Financial effects on corporate investment in UK business cycles

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The slowdown in corporate investment in the early 1990s recession was more marked than in the equivalent period of the 1980s downturn. This article reviews corporate sector investment and financial health in these periods. It then uses a 'credit channel' model to consider the potential for interactions between corporate financial positions and investment spending. Simulations of the model suggest that financial effects may vary in strength over time. In particular, the model provides some support for the view that financial effects might have been relatively more important in the early 1990s recession, given the greater dependence of the corporate sector at that time on external borrowing.

Introduction

The depth and persistence of the UK recession of the early 1990s surprised many economic forecasters, particularly the prolonged weakness of corporate investment growth. Views on the causes of sluggish investment in this period vary. However a number of analyses have suggested a potential role for financial factors, noting the coincidence of weaker corporate investment with a marked financial retrenchment by the sector.(1)(2)

This article focuses on the potential role of corporate financial health in investment behaviour in the early 1990s.(3) It does so by examining whether the theoretical predictions of a macroeconomic model explicitly designed to allow for interactions between real and financial factors are consistent with features of observed behaviour. The model used is the 'financial accelerator model' developed by Bernanke, Gertler and Gilchrist (BGG) (1999), described in the previous article in this *Bulletin*.

Recessions past

The depth and length of the UK recession of the early 1990s surprised many economists, particularly the sharp fall in corporate fixed investment. Several commentators have suggested that corporate indebtedness may have played a role. This section considers this possibility by reviewing historical evidence on investment and corporate financial conditions in recent recessions—with a particular focus on comparing the early 1990s downturn with the recession of the early 1980s.(4)

Spending compared

Table A reports changes in key components of gross domestic expenditure in recent major UK recessions. The table shows that GDP fell by a comparable amount in the downswing phases of the 1980s and 1990s recessions. But the contributions to each downturn varied markedly. Perhaps most notably, consumption fell as the economy entered recession in the early 1990s but supported the economy in the downturn phase of the early 1980s recession.

Table A
Real GDP components in recessions

Percentage change over nine quarters leading up to trough (a)

Trough	1975 Q3	1981 Q1	1992 Q2
Total GDP	-3.1	-2.6	-2.2
Consumption	-1.6	3.7	-1.4
Government consumption	7.7	2.3	4.6
Gross domestic fixed capital formation	-3.1	-10.0	-10.8
of which, business investment	*9.9*	*-6.7*	*-12.3*
Exports	2.7	-3.2	7.8
Imports	-2.9	-2.0	4.4

Source: Office for National Statistics (ONS).

(a) The average interval between peaks and troughs in coincident indicators in the three most recent major recessions (see Moore (1993)).

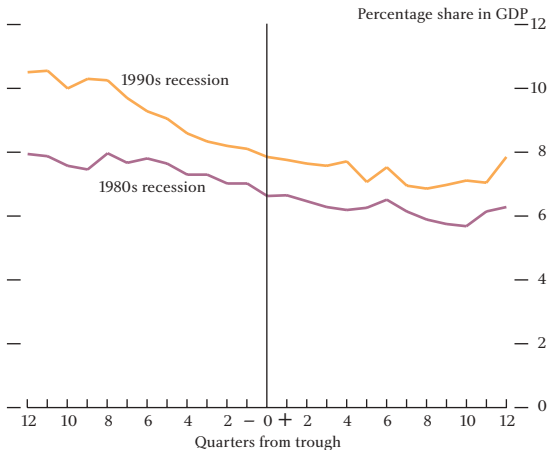
(1) References to the 'corporate sector' relate to non-financial companies only.
(2) Studies of investment behaviour over this period include Young (1993), Smith *et al* (1994) and Whitaker (1998).
(3) This is analysed in more detail in Hall (2001).
(4) This paper focuses on developments in the non-financial corporate sector. However, interactions between household sector financial conditions and spending may have been at least as important in the early 1990s. Potential household sector credit effects are considered in the article by Aoki, Proudman and Vlieghe on pages 460–68 of this *Bulletin*.

The profile of aggregate investment was broadly similar in the 1980s and 1990s downturns, and considerably weaker than in the 1970s recession. But these aggregate data hide sharp discrepancies in the behaviour of public and private investment. Public sector investment was relatively weak during the 1980s downturn, particularly following the 1981 Budget. By contrast, Budgets in the early 1990s tended to raise public sector investment spending. But business investment growth was considerably weaker in the early 1990s than in the 1970s and 1980s recessions: from a relatively high level at the end of the 1980s, business investment fell by around 12% in the period leading up to the output trough in 1992 Q2 and continued to fall until late 1993. In the equivalent period of the 1980s downswing, business investment fell by roughly half as much. Put another way, a fall in business investment accounted for about two-thirds of the GDP downturn in the 1990s recession compared with only about a quarter in the 1980s slowdown.

One possibility is that the sharp fall in investment in the early 1990s reflected particularly weak output growth or a high cost of capital—standard factors used to explain investment in economic models. But, as noted above, the change in GDP was broadly similar across the 1980s and 1990s recessions. Chart 1 shows that although investment by non-financial companies was higher as a share of output entering the early 1990s downturn, it fell more sharply relative to GDP than in the equivalent period of the previous recession.(1) It is difficult to measure the real cost of finance precisely. Chart 2 presents a simple proxy measure based on the ratio of companies' current earnings relative to the market value of their net financial liabilities.(2) According to this measure, the cost of finance was lower in the early 1990s recession than in the 1980s recession. As such, finance costs do not appear to help explain weaker investment in the most recent recession.

