

Why Is Global Business Investment So Weak? Some Insights from Advanced Economies

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- Business investment in advanced economies has been underwhelming since the 2007–09 global financial crisis, explained, in part, by slower growth in aggregate demand. A renewed period of weakness in investment spending began in 2014, likely reflecting the impact of lower commodity prices and, most recently, a rise in economic uncertainty.
- In coming years, there is scope for growth in investment spending to pick up as the drag from low commodity prices and elevated uncertainty fades.
- But even as these headwinds recede, business investment growth is likely to remain slower than in the pre-crisis period largely because of structural factors. Such factors include slowing growth rates for population and total factor productivity and an increasing share of services in the economy.

Non-residential private investment, commonly referred to as business investment, is a crucial economic indicator that carries a greater importance than its small share of aggregate output may suggest. In particular, it reflects expectations about the future, accounts for a large portion of the variation in output, and contributes to the productive capacity essential to sustaining increases in living standards (Schembri 2017). During the 2007–09 global financial crisis, business investment plummeted and a subsequent rebound faltered.¹ Now, almost a decade later, despite substantial monetary stimulus, investment spending continues to struggle to exceed its pre-crisis level. Furthermore, forecasts of business investment have been consistently over-optimistic, proving to be a leading source of error in the Bank of Canada's forecasts of output for the United States and Canada (Guénette et al. 2016).

This article focuses on business investment in advanced economies. Specifically, the article presents an aggregate measure of business investment obtained by combining data for 30 industrialized countries, covering

¹ While several advanced economies have experienced declines in housing and government investment, business investment accounted for the majority of the weakness in global investment (International Monetary Fund 2015).

nearly all advanced economies. After outlining the evolution of advanced-economy business investment since the crisis, the article uses regression analysis to explain the main drivers of investment, particularly since 2011. The slow growth of aggregate demand explains a large share of the weakness in investment growth in the post-crisis period, but does not account for all of it. Other factors, such as elevated uncertainty; tight credit conditions, particularly in the euro area; and the decline in commodity prices, also help to explain the post-crisis dynamics of investment. The article concludes by discussing the implications of the main findings for the outlook for business investment growth. While there is scope for a favourable reversal of uncertainty and higher commodity prices to boost investment growth in the near-term, structural factors such as aging demographics reduce the likelihood that these improvements will be sustained.

The Evolution of Business Investment in Advanced Economies Since the Global Financial Crisis

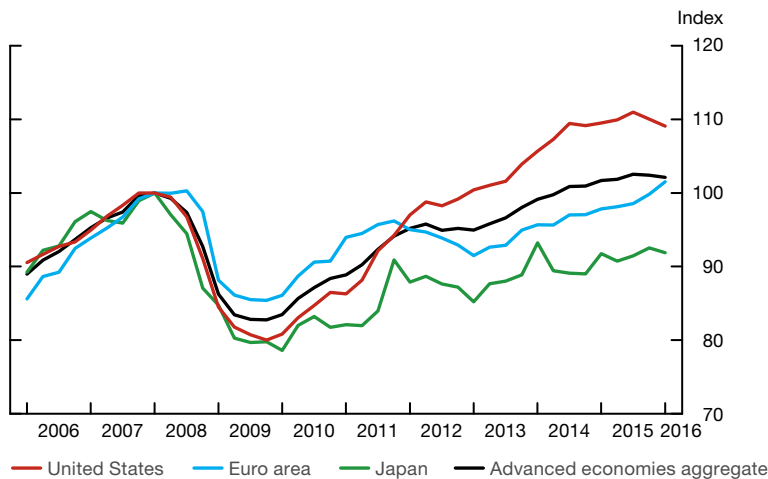
In the wake of the global financial crisis and ensuing worldwide recession, business investment in advanced economies plummeted (Chart 1). This decline was followed first by a relatively muted recovery and then by a stall in 2015. While this pattern characterizes the aggregate experience in advanced economies, it masks heterogeneity in the speed of the recovery across countries and regions. See Box 1 for details on how the data in this article were constructed.

