

## Hazardous times

**A**s the 'credit crunch' spread through global markets like wildfire in summer 2007, central bankers wrestled very publicly with a dilemma. If they cut interest rates, it would help to alleviate the impact of tightening credit conditions on the real economy, as banks staggered under the weight of huge losses on shaky sub-prime loans; but at the same time, cheaper money would amount to bailing out lenders that had made bad decisions.

This problem of 'moral hazard' has been much debated on both sides of the Atlantic in the past three months, but a new CEPR paper provides support for the view that the crisis is partly of the central banks' own making. The authors find that periods of low interest rates - such as that which prevailed after the dotcom crash in 2000 - actually encourage banks to make riskier loans. When rates are increased again, after a long period of such hazardous lending, the results can be devastating.

CEPR REsearcher **Steven Ongena** and his co-authors **Gabriel Jimenez, Jose Luis Peydro-Alcalde** and **Jesus Saurina** have access to a unique database from the Bank of Spain, which details every loan over 6,000 to Spanish businesses, over 22 years: more than 23 million loans in all. For each loan, the Bank's Credit Register holds quarterly details on repayment or default, as well as information about the credit record of the borrower, and the characteristics of the individual banks involved.

Spain is a good country to analyse, because for the period the authors study, monetary policy was effectively determined by external forces. From 1988 to 1998, the Bank of Spain tracked the deutschmark, so Spanish monetary policy tended to follow Germany's; and from 1999, Spain was a member of the euro area, so that its interest rates were set by the ECB in Frankfurt. This is important, because it rules out the risk that interest rates could somehow be affected by loan-defaults, which would raise questions about the direction of causation in the results.

To keep their analysis manageable, the authors use a

random sample of 3% of the loans covered in the Credit Register - 674,133 in total. For each one, they calculate the 'hazard rate': the probability that it defaults in a particular period. This hazard rate is a proxy for the ex ante riskiness of the loan, which is hard to measure directly, without knowledge of what judgements were made by the member of bank staff who granted it. However, the authors also check their results by examining the number of loans granted to borrowers who have defaulted in the past, as a way of trying to capture ex ante risk.

Having worked out the hazard rates, the authors use an economic 'duration model' to measure the dynamic impact of interest rates on the riskiness of loans over time. Just as some of the fiercest critics of former Federal Reserve chairman Alan Greenspan have argued, the authors find that holding interest rates at low levels tends to lead banks to make riskier loans, and to loosen their credit standards.

For example, if the short-term interest rate in the economy is at the average of the sample in the data, both when the loan is issued and when it matures, the annualised hazard rate is 0.56%. If the rate shifts, from the sample minimum when the loan is issued to the maximum at its maturity (9.62%), the hazard rate increases more than six-fold, to 3.38%.

Over a prolonged period of time, low interest rates will therefore lead to a deterioration in the overall quality of banks' loan books, as a growing proportion of their portfolio is made up of these more hazardous debts.

Not all banks respond equally strongly to the stimulus of lower rates, the authors find. Smaller banks take riskier lending decisions when rates are low; so do co-operatives and savings banks. Net lenders in the interbank market, which do not have to expose their loan books to scrutiny in order to borrow from other banks, also tend to take riskier decisions as interest rates fall.

Although a low interest-rate environment leads to lax lending, it has a different effect, however, on existing

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loans. After a loan has been made, a cut in interest rates actually makes it less risky. Lower borrowing costs make it cheaper for struggling borrowers to refinance, making them less likely to be forced into defaulting.

Low interest rates thus have two contradictory effects: they provoke banks to make riskier new loans, but they reduce the probability of default for existing loans. That means in the short-term, loosening monetary policy can reduce overall credit risk – because the riskier new loans make up only a small proportion of banks' total portfolio. But eventually, lower interest rates will worsen the total credit risk in the economy, as a growing proportion of banks' portfolios are made up of the resulting riskier lending.

