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# Learning the rules of the new game? Comparing the reactions in financial markets to announcements before and after the Bank of England's operational independence

*Working Paper no. 255*

Ana Lasaosa

Increased transparency is a stated aim of the new operational framework for UK monetary policy introduced in 1997. Several features of the new framework are designed to increase the accountability and transparency of the monetary policy process. Four Monetary Policy Committee (MPC) members are external to the Bank, and the individual votes are published in the *Minutes*. The nine members of the MPC give speeches laying down their views on particular economic issues. On top of this, the contents of the *Inflation Report* have changed since Bank independence. The *Inflation Report* — introduced shortly after the change to inflation targeting in 1992 — has increased its average number of pages from around 45 to 50, including a new section on 'Monetary policy since the previous *Inflation Report*'. It has occasionally featured a table with alternative scenarios for the inflation forecast. The *Minutes* now include a discussion of alternatives that the MPC considered but did not adopt, plus the reasoning behind its stance. The MPC members have a clear mandate and operational independence without political interference.

This paper uses high frequency data to analyse how the Bank of England's operational independence has changed the way in which markets react immediately after economic releases. Other things being equal, the increase in transparency embedded in the new framework will make monetary policy more predictable once the latest macroeconomic data are known. On this view, the market will be less sensitive to interest rate decisions and more sensitive to macroeconomic data releases.

Previous research on the subject showed a more muted immediate reaction to macroeconomic releases in the United Kingdom after 1997; this suggested that markets were still learning the rules of the new monetary framework. Using two more years of data, this paper finds that that is still the case. Macroeconomic releases continue to move the markets less in the extended

post-independence period, and interest rate changes the same or more. The significance of the difference has in fact increased with two years of data in the case of macroeconomic announcements, and it is robust to the measure of central tendency — the mean or the median — used.

This paper complements the study of price variation with an analysis of trading activity (trades and number of contracts). We find that the differences in trading activity between the two periods tend to mirror the differences in price variation. A separate analysis of unexpected announcements and the surprise component of each announcement reveals a similar pattern. Nor is the possible greater impact of international announcements — another candidate explanation — borne out by the data. Finally, a comparison of the two halves of the post-independence period shows that the reactions to macroeconomic announcements are indeed stronger in the second half. There are tentative signs of a more muted reaction to interest changes, but they lack statistical significance.

An increase in transparency was not the only change brought about by operational independence. The decision-making body is now a committee with nine members. This collective nature may make their decisions harder to anticipate, thus decreasing the response to macroeconomic releases and increasing the reaction to monetary policy decisions. If the interest rate process, though transparent, cannot be observed in real time and is the outcome of a discussion in which new information may result, then the interest rate decision could still be the important price-mover despite the increase in transparency. It is also plausible to argue that the new framework shifted the reaction function of the monetary authority towards a more implicit instrument (or targeting) rule, which involves less reaction to macroeconomic announcements than explicit rules.

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# Comovements in the prices of securities issued by large complex financial institutions

*Working Paper no. 256*

Christian Hawkesby, Ian W Marsh and Ibrahim Stevens

In recent years, mergers, acquisitions and organic growth have meant that some of the largest and most complex financial groups have come to transcend national boundaries and traditionally defined business lines. As a result, they have become a potential channel for the cross-border and cross-market transmission of financial shocks, which is especially relevant for analysis of financial stability in an international financial centre such as London.

To identify the degree to which large complex financial institutions (LCFIs) have exposures to common factors, this paper analyses the degree of comovement in the prices of securities issued by a selected group of LCFIs — more specifically, their share price returns and movements in their credit default swaps (CDSs). A number of techniques are employed to analyse information from the correlation or covariance matrices of these asset prices, including heat maps of correlations, cluster analysis, minimum spanning trees, principal component analysis and factor modelling.

