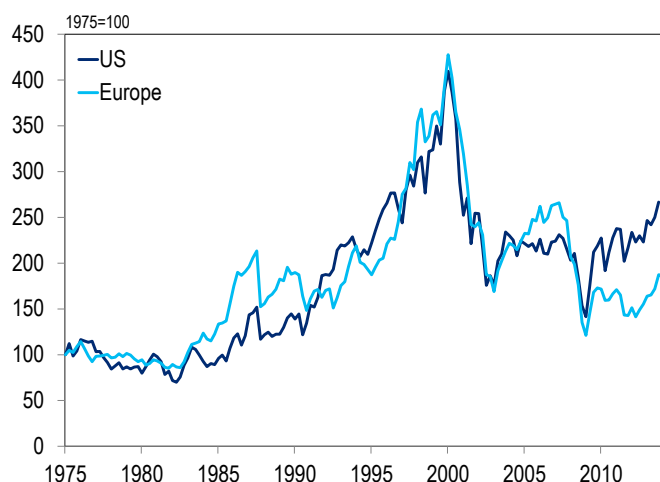
Overall, there therefore seem to be, in our view, ample reasons for the cyclical rebound in investment to continue for some time. We currently expect real gross fixed capital formation in the advanced economies to increase by 3.3% in 2014 and 4.2% in 2015, after growing by 1.2% in 2013. Other major international organisations also expect the pace of real AE investment to increase: the OECD expects 3.3% and 5.4% real growth in investment (total GFCF) in 2014 and 2015, respectively, while the European Commission expects 3.9% and 5.1% real investment growth, also respectively.³²

³⁰ See [Receding Turbulence Clears Way for Growth Without Inflation](#) by Peter D'Antonio (June 2014).

³¹ In Western Europe, price/book ratios still remain relatively low, partly due to lower price/book ratios for banks than in the past.

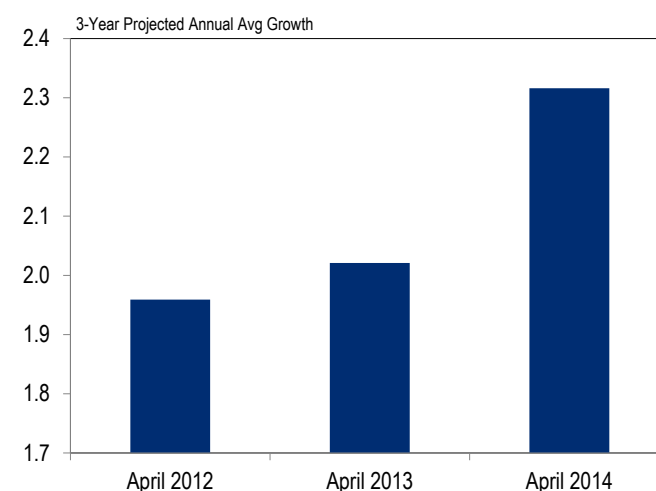
³² Our Citi forecasts for AE investment growth are not directly comparable to those of the OECD or the European Commission. The OECD AE aggregate consists of the 34 OECD countries, and the European Commission's forecast consists of the 18 AEs listed in footnote 4, while our Citi aggregate contains 25 countries.

Figure 26. US and Europe -- Price-to-Book Ratios (1975=100), 1975-2013



Note: Europe refers to a 15-country aggregate, as defined by the MSCI Europe Index.
Sources: Fed, MSCI and Citi Research

Figure 27. Advanced Economies -- Projected Average Real GDP Growth Over the Following Three Years (% pa), April 2012-April 2014



Sources: IMF and Citi Research

Conclusions

Investment shares in advanced economies have been falling for a long time, for many reasons.