And this, the authors suggest, is exactly the situation the world's major central banks have created in the past five years or so. They cut interest rates sharply, to cushion the blow of the stock market crash and investment slowdown when the dotcom bubble burst; but then rates remained low for such a long time that private sector banks made more and more risky decisions.

As rates have risen again, many of those riskier lending decisions have come home to roost. 'During long periods of low interest rates, banks may take on

more credit risk and relax lending standards. Exposing the "hazardous" cohort of loans, granted when rates were low, to swiftly increasing policy rates dramatically exacerbates their risk,' the authors explain.

As some of the world's biggest financial institutions struggle to absorb the costs of defaults on this 'hazardous' tranche of their portfolio, with billions of dollars of sub-prime mortgage loans in the US being the most egregious example, central banks are, once again, trapped in the jaws of a familiar dilemma.

Cut rates to shield the real economy from the banks' travails, and the problem will be temporarily solved because in aggregate, banks' portfolios will become less risky; and many cash-strapped borrowers might be saved from default. But that would be likely simply to store up more trouble for the years ahead, as banks once again relaxed and embarked on a new lending spree.

**DP6514 Hazardous Times for Monetary Policy: What do Twenty-Three Million Bank Loans Say About the Effects of Monetary Policy on Credit Risk?** by Gabriel Jimenez, Steven Ongena, Jose Luis Peydro-Alcalde and Jesus Saurina

## Pitching in for the team

**B**osses who send their staff to build rafts or race go-karts in elaborate 'team-building' exercises presumably hope the resulting burst of solidarity will boost workers' performance. But new research suggests that employees are not always spurred into greater effort by their colleagues.

In a new paper, CEPR Researcher **Eric Gould** and **Eyal Winter** analyse the performance of baseball players over more than three decades to show that, sometimes, harder-working colleagues can actually be a disincentive.

Gould and Winter argue that how much effort an individual puts in depends on the way their performance is related to that of other workers, through the 'technology of production'. If each individual is rewarded according to the success of the team as a whole, in some circumstances it might be perfectly rational to slack off, even as others work harder.

Baseball provides an ideal testing-ground for this idea. The authors argue that it is plausible that players are paid as a result of their team's performance, not their own. Since overall results depend on the team as a

whole, it is difficult for managers to assess how hard each player is working. Also, wages tend to be higher within a successful team, because winning generates more profits.

Thus, if players are acting as income-maximisers, they will be affected by how their personal performance influences the outcome for the team as a whole.

There is plenty of data for Gould and Winter to analyse. The Baseball Archive provides detailed information on the performance of every player, and every team in the US, since 1871 – though the authors only use the years since 1970, when the game was significantly expanded and reorganised.

For a batter, the more his fellow batters succeed, the more successful he is likely to be: unless he hits a home run every time, he needs his team-mates to bat well too, in order to score. In other words, his performance is complementary with that of his batting team-mates.

However, the better a job the pitchers on a batter's team manage to do at preventing the opponents from scoring runs, the less impact his own performance will have on the outcome for the team as a whole. He and the pitcher are effectively substitutes for each other.

It could therefore be rational, the authors argue, for a batter to make more effort when his team-mates are batting well, but to work less hard when the pitchers on his team are doing a good job of stopping runs.

This explanation would go against the standard analysis of behaviour in the workplace, which suggests that performance is affected by peer pressure because team-members tend to encourage, or shame each other into working hard.

To test whether this is true, the authors perform a regression analysis to examine the connection between batters' and pitchers' performance. They measure a batter's performance as his batting average during the season: the number of runs he scored, divided by the number of opportunities he gets to make runs (his 'at-bats'). A pitcher's performance is measured as his 'earned run average': the number of bases the other team obtain while he is pitching, scaled up for the length of a match.

The authors show that a player's batting average tends to increase with the batting performance of his team-mates, but decreases with the quality of his team's pitching. The effects are small, but significant.