Such an analysis of comovement in market prices captures both market perceptions of direct exposures between LCFIs and exposures to similar external factors. Knowledge of these common factors could help to identify potential channels for financial stability threats, such as through interlinkages between LCFIs or common

vulnerabilities. The approach used does not, however, attempt to capture the degree of contagion that may occur during periods of financial stress, as the empirical estimation does not focus exclusively on such periods.

The various techniques applied to analyse comovement provide corroborating results for our peer group of LCFIs. Across the techniques employed, we find a relatively high degree of commonality in the asset price movements of LCFIs (compared with a control group of size/country-matched non-financials). This emphasises the relevance for financial stability of monitoring LCFIs as a special class of financial institutions.

However, there is also clear evidence that a divide still exists between US and European institutions within the LCFI group. Some segmentation is also evident along national lines within Europe and between pure brokerage houses and the banking-oriented institutions. Despite the liberal inclusion of unobserved factors to explain movements in the securities prices of LCFIs, around a quarter of equity returns' variance and a quarter of the variance of CDS price changes has to be allocated to unexplained or idiosyncratic factors on average. So despite recent mergers and acquisitions, LCFIs do not yet form a purely homogeneous group affected equally by common factors.

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# The role of ICT in the global investment cycle

*Working Paper no. 257*

Michael McMahon, Gabriel Sterne and Jamie Thompson

Most macroeconomic forecasters underestimated the volume of global investment during the late 1990s. One potential reason was that the models they were using were insufficiently disaggregated.

We extend previous international empirical models of investment in a number of ways. Following approaches for the United Kingdom and the United States that have demonstrated the benefits from estimating disaggregated investment equations, we use a data set that enables us to disaggregate non-residential investment into information, communications and technology (ICT) and non-ICT assets for all G7 countries and Australia. Furthermore, we calculate for each country a measure of the real user cost of capital that is more richly specified than has generally been the case in cross-country studies. We employ a Hall-Jorgenson real user cost of

capital measure that specifies roles (among others) for the price of investment goods relative to that of other goods in the economy; the real interest rate faced by firms (including corporate spreads); and the cost of equity finance.

The various innovations in our approach and the use of more disaggregated data result in improved econometric performance. Our estimated disaggregated system of investment equations yields out-of-sample forecasts that largely explain the global investment boom in the late 1990s. They suggest very strong relative price effects on ICT investment for all countries in our sample, and it is this sensitivity that accounts for the much improved forecasting performance of our model relative to previous approaches.

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# Estimating UK capital adjustment costs

*Working Paper no. 258*

Charlotta Groth

The aim of monetary policy is to keep inflation low and stable, in accordance with the target set by the Chancellor. A key influence on inflationary pressure is the balance between the demand for, and the economy's capacity to supply, goods and services. This capacity depends both on the quantities and qualities of the primary inputs into the production process — capital and labour — but also on the efficiency with which they are combined. The latter concept is often referred to as total factor productivity (TFP). A good knowledge of current and past productivity growth is therefore important for understanding aggregate supply activity, and so is relevant for the conduct of monetary policy.

To obtain a good measure of TFP growth, it is important to measure output and factor inputs correctly. There are a number of issues that need to be addressed. For example, the composition of aggregate inputs changes over time, and it is important to recognise and adjust for this. Also, the level of utilisation of the inputs may vary over the business cycle, which needs to be taken into account. It may also be costly to change the level of factor inputs, and adjusting for these costs may be important to better understand fluctuations in measured TFP growth.

The purpose of this paper is to get a better understanding of the costs associated with changing the level of capital; capital adjustment costs. The motivation for considering these types of costs is that when firms are investing in capital, they may need to divert resources to installing new capital rather than producing marketable output. This means that in periods of rapid investment growth, firms could be producing two types of products: the final product sold in the market and the services used within the firm to install capital. Marketable output may therefore be lower in periods of high investment growth, and this would cause a downward bias in estimates of measured productivity growth.

Simple plots of the standard measure of TFP growth (the Solow residual) and investment growth suggest a negative relationship between these series: TFP growth

has fallen in periods of high investment growth, such as the late 1980s and the second half of the 1990s.