The recovery in investment was relatively quick in the United States, supported by policy actions, particularly in the form of very accommodative monetary and fiscal policy to stimulate domestic demand as well as comprehensive reforms to the financial system. As early as 2008, the US Federal Reserve launched quantitative easing measures to lower interest rates across the yield curve and contribute to an easing of financial conditions, and thereby stimulate borrowing. Also, the government quickly enacted a

◀ *The recovery in investment was relatively quick in the United States*

Chart 1: Business investment in advanced economies

Index: 2008Q1 = 100, quarterly data



Note: Advanced economies aggregate includes 30 countries accounting for 95 per cent of GDP in advanced economies. For details, see Box 1.

Sources: Organisation for Economic Co-operation and Development, International Monetary Fund, Statistical Office of the European Communities via Haver Analytics and Bank of Canada calculations

Last observation: 2016Q1

Box 1

Data on Business Investment in Advanced Economies

Finding data on business investment for all advanced economies is challenging. While most statistical agencies systematically report estimates of gross fixed capital formation (GFCF), which include residential and government investment in addition to business investment, only 17 countries directly report private business investment. These countries are Australia, Belgium, Canada, Denmark, Finland, France, Germany, Iceland, Japan, the Netherlands, New Zealand, Norway, South Korea, Sweden, Switzerland, the United Kingdom and the United States. They account for 35 per cent of global gross domestic product (GDP) and 83 per cent of advanced-economy GDP expressed in terms of purchasing power parity (PPP).

To increase our coverage of advanced economies as much as possible, we relax our definition of business investment for 13 additional countries to also include government investment.¹ This measure is obtained by subtracting housing investment from GFCF. These 13 countries are Austria, the Czech Republic, Estonia, Ireland, Israel, Italy, Latvia, Lithuania, Luxembourg, Portugal, Slovakia, Slovenia and Spain. The total 30 countries thus account for 40 per cent of global GDP and 95 per cent of advanced-economy

GDP in PPP terms.² To our knowledge, this is the most comprehensive data set of business investment assembled to date pertaining to advanced economies.

All investment data in this article come from the Organisation for Economic Co-operation and Development. The investment data for the 30 advanced economies have been aggregated into a summary measure (displayed in **Chart 1**) by weighting them using relative GDP based on PPP reported by the International Monetary Fund. This aggregation method was also used to obtain measures of aggregate demand (proxied by GDP excluding investment), and credit conditions, both of which were used in our regression analysis. More specifically, we create a measure of aggregate credit conditions that captures the willingness of banks to lend to firms in advanced economies by combining results from individual country and regional senior loan officer surveys (the various results are normalized before aggregation to impose a common standard deviation). In countries where senior loan officer surveys are not available, we use a regional proxy. Before 2003, the European Central Bank's Bank Lending Survey was not conducted. Therefore, the aggregate measure during this time reflects results from the US senior loan officer survey, for the most part, and, to a much lesser extent, results from Australia, Canada, Finland and Japan.

1 For the 17 countries for which we have access to data under both definitions (business investment and GFCF excluding housing), the advanced-economy aggregate investment series display very similar behaviour.

2 Relative to the International Monetary Fund's classification of advanced economies, because of data unavailability, our analysis does not include the following advanced economies: Cyprus, Greece, Hong Kong, Malta, Macao, San Marino, Singapore and Taiwan.

series of regulatory reforms to improve both the capital base and the resilience of the banking sector, eventually enhancing the sector's capacity to lend to businesses. As a result, US banks were in a position to start loosening credit conditions in 2010 after having tightened them for two years (**Chart 2**, blue bars).

Although US business investment has moved above its pre-crisis peak, it is still well below the level observed in a typical recovery (**Chart 3**). This trajectory is consistent with developments following a financial crisis where debt overhangs weigh substantially on aggregate demand (Reinhart and Rogoff 2008; Albuquerque and Krustev 2017). Since 2015, US business investment has moved sideways.