Given the apparent inability of GDP and the cost of finance to account fully for differences in investment behaviour in the early 1990s, we might expect economic models based largely on these explanatory variables to overpredict investment at that time. There is some evidence that a number of economic models failed to predict fully the slowdown in investment growth. Table B suggests that, on average, medium-term projections for aggregate investment made in January 1990 by

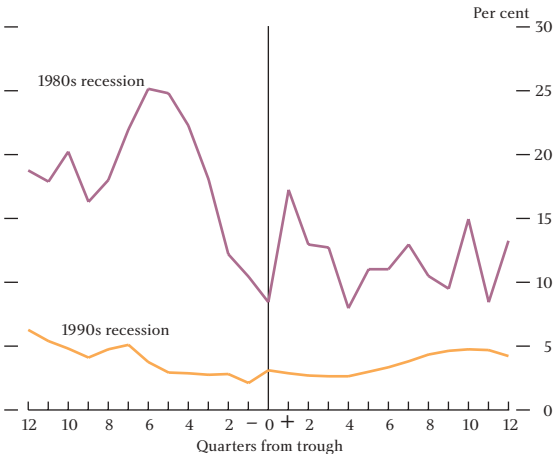
Chart 1
Corporate investment(a)



Sources: ONS and Bank of England.

(a) Industrial and commercial companies (ICCs).

Chart 2
Cost of finance(a)



Sources: ONS and Bank of England.

(a) Defined as ICCs' post-tax profits divided by the market value of their net financial liabilities.

Table B
Forecasts and outturns for gross fixed investment

Average of forecasts made in January 1990; per cent

	1989	1990	1991	1992	1993
Average forecast					
Annual growth in investment	5.7	0.7	1.2	3.5	3.3
Implied investment/GDP ratio	18.6	18.5	18.3	18.4	18.5
Outturns					
Annual growth in investment	5.9	-2.3	-8.7	-0.7	0.8
Actual investment/GDP ratio	18.6	18.1	16.8	16.6	16.4

Source: HM Treasury (1990).

HM Treasury's Panel of Independent Forecasters substantially overstated subsequent investment growth in the early 1990s. And total investment as a share of GDP fell more sharply over this period than the ratio implied by forecasts of investment and GDP, suggesting that this may not simply have reflected errors in GDP forecasts.

(1) The higher investment share in the late 1980s may be due partly to privatisations. Changes in the composition of the corporate private sector are likely to have affected most corporate sector indicators over the period of this study.
(2) This measure is discussed in Fleming *et al* (1976).

Financial conditions compared[1]

If these standard determinants of investment cannot fully explain behaviour over this period, can financial factors account for the unusual weakness of investment in the early 1990s compared with the early 1980s?

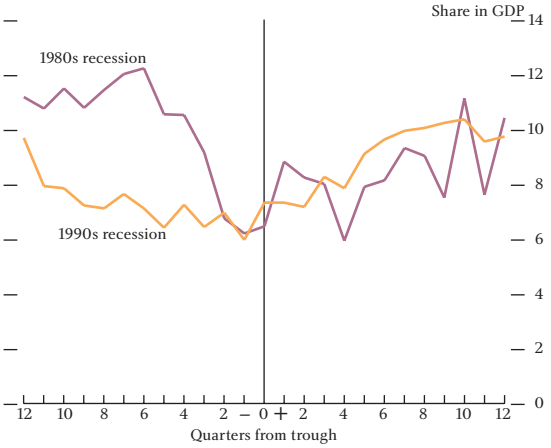
The initial financial position of the corporate sector was considerably less favourable at the start of the 1990s recession than prior to the previous downturn.[2] Several indicators suggest that corporate cash flow was weaker:

- Despite higher corporate profitability, large dividend payments in the late 1980s and early 1990s meant that companies' undistributed corporate income as a share of GDP was relatively lower (see Chart 3).

- Interest payments were a greater burden on corporate income entering the 1990s recession. Income gearing (interest payments as a share of post-tax income) was almost twice as high at the onset of the 1990s recession as at the previous downturn (see Chart 4), reflecting both weaker income and greater indebtedness (see Chart 5).

- As a result, companies were far more dependent on externally supplied finance in the 1990s recession. The financial deficit was around 4% of GDP entering the 1990s downturn compared with a *surplus* of about 1% at the start of the 1980s recession (see Chart 6).

Chart 3
Corporate undistributed income[a]



Sources: ONS and Bank of England.

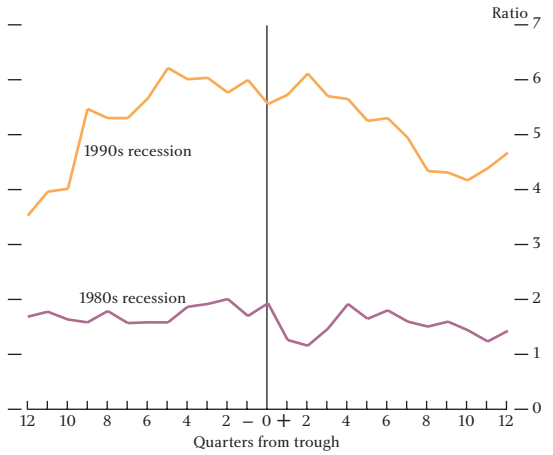
(a) ICCs.