There are a number of studies that estimate capital adjustment costs for US data, but little is known about the importance of these costs for the United Kingdom. The main purpose of this paper is therefore to provide estimates of UK capital adjustment costs, using a newly constructed industry data set for 34 UK manufacturing and services industries, for the period 1970–2000.

The results are applied to an analysis of the second half of the 1990s: a period when TFP growth fell relative to the first half of the 1990s in the United Kingdom, while rising sharply in the United States. This period exhibits high growth in investment in information and communications technology (ICT). Separate estimates of adjustment costs are therefore provided for ICT and non-ICT capital. The results suggest that there exist significant adjustment costs for traditional non-ICT assets (plant and machinery, buildings, vehicle and intangibles). By contrast, there is less support for costly adjustment of ICT capital (computers, software, telecommunications equipment). We find some evidence that UK adjustment costs for non-ICT capital are larger than comparable estimates for the United States, while the cost of installing new ICT equipment appears to have been lower than those facing US firms.

The data set includes data for services industries, such as finance and business services. The output share of these industries has grown rapidly over time, and services industries also exhibited strong investment growth during the 1990s. Sectoral results suggest that it may be more costly to install capital in fast-growing services industries, than in more traditional manufacturing industries.

Finally, we find that capital adjustment costs accounted for around two thirds of the observed slowdown in UK TFP growth in the second half of the 1990s. However, the adjustment is not large enough to reverse the finding that UK TFP growth declined in the second half of the 1990s, unlike the US experience of rising TFP growth.

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# Productivity growth in UK industries, 1970–2000: structural change and the role of ICT

Working Paper no. 259

Nicholas Oulton and Sylaja Srinivasan

The aim of this paper is to quantify the importance of structural change and of investment in information and communication technology (ICT) in accounting for the growth of productivity in the United Kingdom.

The context is a puzzle about UK productivity in the 1990s. Though in other respects — inflation, unemployment, and job creation — the economy has done well since emerging from the 1990–92 recession, and though productivity growth has been quite rapid, it slowed down after 1995. This was in contrast to the United States which experienced a rise in productivity growth in 1995–2000, widely believed to be associated with the ICT investment boom. Why did nothing comparable happen in the United Kingdom?

*The Bank of England industry dataset (BEID)*

We use a new industry dataset, containing annual data for 34 industries spanning the whole UK economy (of which 31 industries are in the market sector), running from 1970 to 2000. The dataset satisfies two important principles. First, it is consistent with the national accounts in both nominal and real terms. Second, industry output is measured gross, so that proper account can be taken of the contribution of intermediate input to productivity growth.

*Structural change*

We considered several different forms of structural change including:

- (1) A change in the degree of inter-relatedness of domestic industries, ie a change in the proportion of each industry's total costs accounted for by buying from other industries. We found that inter-relatedness has risen fairly steadily since 1970 (apart from a dip in the early 1980s). According to growth accounting theory, this means that, even if the growth rates of total factor productivity (TFP) had been constant in individual industries, the aggregate TFP growth rate would still have risen.
- (2) A shift in the composition of output towards industries with a high or low level of labour productivity, tending either to raise or lower the aggregate labour productivity growth rate. We found however that aggregate labour productivity growth was predominantly due to labour productivity growth in individual industries, not compositional changes.

*Productivity growth in the market sector: a growth accounting analysis*

Since 1979, input growth (capital deepening plus labour quality growth) has accounted for three quarters of labour productivity growth in the market sector (ie the whole economy excluding the government sector), while capital deepening alone has accounted for more than half. TFP growth accounted for 28% of labour productivity growth in 1979–90 and for 35% in 1990–2000; reallocation effects accounted for the remainder.

Over the three decades, ICT capital services per hour have grown at a remarkable 22.0% per year, while non-ICT services per hour grew at only 3.3% per year. Interestingly, ICT capital services were growing more rapidly in the 1970s than in the 1990s. But their contribution to overall deepening was lower. This was because in the 1970s the share of ICT capital in income (ie profit attributable to ICT assets as a proportion of GDP) was less than 2%, while by the 1990s it had tripled to more than 5%. The share of ICT capital in income is now about the same as in the United States but ICT capital stocks per capita are still significantly lower in the United Kingdom.