Pitchers, meanwhile, improve their performance when their fellow pitchers are doing well, but are unaffected by how well the batters are doing.

These results show that sometimes there can be a 'negative interaction' - better-performing players do not always coax out a better performance from their team-mates; sometimes, in fact, they do exactly the opposite.

To test the reliability of their results, Gould and Winter

control for a number of other factors that could affect players' performance, including the quality of the manager, the particular year, and the home ground at which the team plays its matches.

They also repeat the analysis using only the players who switched team that season, to exclude the idea that rather than adjusting their performance in response to their colleagues, players are effectively choosing their team-mates. Each time, the results continue to show that batters perform better when their fellow batters do well; but slack off when pitchers are having a successful season.

The authors say their findings are 'consistent with the idea that the effort choices of workers interact in ways that are dependent on the technology of production.' In other words, the effort an individual puts in will depend on how they can contribute to the team's performance, and thus, their eventual reward.

Baseball may be a particularly clear example of a 'team' pursuit, enabling the researchers to measure each player's contribution to the collective outcome - but they argue that 'the results are likely to apply to many work environments where there is an element of team production.' So team away-days and group bonding are all very well, but individual incentives are likely to have more impact than peer pressure.

**DP6527 Interactions Between Workers and the Technology of Production: Evidence from Professional Baseball by Eric D Gould and Eyal Winter**

## Like mother, like son? Educational outcomes across generations

Since the very early days of the welfare state, governments have struggled with the challenge of improving the life-chances of young children. A new paper suggests that one plausible approach is to take a very long view, and start decades earlier, by giving their mothers a better education.

CEPR Researcher **Costas Meghir** and co-authors **Pedro Carneiro** and **Matthias Parey** examine the connections between parents' schooling and their children's performance in the classroom, and find that providing a better education to women has strong and long-lasting positive effects on the lives of their offspring.

To test the relationship between mothers' education and their children's, the authors use the extraordinarily

detailed National Longitudinal Survey of Youth, carried out in the United States. The survey covers more than 12,500 men and women who were aged 15-22 when the first questionnaires were carried out, in 1979. It was repeated annually until 1994, tracking the same respondents, and every two years after that.

As a measure of women's cognitive abilities, the survey includes information on the respondents' scores in the standardised Armed Forces Qualification Test. It also records how many years of schooling they received.

From 1986, when the original survey participants were aged 22-29, a new study began to collect information about their children - including scores in academic tests and a myriad of details about their home, school and

family lives.

By matching these two datasets, covering both parents and children over more than two decades, the authors are able to study the relationship between educational outcomes across the generations.

The biggest methodological hurdle they have to face is the risk that the duration of the mothers' schooling is endogenous: in other words, that the same environmental or genetic factors determining how long a woman stays at school also affect her child's performance, years later.

They handle this by constructing several variables to represent the costs of staying on at school - including distance from the nearest college, and the unemployment and wage rates in the local job-market at the time the mother was 14. When carrying out their instrumental variables regression, they can then show that these factors help to explain how much schooling a mother received - but do not have an independent causal role in determining the child's performance.

In this way, the authors are able to isolate the impact of parental schooling.

Their sample covers 4,379 white children, from 1,948 mothers; and 3,051 black children, from 1,211 mothers. For white children, the effects of mother's education on their scores at school are most significant in the early years. An extra year of schooling for mum increases a child's score on the widely-used Peabody Individual Achievement Tests in maths by 10 per cent of a standard deviation; but by the age of 12-14, the effects have faded.

There is also a positive impact on the child's behaviour, measured using the standard Behaviour Problems Index; but unlike the effects on test-scores, this tends not to fade away. Indeed, by 12-14, an extra year's maternal schooling has a stronger, positive effect on a child's behaviour than at 7-8.

An extra year's education for a white child's mother also reduces by 2.8 percentage points the probability that he or she has to repeat a grade at school, both at age 7-8, and by 12-14. These effects are strongest for girls; and most pronounced for those whose mothers were naturally brightest - i.e. those who scored well on the original ability test, when they were children.