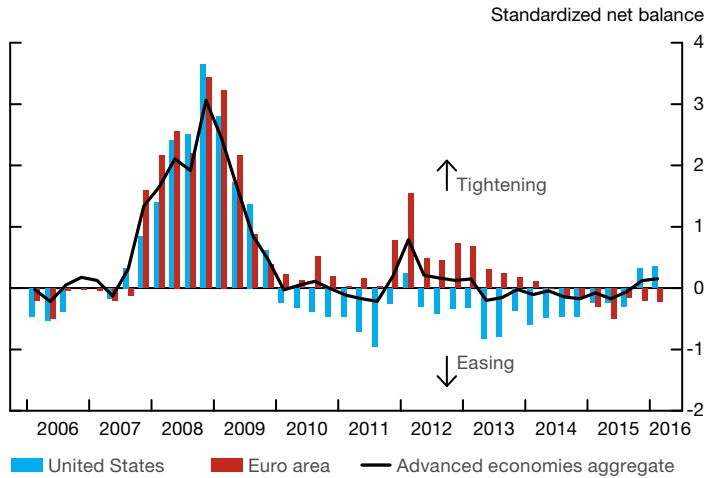
In addition to the global financial crisis, the euro area faced a sovereign debt crisis in 2011–12 that was characterized by a further deterioration in credit conditions; these have only recently begun to improve (**Chart 2**, red bars).

In Japan, meanwhile, domestic investment has been sluggish because manufacturing firms, notably in the auto industry, have been increasingly relocating production abroad, mostly to fast-developing Asian economies,

◀ *Credit conditions have recently begun to improve in the euro area, while domestic investment has been sluggish in Japan*

Chart 2: Bank credit conditions for lending to firms

Net tightening of credit conditions, quarterly data



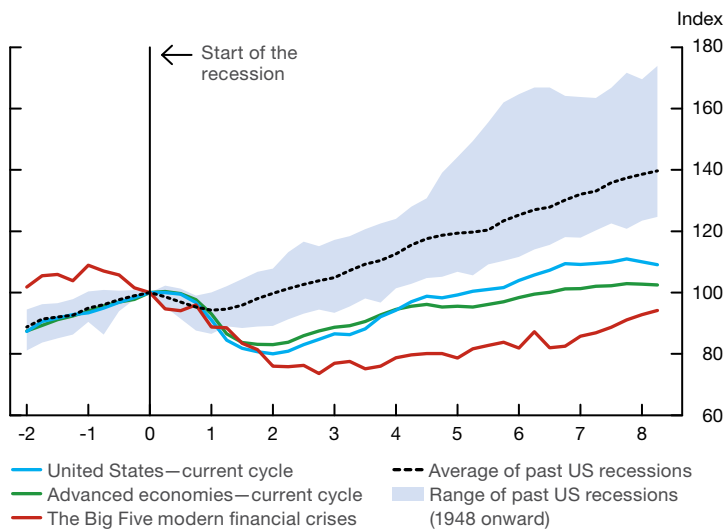
Note: Advanced economies aggregate includes 30 countries accounting for 95 per cent of GDP in advanced economies. For details, see Box 1.

Sources: National sources, International Monetary Fund via Haver Analytics and Bank of Canada calculations

Last observation: 2016Q1

Chart 3: Comparative recoveries in business investment

Real GDP across economic cycles; Index: start of recession = 100, quarterly data



Note: The Big Five modern financial crisis, as described by Reinhart and Rogoff (2008), are Spain (1977), Norway (1987), Finland (1991), Sweden (1991) and Japan (1992).