We find that ICT capital accounted for 13% of growth in the market sector in 1970–79 (ie 0.47 percentage points out of 3.62% per annum growth of GDP per hour), 26% in 1979–90, and 28% in 1990–2000. In 1995–2000 the proportion rises to 47%. ICT capital, despite only being a small fraction of the total capital stock, contributed as much to growth as non-ICT capital in 1990–2000 and getting on for twice as much in 1995–2000.

*Testing the growth accounting assumptions*

The growth accounting analysis makes a number of strong assumptions. So we test these assumptions econometrically by panel regression analysis. We find that the growth rate of labour productivity is more strongly associated with the growth of ICT than with that of non-ICT capital. But the association between productivity and ICT capital gets stronger and more significant statistically as the period over which growth is measured gets longer: over one year the association is low and statistically insignificant, but over five years it is large and highly significant.

*Complementary investment and capital*

It is often argued that successful implementation of an ICT project requires costly reorganisation of the firm around the new technology. By incurring current costs, the firm acquires a capability that helps it to absorb new technology in the future. In other words, the investment in reorganisation creates a stock that yields future benefits. The empirical difficulty is that this type of 'complementary' investment is not measured as such in the national accounts.

The effect on the estimation of TFP is quite complex. Omitting the contribution of growth in the stock of complementary capital biases the estimate of TFP growth upwards, while omitting the contribution of the growth in complementary investment biases it downwards. In a boom investment tends to grow more rapidly than capital, leading to a net downward bias. Simulation shows that the bias can be quite large. We also estimate the bias econometrically on our panel of industries, using ICT capital as a proxy for complementary capital. We find, in accordance with the theory, that ICT capital significantly increases TFP growth, while ICT investment significantly reduces it. So a surge in complementary investment accompanying the surge in ICT investment in the second half of the 1990s may explain some at least of the observed slowdown in TFP growth.

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# Financial constraints and capacity adjustment in the United Kingdom: evidence from a large panel of survey data

*Working Paper no. 260*

Ulf von Kalckreuth and Emma Murphy

Recent research has shown that the causes and effects of financial constraints for firms in the private sector is of key importance for a variety of policy issues relevant to central banks. First, the quantitative and qualitative features of monetary transmission depend on whether or not borrowing and other financial constraints have important effects on the real economy. Second, the real consequences of shocks to the financial system depend on the way in which firms cope with their financial constraints. Due to the interrelationships between firms, financial constraints also may form part of a propagation mechanism creating systemic risk. Third, financial constraints might be especially relevant for investment activities that are difficult to raise finance for but quite important for economic growth, such as research and development, or the introduction of innovative products and processes.

Survey data have a decisive advantage over other micro data sources: firm managers can be directly asked for the main constraints to their activities. Unlike balance sheet information, these data are available in a timely manner. Potentially this makes them a valuable direct tool in policy analysis compared to indirect methods of detecting financial constraints that rely on ambiguous cash-flow sensitivities. However, it is necessary to make sure that managers' statements are compatible with how economists use the concept of financial constraints: their survey responses need to correspond to what theoretically might be expected in a financially constricted environment.

We are able to use the *CBI Industrial Trends Survey (ITS)*, which is an important survey for business cycle analysis in the United Kingdom. For the eleven years between January 1989 and October 1999, the cleaned, unbalanced panel contains 49,244 quarterly observations on 5,196 firms. According to the CBI, the *ITS* represents around 33% of total UK manufacturing employment. The data set covers all size ranges, including small firms for which very little information is available from other micro data sets. More than 63% of the *ITS* observations cover firms with less than 200 employees. On average, around 21% of respondents state that they are constrained by inadequate amounts of finance, and that these constraints have an influence on their investment plans.