For black children, the effect of extra maternal schooling on maths and reading test-scores is also strong at age 7-8; but unlike for white children, it does not fade away over time. In fact, the impact on the probability that a child will be forced to repeat a grade at school is actually twice as large at age 12-14 as at 7-8. For the children of mothers who scored poorly on the original ability test, a single year's extra education

reduces their chance of having to repeat a school-year by as much as 10 per cent. For black children, unlike their white counterparts, the effects uncovered by the authors are more pronounced in boys.

Having established that there are clear, and seemingly long-lasting connections between mothers' education and their children's test-scores and behaviour, the authors use some of the other detailed findings in the survey to examine some of the transmission channels through which boosting parents' schooling might help their children.

They find that in general, more educated mothers tend to have higher family incomes, and choose partners who themselves are more educated. They are also more likely to be married when they have children, and to give birth later.

In general, more educated mothers are more likely to be in work, and to work more hours than others. This might suggest that their children would see less of their mothers, and would suffer as a result. However, the authors' initial findings suggest that these disadvantages are somehow outweighed by other advantages, at least as far as the child's educational and behavioural outcomes are concerned.

Specific responses to the survey concerning family life show that, for example, children of more educated mothers are more likely to have a computer and a musical instrument at home; they are taken on family outings more often; and, perhaps surprisingly, despite the extra hours their mothers are likely to be spending out at work, they are 4.5% more likely to read to the child at least three times a week.

For black mothers, not only is extra education likely to help them generate extra income; they are also likely to have a smaller family, perhaps helping to offset some of the time-constraints of juggling work and home life. On average, an extra four years of education - the length of a standard American college degree - reduces the number of children born to a black mother by 1.2.

Just a few decades ago, the value of educating women at all was deemed questionable - but this detailed intergenerational study shows that the benefits of schooling extend well beyond women themselves, to the home and family lives they are able to provide for their children. Tackling intergenerational mobility is a pressing political concern, and the authors' findings suggest the education system must be at the heart of any serious attack on the issue.

**DP6505 Maternal Education, Home Environments and the Development of Children and Adolescents** by Pedro Carneiro, Costas Meghir and Matthias Parey

# What difference does distance make?

'Offshoring' - the process of hiving off jobs to lower-cost economies - began in manufacturing, as multinationals shipped the less sophisticated parts of their production-process abroad. But as the IT revolution has slashed the costs of long-distance communication, it has also become commonplace for services to be performed thousands of miles away from a company's HQ. A firm in Basingstoke can have a back-office in Bangalore.

Thomas Friedman, in the bestseller *The World is Flat*, enthusiastically called this process 'globalisation 2.0'; but the idea of wholesale offshoring of services jobs causes widespread alarm in the world's richest countries.

In a new paper, CEPR Researcher **Thierry Mayer** and co-authors **Keith Head** and **John Ries** attempt to assess the risk that thousands of services jobs are set to disappear overseas. They use a concept of economic 'distance', previously applied to manufacturing, to quantify the costs to firms of having services performed thousands of miles away, instead of on-site.

They begin by constructing an economic model of an international market for services, where each job in the sector is filled by the person who costs the least - but crucially, this includes not just wages, but the costs of 'delivering' a unit of the service.

In manufacturing, these costs might include the tariffs applied to exports and imports by governments, as well as the price of transporting a product to its destination market.

The authors construct an equation that they can use to test what factors contribute to 'distance' in an international market for services. They suggest that physical distance itself will create 'delivery costs'; but so will differences in time zones, languages, and the legal system.

Offshoring services functions to a country with a different language is likely to imply translation and training costs, for example; while lack of a shared legal system may make it harder to create and enforce the complex, binding contracts essential to making offshoring work successfully.

The authors also want to test the impact of shared colonial origins on 'distance'. The legacy of colonialism can be lasting commercial and cultural links, which might help to overcome some of the problems of geographical distance.