Sources: National sources and authors' calculations

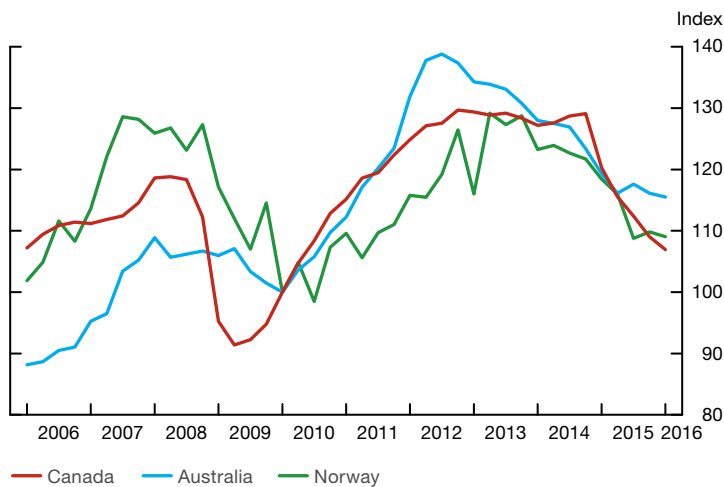
to take advantage of lower labour costs and rising demand in the host countries. This offshoring is occurring despite favourable domestic profitability and liquidity conditions (Kang and Piao 2015).

Commodity-producing advanced economies experienced a boom in their business investment, especially from 2010 to 2014 (Chart 4), linked to the robust demand for resources and the resulting high prices for oil and other commodities. However, from 2014 onward, with the large decline observed in commodity prices, investment in these commodity-producing economies has retreated substantially.

◀ *Commodity-producing advanced economies experienced a boom in their business investment, especially from 2010 to 2014*

Chart 4: Real business investment in commodity-producing advanced economies

Index: 2010Q1 = 100, quarterly data



Source: Organisation for Economic Co-operation and Development

Last observation: 2016Q1

The Determinants of Business Investment

A firm's decision to move forward with an investment plan is complex and influenced by a number of factors. For some, it could stem from the need to replace or repair aging capital—either machinery and equipment or structures. New investment is often required because the value and usefulness of physical capital tend to depreciate over time; technology-related investments such as computers, for example, depreciate rapidly. Firms also invest in additional capital to increase production in response to growing demand. In both cases, firms invest to maintain or improve their competitiveness and maximize profits.

Below is a description of some of the major determinants of business investment that will be used in the analysis of investment dynamics.

Aggregate demand

Firms invest primarily to increase capacity to meet the current and anticipated demand for their products. In the empirical literature on business investment, it is common to use gross domestic product (GDP) excluding investment as the measure of aggregate demand to avoid using investment to explain itself.² Aggregate demand is generally viewed as the most important driver of the short-term dynamics of business investment. In the long run, however, both aggregate demand and investment are driven by structural factors, such as demographics related to population aging and the economy's total factor productivity. The rate of depreciation also plays a role in determining the growth rate of business investment.³

Financial conditions

Financial conditions encompass two elements: the real user cost of capital and credit conditions.

² While anticipated demand likely plays an important role in shaping investment decisions, data quantifying firm expectations are generally not available.

³ Aggregate depreciation is a function of the sectoral composition of the economy.

The real user cost of capital is the minimum return that a firm needs to cover depreciation, taxes and the opportunity costs of the funds used to finance a project. The user cost of capital is a function of the level of interest rates—all else being equal, higher user costs imply lower investment spending.

When a firm approaches a bank and requests a loan to finance an investment expenditure, the bank will evaluate the level of risk associated with the proposed project. Banks generally set minimum credit standards that an applicant must meet to be eligible for a loan. If the creditworthiness of the applicant (or its investment project) does not meet these standards (also referred to as credit conditions), the bank will reject the loan application. Credit conditions are therefore an important driver of the supply of bank credit and of business investment more generally. This is especially the case in countries where firms highly depend on bank lending (rather than on private equities or bonds), such as countries in the euro area.

In an economic downturn, even when monetary policy becomes more accommodative, banks typically tighten credit standards, making credit less available at any given interest rate.⁴ As mentioned earlier, credit conditions tightened substantially in most advanced economies during the global financial crisis, and they continued to tighten in the euro area until about 2014, as a result of the European debt crisis (Chart 2, black line). In response, some central banks, including the European Central Bank, adopted innovative policies to improve the supply of credit to the economy (Fay and Hess 2016; Santor and Suchanek 2016). Nevertheless, the unprecedented tightening of credit conditions during these two episodes of intense financial stress highlighted the key role of credit supply in promoting investment (European Central Bank 2016).