Chart 4
Corporate income gearing[a]

Sources: ONS and Bank of England.

(a) ICCs pre-1987; private non-financial corporations (PNFCs) post-1987.

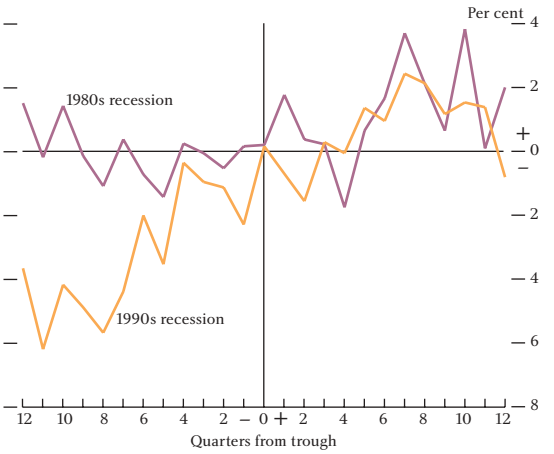
Chart 5
Corporate debt: income ratio[a]



Sources: ONS and Bank of England.

(a) ICCs pre-1987; PNFCs post-1987.

Chart 6
Corporate financial balance[a]



Sources: ONS and Bank of England.

(a) ICCs.

(1) Recent developments in corporate financial positions are discussed in the box on pages 6–7 of the August 2001 *Inflation Report* and in the *Financial Stability Review*, Issue 10, Bank of England, June 2001, pages 74–82. For a discussion of trends in corporate and personal sector financial health in recent recessions, see Chrystal and Hoggarth (1998).

(2) Note that fully consistent data for the financial position of the non-financial corporate sector are not available for the full period considered in this study.

Corporate balance sheet positions were also less favourable entering the 1990s downturn and weakened substantially as capital markets revised their expectations about future profitability:

- Confidence about future profitability and greater credit availability due to financial liberalisation contributed to a substantial build-up in corporate debt during the 1980s, heightening the sensitivity of the sector to interest rate changes (see Chart 5).
- Capital gearing, as measured by debt relative to physical capital, rose in the downswing of the 1990s recession to about four times its level in the 1980s downturn (see Chart 7).
- Capital gearing, as measured by debt relative to financial market valuations of corporate assets (including non-physical assets), started the 1990s downswing at similar levels to the equivalent period of the previous downturn but rose sharply as markets revised their valuations of corporate assets (see Chart 8).
- The persistent weakness of asset prices was an important distinguishing feature of the 1990s recession. Chart 9 shows the sustained weakness in real equity prices and falls in real house and commercial property prices in the early 1990s. As well as indicating marked revaluations of the present value of future asset returns, these asset price reductions lowered collateral available to back corporate borrowing.

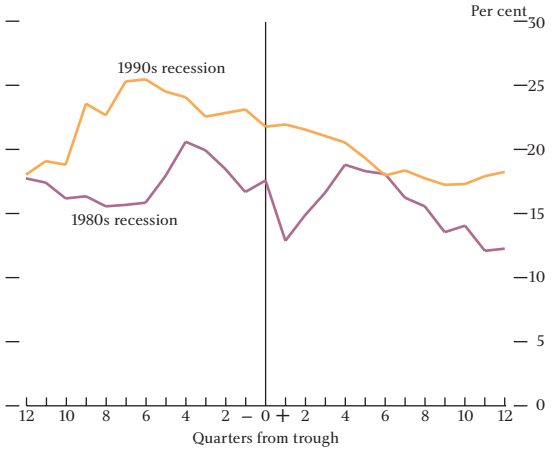
Overall, these *ex ante* indicators suggest considerably higher corporate financial fragility at the onset of the 1990s recession than at the start of the previous downturn. *Ex post* evidence subsequently pointed to greater corporate distress in the 1990s recession in response to the unanticipated weakening in economic prospects at that time. For example, default rates reached unprecedented levels, evident in sharp rises in the rate of corporate insolvencies (see Chart 10).

Chart 7
Corporate debt as a share of physical assets(a)

Sources: ONS and Bank of England.

(a) ICCs pre-1987; PNFCs post-1987.

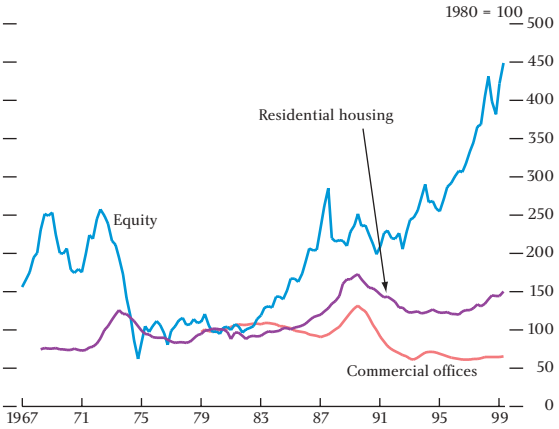
Chart 8
Corporate debt as a share of financial valuations of assets(a)



Sources: ONS and Bank of England.