First, we describe the financing environment for small firms in the United Kingdom during the 1990s. We then

present our data set by means of descriptives statistics. At this stage, the differences between large and small firms appear modest. We proceed to examine the usefulness of our data on financial constraints. Our focus is on capacity adjustment as the *ITS* data on capacity restrictions, planned expansion and rates of capacity utilisation are especially rich. Firms report whether their capacity is insufficient with respect to demand. Those firms which indicate financial constraints should have insufficient capacity often and take longer to get rid of their capacity restriction, either because they are less able to finance their investments or else because the capacity shortfall is larger.

To test this prediction, we first look at the statistical association between two types of constraints: capacity restrictions and financial constraints. We test whether those two types of constraints tend to occur jointly. Then we analyse the duration of capacity gaps with respect to spells of capacity restrictions. To the best of our knowledge, the duration of capacity constraints has never been investigated before on a microeconomic level.

For both size classes, we find a clear contemporaneous association between the two types of constraints. This association stays intact when we look at whether capacity constraints were present in the previous period. With respect to duration, financially constrained firms take longer to end a period of insufficient capacity. On average, the actions taken by a firm to close its capacity gap will leave it with a level of capacity that is about 20% lower if it is financially constrained, compared to a firm that does not report financial constraints. This is entirely consistent with the results we obtain from association analysis.

We conclude that the survey data contain useful information on financial constraints.

Splitting the sample shows that the relationship between financial constraints and the duration of capacity restrictions is weaker for larger firms, indicating that financial constraints might be of less relevance to their activity. On the other hand, small firms appear able to overcome their capacity shortfalls faster than larger firms. This might indicate that small firms, due to flat hierarchies and low co-ordination costs, are more flexible in coping with the demand shocks typical for their size.

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# Default probabilities and expected recovery: an analysis of emerging market sovereign bonds

*Working Paper no. 261*

Liz Dixon-Smith, Roman Goossens and Simon Hayes

In this paper information contained in bond prices is backed out to assess credit risk in emerging market economies (EMEs). As a first step a model is set out which is used to decompose bond prices into its constituent parts — in particular default probabilities and expected recovery rates. The model is then applied to a group of EME sovereign bonds. This enables a judgement to be made among other things, on whether the model is useful to gain some insight into recent emerging market crises.

Yield spreads on EME sovereign bonds reflect, in part, market perceptions of the risk of default and expected recovery in the event of default. Typically, indices of average bond yield spreads are used to evaluate how the market's perception of credit risk evolves over time. However, backing out 'fundamental' determinants such as default probabilities and recovery rates is not straightforward. Moreover, there is information in the term structure on the probabilities of default in the near term that cannot be inferred from simple indices of average spreads.

There are a number of ways to extract this information but two types of models that are commonly used are structural and reduced-form (intensity-based) ones. A simple 'reduced-form' approach is followed in this paper. The model is augmented to incorporate information from the yield curve by introducing a more realistic distributional assumption for the risk-neutral probability density function. A Weibull distribution is assumed which allows the level and the slope of the

probability of default structure to be derived. It also enables useful summary statistics (such as the median time to default) to be calculated which gives a greater insight into the development of credit perceptions. The model also allows time-varying recovery rates to be estimated simultaneously with the probability of default.

The model is applied to six EMEs: Argentina, Brazil, Colombia, Mexico, Russia and Turkey over the January 2000–July 2002 period. For all countries, investors' perception of the (risk-neutral) probabilities of default at different maturities and the expected half-life to default are backed out. Long-term probabilities of default are found to be highly correlated with the spread. However, short-term probabilities behave quite differently indicating that there are periods of high volatilities that seem to coincide with market-wide uncertainty. Time-varying recovery rates are assumed for countries facing financial difficulties in the short term — such as Argentina and Brazil — and the empirical results are consistent with this assumption. In other words, investors seem to perceive that recovery rates fall significantly when default seems imminent. Finally, movements in the median time to default generally appear plausible — falling when credit conditions deteriorate and rising when they improve — both across time and country.