◀ *The unprecedented tightening of credit conditions during episodes of intense financial stress highlighted the key role of credit supply in promoting investment*

Uncertainty

Given the long lead times for planning and implementation as well as the considerable time it may take before an investment starts to pay off, firms' investment decisions can be greatly affected by uncertainty. When conditions are highly uncertain, investors possess a valuable option to wait—an option that is lost once irreversible investment decisions are made. Since waiting allows investors the opportunity to collect more information, elevated uncertainty and risk aversion lead firms to take a more cautious approach to investments.⁵ It is therefore not surprising to observe that firms delay investment purchases in periods of high uncertainty until they have more clarity about the future (Bernanke 1983).⁶ Conversely, a favourable resolution of uncertainty could increase investment by unleashing the “animal spirits” of entrepreneurs.

Several recent studies have estimated economic uncertainty using stochastic volatility models (Jurado, Ludvigson and Ng 2015; Jo and Sekkel 2016). By focusing on the volatility in the unforecastable component of a large number of economic indicators, these measures may provide a more reliable signal for business investment. Relative to other popular uncertainty proxies, such as the economic policy uncertainty index published by Baker,

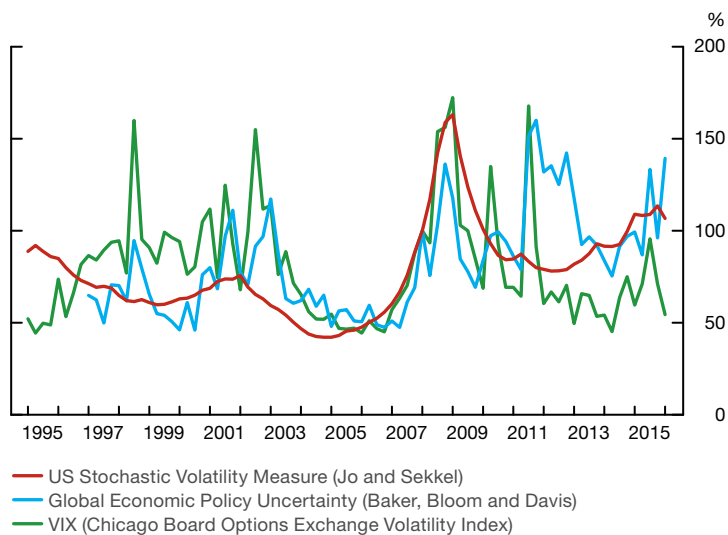
⁴ The cost of external financing also depends on the financial position of the borrower. When the borrower's balance sheet is healthy (elevated net worth), the firm is able to reduce its borrowing costs (Bernanke and Gertler 1989). Given that cash flow tends to decrease in recession periods, this balance sheet effect adds to the procyclicality of investment financing.

⁵ Dixit and Pindyck (1994) argue that uncertainty increases the benefit of waiting for more information before incurring the sunk cost of investment projects.

⁶ Leduc and Liu (2016) find that increases in uncertainty have effects similar to those of negative aggregate demand shocks; that is, they raise unemployment and lower inflation.

Chart 5: Uncertainty measures

Index: 2008Q1 = 100, quarterly data



Sources: Jo and Sekkel (2016); Baker, Bloom and Davis (2016); and Bloomberg Last observation: 2016Q1

Bloom and Davis (2016) or a volatility index derived from stock options (VIX), these economic uncertainty indexes capture the same broad trend and point to less frequent, larger and more persistent uncertainty shocks (Chart 5).⁷

Commodity prices

Some advanced economies, such as Canada and Australia, are also important commodity producers. Since the extraction of resources typically requires large infrastructure investment over a long period, movements in commodity prices—energy prices especially—play a key role in determining the level of commodity production and therefore investment. Shifts in commodity prices can significantly affect the behaviour of business investment in these economies. Interestingly, even in countries where commodities do not represent a large share of output, pronounced and persistent movements in commodity prices can have very large effects on investment in the commodity sector and thus a substantial impact on aggregate investment. This was evident in the United States in the lead up to the 2014 oil price collapse, when investment in the extraction of oil and natural gas sectors ramped up as firms exploited new technologies and then subsequently plummeted alongside prices.