They suggest that the impact of offshoring services to a different time-zone could in theory be either positive or negative. It might cause problems for colleagues struggling to co-ordinate with each other, because their working days barely overlap - what the authors call the 'synchronisation effect.' On the other hand, stretching across time-zones allows a business to operate twenty-

four hours a day, seven days a week: the 'continuity effect.'

To establish the strength of these various factors that could make up 'distance' in the global services market, the authors carry out a regression analysis, testing the impact each factor has on the volume of trade in services.

To do this, they use data collected by eurostat, the European statistics agency, covering bilateral services trade between 64 countries - including EU members, the US, and Japan - over the period 1992 to 2004. The eurostat data allows the authors to disaggregate different services industries, so that they can focus on the particular areas where offshoring has become more common, including finance and computing.

Since the mid-1980s, both goods and services have been traded more widely, so that the value of exports and imports as a proportion of economic output has increased. But services trade has been expanding even more rapidly than trade in goods.

The composition of services trade has also changed. Over the past two decades, the category called 'computer, communication and other services' has rapidly become more important, accounting for more than 40% of total services trade by 2004; while the more traditional transport and government services sectors have declined in importance.

By performing the regression analysis, the authors find that - as they expected - colonial relationships, a common language, and a shared legal system all have significant, positive effects on services trade, helping to lessen the impact of geographical distance alone. As far as stretching across time-zones is concerned, their results suggest that the 'continuity effect' of spanning the globe outweighs the problems created by the 'synchronisation effect' of getting people to work together at different times of day and night.

Because they have more than a decade's worth of data, the authors are able to calculate the size of the 'distance effect' in 1992, and measure how it has changed. They show that the distance effect has declined markedly over time, supporting the idea that falling telecoms costs have helped to reduce the need for costly face-to-face meetings - and made geographical distance matter less.

Distance effects for the services sector are now similar to those for the trade in goods, according to the authors' analysis; but while distance effects for goods have if anything been increasing slightly over time, in services they are on a declining trend.

In order to give a better idea of how important proximity is for services - and thus how powerful the threat of offshoring may be - the authors then use their findings to calculate what premium businesses would be

prepared to pay to hire someone locally, rather than thousands of miles away.

Assuming the productivity of home and offshored workers is similar, they calculate the 'wedge' in wages that an employer would be prepared to pay, to get a service performed locally. They find that a London-based firm would be willing to pay between 30% and 80% more in wages for a services supplier based 83 miles away in Oxford, rather than in Dublin; and a 53% to 163% wage-premium for a service provided in Dublin, rather than Bangalore.

And workers in Oxford could be paid something between 99% and 373% more than workers in Bangalore, and still be attractive to a London firm. In other words, employers are prepared to pay close to five

times as much, to get a service provided locally (within 100km), rather than remotely (more than 10,000k away).

These findings do provide some comfort for those fearing that in a hi-tech, globalised world economy, distance no longer matters and in the services trade is effectively costless. The authors are able to show that there is a clear 'distance effect', even for sectors such as IT, which seem most prone to large-scale offshoring. However, there is also evidence that in services, distance effects are waning - and the world is getting smaller.

**DP6542 How Remote is the Offshoring Threat?** by  
Keith Head, Thierry Mayer and John Ries

The Centre for Economic Policy Research ([www.cepr.org](http://www.cepr.org)), founded in 1983, is a network of over 700 researchers based mainly in universities throughout Europe, who collaborate through the Centre in research and its dissemination. The Centre's goal is to promote research excellence and policy relevance in European economics. CEPR Research Fellows and Affiliates are based in over 237 different institutions in 28 countries. Because it draws on such a large network of researchers, CEPR is able to produce a wide range of research which not only addresses key European policy issues, but also reflects a broad spectrum of individual viewpoints and perspectives. CEPR has made key contributions to a wide range of European and global policy issues for over two decades.

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