Notwithstanding problems with the paucity of data for some EMEs, the findings of this paper shed light on recent sovereign crises.

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# The impact of unsecured debt on financial distress among British households

*Working Paper no. 262*

Ana Del-Río and Garry Young

Unsecured borrowing by British households, mainly in the form of personal loans, overdrafts and credit cards, has grown rapidly over the past decade or so. This has led to widespread concerns that many households have taken on more debt than they can easily afford, with possible future consequences for macroeconomic and financial stability.

This paper examines survey evidence on the extent to which households consider unsecured debt to be a burden, using this as an indicator of financial distress. Its aim is to quantify the level at which unsecured debt becomes a problem for the typical household and what other factors affect this outcome. The paper uses evidence for 1995 and 2000 from the British Household Panel Survey (BHPS), which since 1995 has questioned households about their attitudes to unsecured debt.

We examine how attitudes to debt are related to survey measures of the amount of debt that people have and its affordability. We find that, in general, there is a clear link between the subjective measure of financial distress and indicators of the affordability of debt. Our estimates suggest that the main determinant of debt problems is the unsecured debt to income ratio. There is no clear point at which debt becomes a problem, but our analysis suggests, for example, that having an unsecured debt-income ratio above 12% (the 70th percentile of households with any debt) adds at least 17 percentage points to the probability of unsecured debt being somewhat of a burden and 4 percentage points to the probability of it being a heavy burden, compared to households without any debt. Nevertheless, our estimates also show a general softening in attitudes towards debt, since the higher debt to income ratios observed in 2000 did not lead to an increasing likelihood of reporting debt to be somewhat or a heavy burden. We attribute this to the greater affordability of debt in 2000.

Other than the unsecured debt to income ratio, the most important factors affecting the likelihood of a household reporting debt to be somewhat of a burden in

2000 were the level of mortgage income gearing, the level of financial wealth of the household, their health, ethnicity and marital status. Having mortgage income gearing above 20% of income added about 9 percentage points to the probability of reporting debt to be somewhat of a burden. Being unemployed was also associated with a higher probability of reporting debt problems.

While the proportion of households reporting debt problems did not change between 1995 and 2000, there were important shifts among different groups. In particular, more households in the youngest age group reported debt repayments were a heavy burden in 2000, while the opposite applies to the oldest age group where a smaller proportion of households than in 1995 reported debt was a heavy burden. By income group, the main change was a sharp fall in 2000 in the proportion of very low income households who reported that debt was a heavy burden.

The paper shows that these changes can largely be accounted for by the changing economic circumstances of different groups rather than an unrelated shift in attitudes. The increase in the median debt to income ratio of the young from just under 8% in 1995 to a level between 10% and 14% in 2000 was the main factor accounting for their greater tendency to report debt problems.

While any given level of indebtedness was less problematic in 2000 than 1995, the increased quantity of unsecured debt taken on by these groups meant that they were more likely to face problems and be vulnerable to potential shocks in their income and interest rates. Moreover, the evidence suggests that the likelihood of reporting debt to be a burden increased for households with high debt to income ratios who also experienced an adverse financial shock. This suggests that, while the greater indebtedness of British households in 2000 had not raised the perceived burden of debt, some would be more vulnerable to adverse economic shocks should these occur in the future.

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# The determinants of unsecured borrowing: evidence from the British Household Panel Survey

*Working Paper no. 263*

Ana Del-Río and Garry Young

Unsecured borrowing by households, mainly in the form of personal loans, overdrafts and credit cards, has grown rapidly over the past ten years or so. This has raised concerns that it could cause widespread financial difficulties and default among households who might struggle to keep up with their debt repayments. The validity of such concerns will depend to a large extent on the type of people who have increased their indebtedness and whether they are borrowing more because their economic circumstances have changed and they feel more confident about taking on additional financial commitments. Borrowing for these reasons is unlikely to be as risky as increased borrowing without a change in underlying economic conditions.