What Explains the Recent Slowdown in Business Investment?

A number of papers have analyzed the post-crisis weakness in business investment in advanced economies. Some (e.g., Barkbu et al. 2015; Lewis et al. 2014; Bussière, Ferrara and Milovich 2015) find evidence that uncertainty explains a large portion of this weakness. In contrast, economists at the International Monetary Fund (IMF 2015) find that subdued aggregate demand can fully explain the behaviour of investment. Leboeuf and

⁷ Jo and Sekkel's (2016) stochastic volatility measure of uncertainty is only available for the United States.

Box 2

An Accelerator-Type Model of Business Investment

For the purpose of this article, we estimate accelerator-type regression models. We first consider a simple model by regressing real aggregate business investment (*Investment*) in 30 advanced economies on real aggregate demand (*GDP excluding investment*):

$$\Delta\%(Investment)_t = -0.57 + 2.1*\Delta\%(GDP\ excluding\ investment)_{t-1} + 0.6*\Delta\%(GDP\ excluding\ investment)_{t-2}$$

$$Number\ of\ observations = 89, Adjusted-R^2 = 0.46$$

This regression is estimated using ordinary least squares on first-differenced data spanning from the first quarter of 1994 to the first quarter of 2016. Real aggregate demand is defined as advanced-economy real gross domestic product (GDP) excluding investment to avoid using investment to explain itself. Aggregate demand is found to be positively related to business investment and explains close to half of the historical variation in business investment.

To better explain the dynamics of business investment, we augment the simple accelerator model by including credit conditions, uncertainty and real energy prices:¹

$$\Delta\%(Investment)_t = 0.54 + 1.09*\Delta\%(GDP\ excluding\ investment)_{t-1} - 0.38*uncertainty_t - 0.82*\Delta(credit\ conditions)_t + 0.024*\Delta\%(real\ energy\ prices)_{t-1}$$

$$Number\ of\ observations = 89, Adjusted-R^2 = 0.72$$

1 The user cost of capital was not statistically significant when included in our short-run dynamic equation. Although a long-run relationship exists between investment and the user cost of capital, including this long-run effect in an error-correction framework does not alter our main findings.

Uncertainty is captured by the Jo and Sekkel (2016) stochastic volatility measure, and credit conditions are proxied by a weighted average of credit conditions in advanced economies (Chart 2, black line).² We use the global energy commodity price index produced by the IMF (*real energy prices*).³

As in the simple model, the aggregate demand component is found to be positively related to business investment. Uncertainty and credit conditions also have the expected sign: rising uncertainty and tighter credit conditions are both associated with a slowdown in investment growth. Real energy prices are found to have a positive and significant effect on business investment in advanced economies. This may sound counterintuitive given that, on average, advanced economies are net importers of energy. However, movements in energy prices over time have generally been dominated by current and expected developments in global demand (Kilian and Murphy 2014).⁴

2 We tried several proxies for uncertainty in the regression, including the volatility index derived from stock options (VIX), the economic policy uncertainty index and the stochastic volatility measure of Jo and Sekkel (2016). Only the stochastic volatility measure is found to be useful in explaining the behaviour of aggregate business investment in advanced economies.

3 The nominal energy price index is divided by the US GDP deflator to obtain a real price measure.

4 This finding also holds when we estimate the equation using data for net commodity importers only, reinforcing the notion that oil prices primarily capture the influence of global aggregate demand rather than of supply-side commodity considerations.