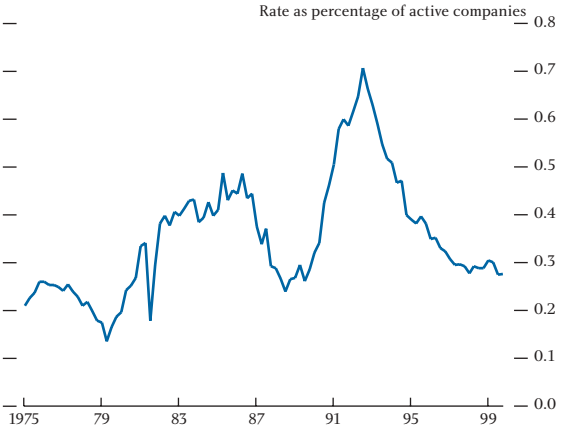
(a) ICCs pre-1987; PNFCs post-1987.

Chart 9
Real asset prices



Sources: ONS and Bank of England.

Chart 10
Insolvency rate



Sources: ONS and Bank of England.

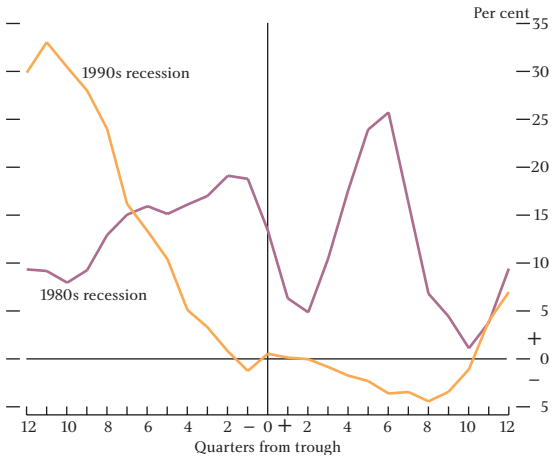
Finance demand and supply

One interpretation of the sustained weakness of investment in the early 1990s is that the unexpected deterioration in economic prospects led to a sharp fall in companies' desired levels of capital and indebtedness. Rather than invest, companies may have used internal funds to repay debt and reduce their potential sensitivity to future shocks. On their own, changed expectations about the returns from existing capital and a desire to strengthen their balance sheet positions should not have inhibited companies from borrowing to fund profitable new investment opportunities. But greater uncertainty about future demand (see Chart 12 below) may have raised risk premia embedded in corporate hurdle rates for investment.

It is also possible that the weakness of investment in the early 1990s might have partly reflected a tightening in the supply of finance. The willingness of lenders to satisfy corporate finance demand will depend on their assessment of the likely returns from lending. In general lenders will supply funds if loan rates exceed the cost of providing funds, including expected default costs. Lenders may assess default probabilities using *ex ante* indicators of borrower financial risk and/or *ex post* evidence on default. As noted above, these indicators of credit risk tended to be less favourable in the early 1990s downturn than in the previous recession and lenders may have adjusted rates on new loans accordingly. By itself, rising loan rates relative to risk-free rates in response to greater risk in lending does not represent a tightening in supply for equivalent-risk companies. But is there any evidence that loan rates or other terms of provision of funds rose by more than needed to offset higher credit risk? Did lenders stop offering funds to certain classes of borrower altogether? And did this inhibit new investment?

Over the course of the early 1990s recession, there was certainly a substantial weakening in flows of external finance to the corporate sector. The corporate financial balance, which measures total net flows of finance into the sector, moved from a large deficit to a surplus (see Chart 5). And within total financial flows, bank lending growth fell sharply, with firms on average repaying bank debt in the early years of the recovery (see Chart 11).(1)

Chart 11
Corporate bank lending growth(a)

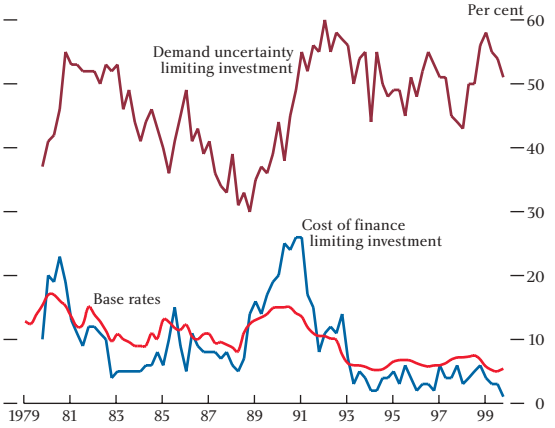


Source: Bank of England.

(a) ICCs.

In practice, however, it is extremely hard to judge whether lower volumes of finance reflected weaker corporate demand for funds or tighter finance supply.(2) We have little direct evidence on the actual loan rates and risk characteristics of lending to the corporate sector during the 1990s recession. One potential aggregate indicator is the CBI Industrial Trends survey, which showed a much sharper rise in the proportion of manufacturing respondents citing the cost of finance as a constraint on capital expenditure in the early 1990s than in the early 1980s (see Chart 12). And, importantly, this rise was greater than can be explained by the normal relationship between base rates and responses to this question, although this might just reflect deteriorating credit quality (evident in higher

Chart 12
CBI cost of finance



Sources: CBI and ONS.