This paper examines survey evidence on the determinants and distribution of unsecured debt using waves 5 and 10 for 1995 and 2000 of the British Household Panel Survey (BHPS). Previous work in the Bank has used the BHPS to analyse the overall financial position of households, including the distribution of unsecured debt across different income and age groups. This paper looks in more detail at the determinants of the cross-sectional distribution of unsecured debt and whether this distribution has changed over time. That makes it possible to assess whether unsecured debt has increased because the factors determining its use have changed or whether more debt is held for given circumstances.

One of the key risks associated with unsecured debt is that it is increasingly used by high risk borrowers. Despite the increased prevalence of credit cards, there is no evidence from the BHPS that participation in the unsecured debt market rose between 1995 and 2000. In both years, around 39% of people claimed to have some debt in this form. These may not be the same people, as the BHPS suggests that 35% of the most indebted quartile in 1995 had no unsecured debt in 2000. But the evidence suggests that there has been no substantial change in the factors that determine whether an individual is likely to have unsecured debt or not.

In line with standard life-cycle considerations, econometric analysis indicates that the main determinant of the participation decision is the age of the borrower, with 20 to 30-year olds most likely to borrow unsecured. Other statistically significant factors are income, economic prospects, qualifications, job status, housing status and the extent of mortgage borrowing.

While there is no clear statistical evidence of a change in the determinants of participation in the unsecured credit market between 1995 and 2000, there was, though, a striking increase in the amount of debt held by borrowers between these two years. According to econometric estimates, the main determinant of the level of unsecured borrowing of borrowers is the level of individual income. Age seems to be less important in determining the amount of unsecured borrowing than the decision to participate in the unsecured market. The other statistically significant determinants of the amount of borrowing are economic prospects, qualifications, job status, housing status and the extent of mortgage borrowing. But, as with the participation decision, there is little evidence of a major change in the importance of these determinants between 1995 and 2000, although there does appear to have been a slight increase in the relative borrowing of those with high incomes. Instead, the main change between these years has been an increase in the amount borrowed throughout the distribution. This suggests that factors affecting all current and potential borrowers, regardless of their personal characteristics, were most important in explaining the rise in unsecured debt between 1995 and 2000.

Thus the rise in unsecured borrowing appears not to have been concentrated within poor risk groups, but to have been a general phenomenon affecting those likely to be borrowers to a similar extent. While it is not possible, on the basis of the information available, to explain the cause of this shift, it is consistent with lower rates of interest on unsecured debt. According to the theory outlined in this paper, lower rates on unsecured debt would raise both the unsecured and secured borrowing of those unable to borrow as much as they would like at secured interest rates, without encouraging further borrowing by those who are unlikely to participate in the unsecured market. This would improve the welfare of those who had been constrained by enabling them to spread their spending more smoothly over time.

Of course, more unsecured debt involves greater risks even if debt is not concentrated among high risk groups. Some individuals do have very high levels of debt in relation to their income and that exposes them to the risk that they will not be able to repay. But there is no evidence that this situation worsened between 1995 and 2000.

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# Liquidity risk and contagion

*Working Paper no. 264*

Rodrigo Cifuentes, Gianluigi Ferrucci and Hyun Song Shin

Prudential regulations in the form of liquidity or capital requirements are designed to enhance the resilience of financial systems under a broad range of market conditions. However, at times of market turbulence the remedial actions prescribed by these regulations may have perverse effects on systemic stability. Forced sales of assets may feed back on market volatility and produce a downward spiral in asset prices, which in turn may affect adversely other financial institutions.

Regulators are familiar with the potentially destabilising effects of solvency constraints in distressed markets. For example, in the wake of the September 11th attacks in the United States, global financial markets were buffeted by unprecedented turbulence, which prompted the authorities to suspend various solvency tests applied to large financial institutions. In the United Kingdom, for instance, the ‘resilience test’ applied to life insurers (in which firms have to demonstrate solvency in the face of a 25% market decline) was suspended for several weeks. Also, following the decline in the European stock markets in the summer of 2002, the Financial Services Authority — the UK regulator — diluted the resilience test so as to preempt the destabilising forced sales of stocks by the major market players. The crisis of the Long-Term Capital Management (LTCM) hedge fund in 1998 is another instance where credit links and asset prices acted in concert to propagate market distress.