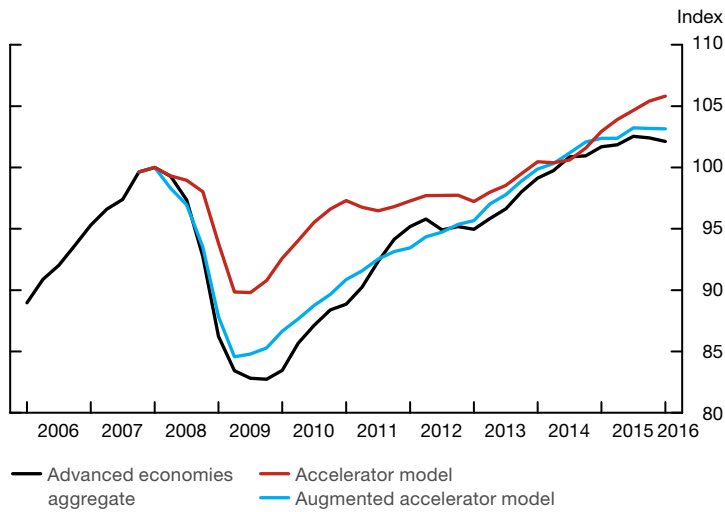
Fay (2016) limit their analysis to a small set of advanced economies and find that the main driver behind the post-crisis weakness in investment is pessimism on the part of firms about foreign demand prospects. Heightened uncertainty, tight credit conditions and weak corporate profits are also found to explain the slowdown in investment.

Ultimately, explaining business investment is a difficult task, and no single model appears superior to others (Bernanke 2003). Accelerator-type models, which relate the dynamics of business investment primarily to the dynamics of aggregate demand, are a relatively simple framework that generally fit the data well over a long time period and provide good-quality forecasts of investment (Lee and Rabanal 2010; IMF 2015; Furman 2015).

An accelerator-type model (Box 2) is used as the baseline investment model in this article. As shown by the red line in Chart 6, the simple model cannot explain the severity of the investment contraction during the crisis and the recent slowdown. When we add a role for uncertainty, credit conditions and energy prices to the model, however, it is able to capture the investment dynamics much better (Chart 6, blue line).

Chart 6: Evolution of advanced-economy business investment versus simulations

Dynamic simulations, index: 2008Q1 = 100, quarterly data

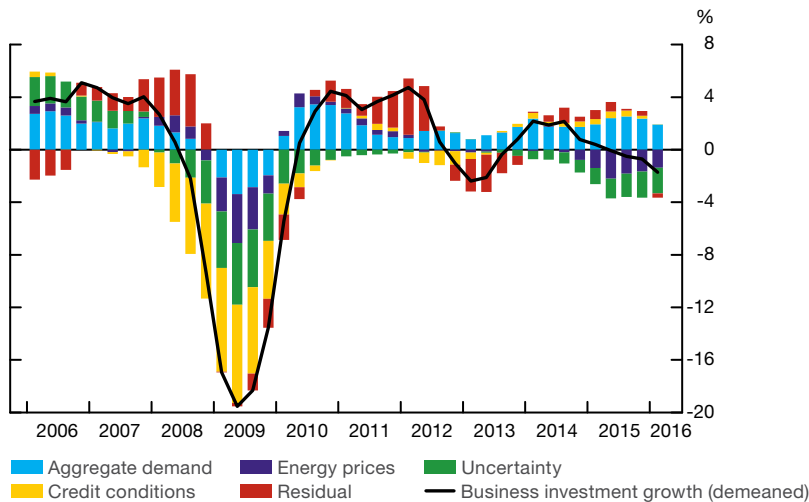


Note: Advanced economies aggregate includes 30 countries accounting for 95 per cent of GDP in advanced economies. For details, see Box 1.

Sources: Organisation for Economic Co-operation and Development, International Monetary Fund via Haver Analytics and authors' calculations Last observation: 2016Q1

Chart 7: Contributions to advanced-economy business investment growth

Year-over-year percentage change, quarterly data



Note: The constant was included in the regression but excluded from chart for expository purposes.

Source: Authors' calculations Last observation: 2016Q1

Based on the historical estimation of the augmented accelerator model, we can decompose the movements in the growth rate of aggregate-advanced economy business investment since 2006 (Chart 7).