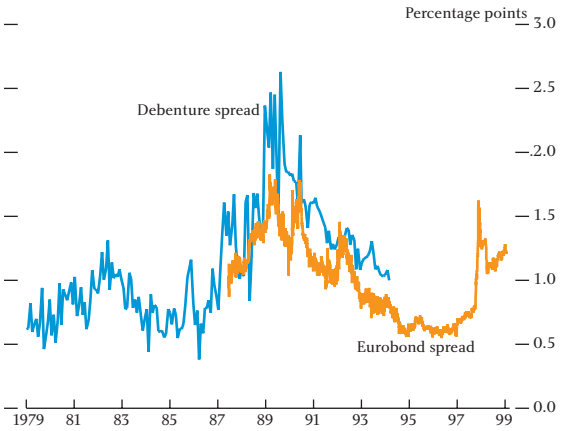
(1) Espezel and Mizen (2000) note that corporate non-bank external finance liabilities increased over this period. Kohler *et al* (2000) point out that higher non-bank finance might be consistent with a trade credit channel interpretation, with quoted firms 'helping out' those firms without direct access to capital markets.

(2) For example, evidence submitted by the Bank of England to a Treasury and Civil Service Committee in March 1991 concluded: 'There is little evidence that (lenders) have tightened standards beyond what is required, given the change in their customers' position and prospects'; see Bank of England (1991). Hickok and Osler (1994) found that 'slowing credit demand due to cyclical factors appears to explain some but not all of the recent slowdown in British credit growth (in the early 1990s)'.

insolvencies in the early 1990s) rather than a tightening in credit supply for equivalent-risk loans.

Corporate bonds offer an alternative source of finance for large borrowers. To the extent that prices of credit-rated corporate bonds reflect an assessment of average default risk over the duration of the bond, short-term shifts in bond spreads might help to identify whether finance costs shifted because of changing risk or due to tighter credit supply. Chart 13 shows the spread between bond rates for A-rated corporates and default-risk-free yields on government debt of comparable maturity. These spreads widened significantly more at the start of the 1990s than in the early 1980s downturn. It may well be that this widening in spreads simply reflected an equal shift in the risk of A-rated companies from the perspective of both borrowers and lenders (ie there was no shift in the external finance premium). However, it is also consistent with a tightening in the terms of finance supply and a rise in the external finance premium. That might have added to the demand-side factors weakening corporate investment.

Chart 13
Corporate bond spreads(a)



Sources: Bloomberg and Bank of England.

(a) Proxy measures defined as yields on debentures or corporate eurobonds minus approximate equivalent-maturity yield on risk-free government debt. Corporate bond yields are derived as a composite of investment-grade company debt.

Modelling financial effects

Many theoretical models of aggregate investment make the simplifying assumption that corporate financial conditions have no effect on investment behaviour. However, growing empirical evidence, particularly in the United States, supports a role for corporate financial health in determining investment.(1) In addition, a recent theoretical macroeconomic model by Bernanke, Gertler and Gilchrist (1999)(2) explicitly considers ways in which corporate financial health and investment may interact when capital markets operate with imperfect information about the risks involved in finance provision. In this model, lenders are unable costlessly to observe and assess companies' ability to repay borrowed funds. So borrowed funds tend to be a more costly source of finance for investment than retained profits. BGG show that this cost differential—the 'external finance premium'—might vary with borrower financial health. Specifically, when borrowers can finance much of their investment using retained profits, the cost of finance will be low, encouraging investment. And when companies are heavily dependent on external financing, finance costs will tend to be higher, discouraging investment. This added financial effect can amplify and prolong the impact of shocks to the economy.

Historic relationships between financial variables and investment

Are the theoretical predictions of the BGG model consistent with actual developments in investment and corporate financial health in recent recessions? A starting-point for assessing the BGG model's theoretical predictions is to consider average historic relationships between these variables in the UK economy. Chart 14 shows how business investment, corporate external funding, real GDP, real equity prices and corporate bond spreads have responded on average to unexpected interest rate rises.(3) The chart suggests that on average companies' total net flow of external funds, as measured by the financial deficit, has fallen after monetary tightenings. As might be expected, output and particularly investment have declined. And equity prices have weakened, perhaps as markets have anticipated lower future yields. Finally, there appears to be no statistically significant response of bond spreads for A-rated corporates.

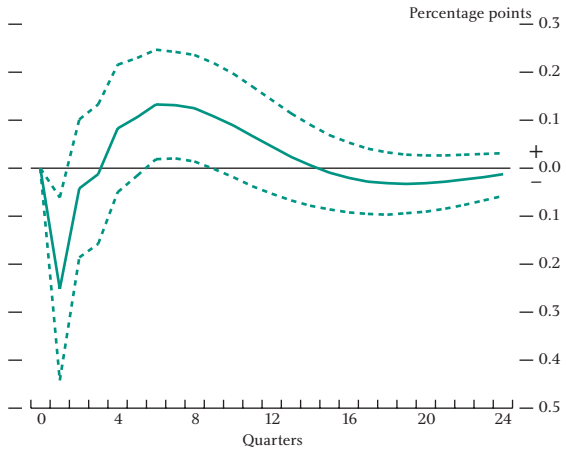
Relationships between financial variables and investment in the BGG model

How do these actual responses compare with the behaviour of these variables in the BGG model economy? To investigate this we set parameters in equations of the BGG model roughly to approximate

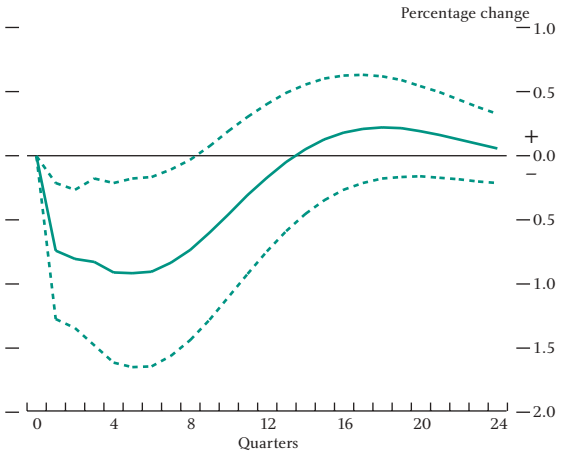
(1) Hubbard (1997) provides a survey of US evidence. UK studies include Devereux and Schianterelli (1990) for corporate fixed investment and Small (1997) for inventory investment.
(2) Described in 'Credit channel effects in the monetary transmission mechanism' on pages 442–48 of this *Bulletin*.
(3) As estimated using an econometric vector autoregression model.