This paper looks at these issues. It combines liquidity risk with externally imposed regulatory solvency requirements, when mark-to-market accounting rules of firms’ assets are in place. The model incorporates two channels of contagion — direct balance sheet interconnections among financial institutions and contagion via changes in asset prices. Changes in asset prices may interact with externally imposed solvency requirements or the internal risk controls of financial institutions to generate amplified endogenous responses that are disproportionately large relative to any initial shock. A shock that reduces the market value of a firm’s balance sheet elicits the disposal of assets or of trading positions. If the market’s demand is less than perfectly elastic, such disposals result in a short run change in

market prices. When assets are marked to market at the new prices, the externally imposed solvency constraints, or the internally imposed risk controls may dictate further disposals. In turn, such disposals will have a further impact on market prices. In this way, the combination of mark-to-market accounting and solvency constraints has the potential to induce an endogenous response that far outweighs the initial shock.

Many papers examine balance sheet interlinkages as a possible source of systemic risk. However, they assume that asset prices do not change and therefore invariably find that systemic contagion is never significant in practice, even in the presence of large shocks. In the absence of price effects, this is hardly surprising as direct credit connections among financial institutions represent only a limited fraction of their balance sheets. Conventional wisdom is also that collateralisation — ie the practice of requiring borrowers to provide assets to secure a loan — may have mitigated these risks further. This paper suggests that systemic risk may be larger than thought, even in the presence of collateralisation. The reason is that the risk that materialises is not a credit risk but a combination of credit and market risks, exacerbated by counterparty risk.

Liquidity requirements can mitigate contagion, and can play a similar role to capital buffers in curtailing systemic failure. In some cases, liquidity may be more effective than capital buffers in forestalling systemic effects. When asset prices are extremely volatile, for example during periods of major financial distress, even a large capital buffer may be insufficient to prevent contagion, since the price impact of selling into a falling market would be very high. Liquidity requirements can mitigate the spillover to other market participants generated by the price impact of selling into a falling market. Moreover, because financial institutions do not recognise the indirect benefits of adequate liquidity holdings on other network members (and more generally on system resilience), their liquidity choices will be suboptimal. As a result, liquidity and capital requirements need to be imposed externally, in relation to a bank’s contribution to systemic risk.

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# Asset pricing, asymmetric information and rating announcements: does benchmarking on ratings matter?

*Working Paper no. 265*

Spyros Pagratis

This paper discusses an intertemporal model of asset pricing under asymmetric information, demonstrating how noisy public ratings about the quality of a risky asset could enhance information efficiency, albeit at a cost of higher asset price volatility. The analysis also draws implications for the use of ratings for benchmarking purposes, with most notable example the dichotomy between investment and subinvestment grade credits. In particular, we consider a stylised version of benchmarking investment decisions to ratings, whereby a residual class of (noise) traders link their net supply of a rated asset to some measure of the probability that the rating next period will fall below a given threshold. Thus, benchmarking to ratings can be rationalised as the result of forced sales by a class of regulated investors (eg pension funds) that are restricted to hold securities whose ratings are above a prespecified threshold, and unload their holdings to the market

proportionally to the probability such downgrading will take place.

The main conclusion from the analysis is that, with benchmarking, price efficiency drops while volatility increases. That is because, perceived changes in fundamentals feed into prices not only through changes in perceptions about future income from holding the asset, but also through beliefs about capital gains that depend on the net supply of the asset. Given that benchmarking renders the net supply of traded assets partly forecastable, informed traders are inclined to trade more aggressively on any item of news that could imply a change in fundamentals in order to exploit perceived mispricings. Thus, informed traders become more prone to misinterpret any item of news as information about fundamentals leading to less informative and more volatile prices.