Investment in the advanced economies has been weak. It was battered in the global recession, and its recovery has been disappointing. Importantly, as we have shown, AE investment has been weakening for some time. Many reasons have been suggested for such a long-term downward trend in AE investment shares, including myopic managers and capital markets, greater uncertainty (including policy uncertainty, geopolitical uncertainty and uncertainty driven by tensions relating to rising income and wealth inequality and to social and political polarisation), a lack of public investment and a growing relative disadvantage compared to cheaper, less-regulated and faster-growing EMs. But we have highlighted that a deeper look into the investment data shows four other important factors that likely played an important role. A fall in the growth of the labour force, TFP and GDP probably lowered incentives to invest, whereas a rise in depreciation rates implied that net investment and the growth of the capital stock have weakened even more than gross investment. However, a fall in the relative price of investment meant that investment in real terms has fallen a lot less than in nominal terms; and real non-construction investment shares have been stable or rising (depending on whether they are looked at in net or gross terms).

Even though a cyclical rebound is underway, many of the long-term trends may well continue, in our view, suggesting that investment shares are likely to remain weak in the future.

Even though a cyclical rebound is now underway, it seems likely, in our view, that these longer-term trends will continue. Thus, following a cyclical rebound, investment shares are likely to remain low (in historical comparison) and perhaps continue their downward trend. The growth of total population and the working-age population is likely to fall further – the UN estimates that the working-age population in the advanced economies may have started falling and should continue to fall in the coming decades, unless large-scale migration into the advanced economies unexpectedly changes these trends. Future trends for TFP growth are more uncertain. A continuation of the historical trend would suggest further declines (TFP growth in AEs since 2000 averaged less than half the 1.5% pa growth observed in the 1970s). It is, however, possible that the recent advances in information and

communication technologies will be able to lift TFP growth in the years to come.³³ On top of that, private and public sector debt levels are still at or close to multi-decade highs, implying that some investment may well be impeded by financing constraints or at least may need to be less credit-intensive than in the past.

Against these trends, the details of investment growth are more benign (but may only offer limited consolation): A continued fall in the relative price of investment should imply that real investment will continue to grow faster than nominal investment. And non-construction investment – the type of investment that presumably adds more to productivity than construction investment – is likely to continue to structurally grow faster than construction investment.

³³ For exciting commentary on productivity growth prospects, see “The Demise of U.S. Economic Growth: Restatement, Rebuttal, and Reflections” by Robert Gordon (on the side of the pessimists) and *The Second Machine Age* by Brynjolfsson and McAfee (on the side of the optimists).

Appendix

Figure 28. US – Shift Share Net Investment Analysis

	(A) Net Investment to GVA 1970-1979 Avg	(B) Net Investment to GVA 2012	(C) GVA to Total GVA 1970-1979 Avg	(D) GVA to Total GVA 2013	(A) × (C)	(A) × (D)
Real estate and Renting	31.8	2.5	12.4	14.9	3.9	4.7
Utilities	21.4	10.9	2.6	2.0	0.6	0.4
Information	13.1	6.4	4.3	5.5	0.6	0.7
Mining	9.8	11.6	2.1	3.1	0.2	0.3
Healthcare	8.1	2.5	4.2	8.2	0.3	0.7
Mgmt of Companies	7.9	0.5	1.6	2.2	0.1	0.2
Agriculture	7.8	3.8	3.4	1.8	0.3	0.1
Finance & Insurance	6.3	0.5	5.2	7.6	0.3	0.5
Arts & Entertainment	4.9	0.3	0.7	1.1	0.0	0.1
Education	4.6	4.8	0.8	1.3	0.0	0.1
Manufacturing	4.4	1.9	25.3	14.2	1.1	0.6
Trans & Warehousing	3.9	3.6	4.5	3.4	0.2	0.1
Accommodation & Food Services	3.7	0.0	2.7	3.1	0.1	0.1
Other Private Service	3.6	-0.5	2.9	2.5	0.1	0.1
Admin & Waste Mgmt	3.5	1.2	1.3	3.5	0.0	0.1
Prof & Technical Services	2.8	1.0	3.3	8.0	0.1	0.2
Retail Trade	2.7	0.1	9.2	6.5	0.2	0.2
Wholesale Trade	2.6	1.5	7.8	6.8	0.2	0.2
Construction	1.6	0.9	5.6	4.2	0.1	0.1
Total Private	8.5	2.3	100.0	100.0	8.5	9.5

Note: GVA stands for gross value added. Data are in nominal terms.
Source: BEA and Citi Research

Appendix A-1

Analyst Certification

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