Chart 14
Estimated average responses to interest rate rises(a)

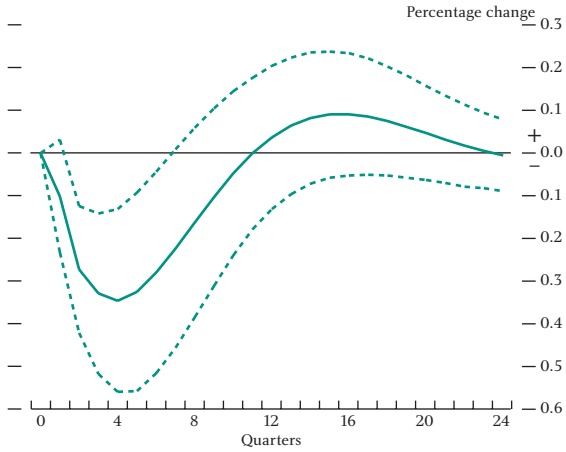
Response of financial deficit



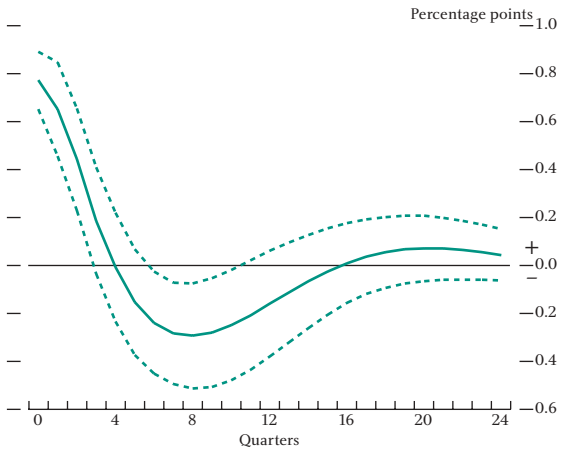
Response of investment



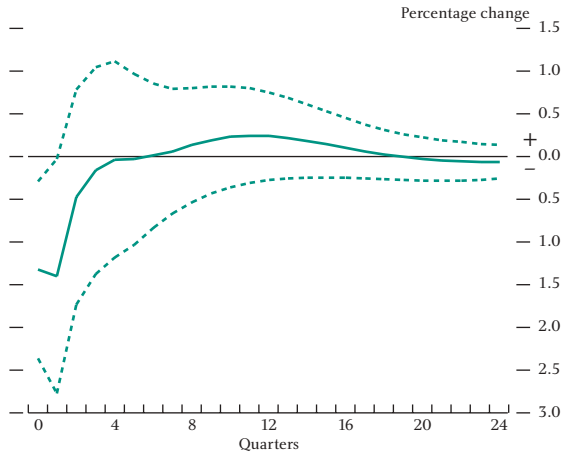
Response of output



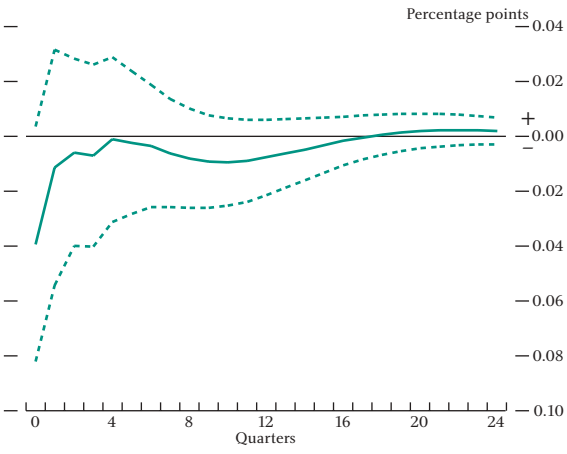
Response of interest rate



Response of share prices



Response of bond spreads



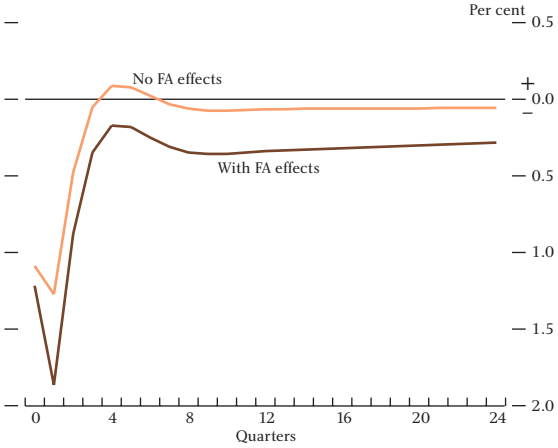
(a) Response to a one standard deviation (about 80 basis points) interest rate shock. Dashed lines mark bands of plus and minus two standard errors.