In the wake of the global financial crisis, the sharp decline in aggregate demand and its spillovers to energy prices was a key factor behind the exceptional weakness in business investment. However, the dynamics of demand are not the whole story. We find that the sharp tightening of credit conditions was a key contributor to the slump in investment. Furthermore, the surge in economic uncertainty also contributed to reduced investment during this period.

During 2010–11, business investment in advanced economies recovered strongly, aided by a rebound in aggregate demand and a gradual dissipation of uncertainty. However, investment growth experienced a notable slowdown through 2012–13, weighed down by moderating aggregate demand, combined with a tightening of credit conditions in Europe.

Since 2014, business investment growth in advanced economies has experienced a renewed episode of weakness despite a strengthening in aggregate demand. This slowdown can be explained by the fall in energy prices (Chart 7, purple bar).⁸ Also, the persistent rise in macroeconomic uncertainty (Chart 7, green bar) has played an increasing role in dampening investment since 2014. This rise in macroeconomic uncertainty may reflect a sequence of unanticipated economic and political developments, such as the sharp fall in oil and other commodity prices, crises in several emerging markets (e.g., Brazil and Argentina) and political developments in the United States and Europe.

Conclusion

Although simple accelerator models generally do a reasonable job at explaining business investment dynamics in advanced economies, movements in aggregate demand are unable to account for the severity of the decline in business investment during the global financial crisis as well as the more recent slowdown. When the simple model is augmented to take into account credit conditions, uncertainty and commodity market developments, it better tracks the weakness of business investment in the crisis and post-crisis periods. This finding reinforces the idea that investment is weak relative to past business cycles because there are more factors at play than just demand in the current cycle. The slowdown since 2014 appears to be linked primarily to the collapse of global energy prices and increased macroeconomic uncertainty.

While energy prices have rebounded since early 2016, they remain low relative to their pre-2014 levels. Also, uncertainty remains elevated. The favourable resolution of uncertainty, combined with a broad easing of credit conditions, particularly in the euro area, could support an acceleration of business investment in advanced economies in the coming years. The potential benefits of such resumption of investment growth are clear. In the short term, stronger investment could boost economic activity, supporting the closing of output gaps and allowing central banks to normalize policy. In the longer term, stronger investment would lead to sustained increases in living standards by increasing the economy's stock of productive capital and spurring technological innovation. By supporting both stronger aggregate demand and the long-term potential growth of the economy, accelerated investment can help achieve faster rates of economic growth.

In the longer run, however, structural factors, such as demographics, imply a lower average track for business investment. In recent years, advanced economies have experienced a slowdown in the growth of the labour force as a result of an aging population. A similar slowdown was observed in the growth rate of productivity, possibly linked to a lower scale and scope of technology adoption, a plateauing of educational attainment or simply a

◀ *The slowdown since 2014 appears to be linked primarily to the collapse of global energy prices and increased macroeconomic uncertainty*

⁸ As mentioned by Fay, Guénette and Morel (2016), following the large correction in energy prices observed in mid-2014, the response of investment in oil-producing countries has been negative, large and quick to materialize.

shift in productivity growth back to historical norms (Reza and Sarker 2015).⁹ While there is scope for stronger productivity growth in the future, supported by rising spending on research and development worldwide, demographic trends are unlikely to reverse.¹⁰ Therefore, while a pickup in business investment is expected to occur, a return to pre-crisis rates of growth is unlikely.

Finally, this article has focused on the investment behaviour in advanced economies only. Exploring differences as well as linkages with emerging-market economies remains an area for further analysis.

⁹ Other structural forces weighing on the growth rate of business investment include the lesser need for physical capital in our modern high-tech economy (Summers 2015), the longer-term shift toward service sector activity (OECD 2015), and globalization and the related shift in investment toward emerging markets (Berganza, Romero and Sastre 2016).

¹⁰ D'Souza and Williams (2017) argue that a wider adoption of digital technologies could increase future trend productivity.

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