actual relationships and structural features of the UK economy. A key parameter relates to the financial position of the corporate sector. Theoretically, calibration of corporate financial conditions in the BGG model requires an estimate of the proportion of the corporate capital stock that is financed using companies own internal funds and/or backed by collateral. In the United Kingdom, the share of debt on corporate balance sheets has been low historically (relative to, say, the United States) and the share of traded equity correspondingly high. Using this financial health indicator to calibrate the model would yield weak financial effects. However, the *internal* equity of the corporate sector—that is, companies' own stake in financing their production activities, which might help lenders to assess potential default risk—may be overstated by the value of *traded* equity. As such we set the BGG financial health parameter using the share of internally-generated finance (ie profits) in total financial *flows* to the sector (in this benchmark comparison this is set at 60%, the approximate average for the whole period since 1978).

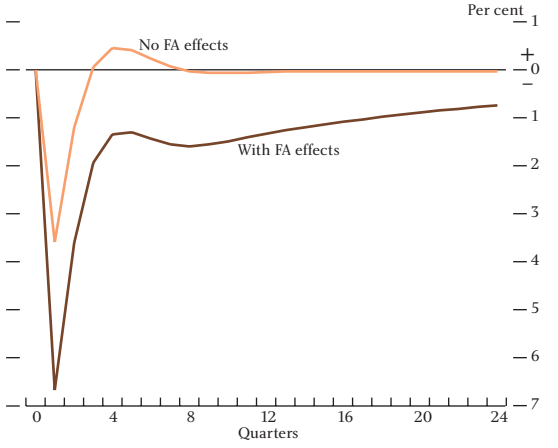
Chart 15 shows how key variables in the BGG model respond to a simulated similar unexpected rise in interest rates when financial conditions are set to reflect UK historical average internal finance shares in investment. As seen in the estimated responses of actual data, investment and output fall after an unanticipated rise in interest rates, although the initial quantitative impact in the model is much larger than in the data. The spread of rates charged for external funds over risk-free interest rates (the external finance premium) rises slightly—reflecting the negative impact in the model of higher interest rates on corporate profits and collateral—while estimated average actual responses of bond spreads show little change. The chart also shows simulated responses based on the BGG model, but with the financial effects 'switched off' (ie the cost of external finance does not respond to shifts in the financial position of firms). These results show how financial effects in the model add to the size and persistence of the responses of investment and output to interest rate rises.

Chart 15
Model economy

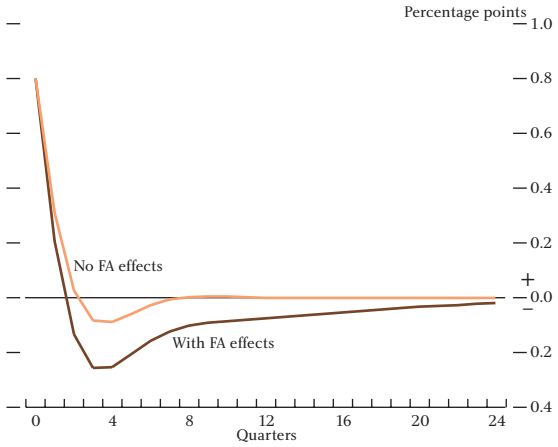
Output



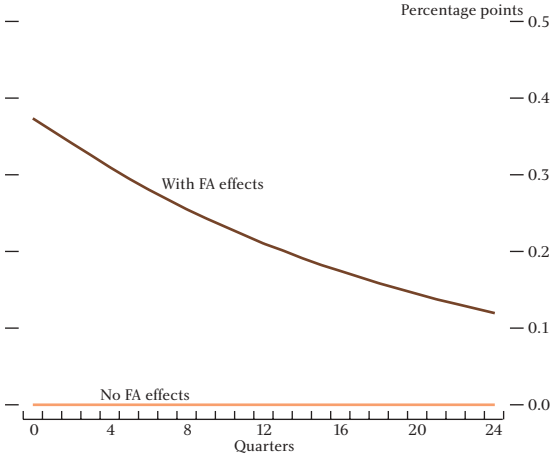
Investment



Nominal interest rate



External finance premium



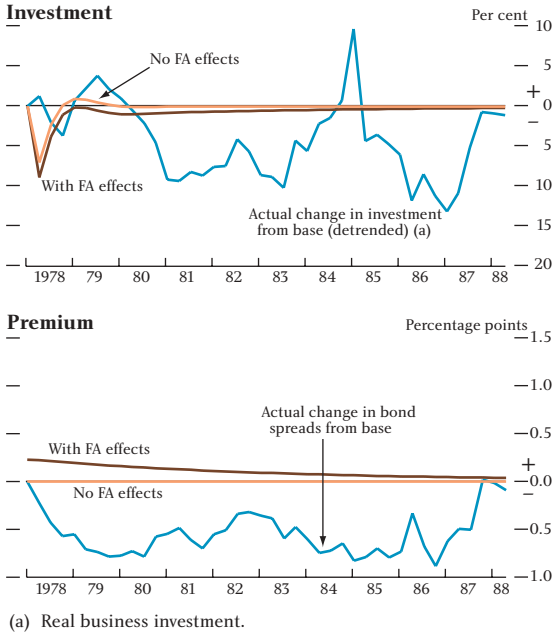
Time-varying financial effects

At face value, the limited response of external finance spreads in actual data seems to suggest that financial effects may have been of little importance in the United Kingdom. However, we cannot exclude the potential for such effects on these results alone. It may well be the case that the strength of interactions between investment and corporate financial health has varied over time. As such, our average estimates in Chart 14 may have covered periods when financial effects may have mattered and periods when they probably did not. Chart 13 lends some support to this view. Bond spreads actually fell at the start of the early 1980s downturn but rose sharply in the early 1990s downturn.

Can we use the BGG model as a tool for understanding ways in which corporate financial effects may have varied over time? In this section we attempt to illustrate how one might, by running some simple experiments based on investment behaviour in the recessions of the early 1980s and 1990s. In each experiment the parameter capturing the financial position of the corporate sector is reset broadly to match internal finance shares at the start of each downturn. We noted above that the financial condition of the UK corporate sector was less favourable at the onset of the 1990s recession than at the start of the 1980s downturn. In each case, we simulate the effect of unexpected increases in interest rates on the model economy, assumed for simplicity to equal actual rises in official interest rates in 1978 and 1988 (although these rises may well considerably overstate actual monetary 'shocks' at these times). We also abstract from the other shocks hitting the economy over these periods. Finally, we compare our simulations with actual changes in (detrended) investment and bond spreads from their starting levels in these periods.

Chart 16 shows simulations of the impact on our model economy of the rise in interest rates in 1978, with initial financial conditions set to approximate the relatively low external borrowing of the corporate sector at that time.(1) Comparison of model responses with and without financial accelerator effects suggests that those financial effects may not have added greatly to the impact on investment of the monetary tightening in this period—perhaps not surprising given the relatively low dependence of the corporate sector on external finance at the time. There is a slight rise in the premium on external finance in our simulation, contrasting with the actual falls observed in bond spreads (although Chart 12 suggests that spreads on other forms of finance may have risen at this time).(2)

Chart 16
1980s recession experiment



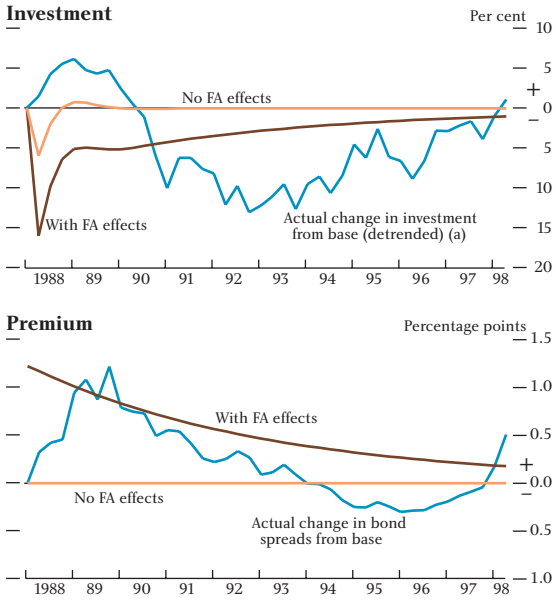
(a) Real business investment.

Chart 17 reports results for an experiment for the 1990s recession. Here financial effects are more potent in our simulations, reflecting the less favourable initial financial position of the UK corporate sector.(3) After the initial rise in interest rates in 1988, actual investment continued to rise but then fell sharply and remained below its starting-point for some time. As in previous experiments, these simple simulations of our stylised model economy do not adequately capture this short-run behaviour of actual investment. But the simulations do seem to suggest that weaker financial health might have contributed to the persistent weakness of investment particularly when compared with results from the model economy without financial effects. An important factor leading to sustained weak investment in the model is lower asset prices (which, as noted earlier, were an important distinguishing feature of the period). Lower asset prices, together with higher interest rates, weaken the financial position of an

(1) Specifically, the internal finance share is set to 75%. The economy is hit in 1978 Q1 with a monetary shock of 150 basis points (approximately equal to the overall change in base rates in the year from 1978 Q1 at a quarterly rate).
(2) The anomalous fall in bond spreads in the early 1980s might have been related to the thinness of the corporate bond market at that time. See Davis (1992) for a discussion of historic trends in the UK corporate bond market.
(3) Here the internal finance share is low at 40%. A 125 basis points monetary shock hits the economy in 1988 Q2 (approximately equal to the change in rates over the year from 1988 Q2 at a quarterly rate).

indebted corporate sector, leading to a rise in the external finance premium. As the charts show, the model economy broadly mirrors movements in corporate bond spreads over this period, with an initial rise and then gradual decline in the external finance premium charged over base rates.

Chart 17
1990s recession experiment



(a) Real business investment.

Conclusions

This article has explored the potential different role of financial factors in corporate investment behaviour in the 1980s and 1990s recessions. Companies were much more dependent on external finance in the early 1990s downturn and investment was relatively weaker. The article uses a macroeconomic model, which includes potential for financial effects, as a tool for analysing possible shifts over time in the strength of interactions between corporate financial conditions and investment. Model simulations suggest that financial effects may have been more important in the early 1990s recession than in the 1980s recession.

Clearly these simple experiments cannot hope to explain the complexities of investment behaviour in recent recessions: the article does not claim that financial accelerator effects were the single, or even the most important, determinant of corporate investment behaviour in the early 1990s recession. But the model-based results do illustrate that relationships between financial conditions and real behaviour can vary substantially over time. In this way, the exercise highlights the importance of monitoring interactions between corporate financial fragility, finance supply and investment spending.

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