

Public Sector Reform and Financial Market Development

Final Conference of the Research Training Network
Project on Financing Retirement in Europe (FINRET)

15-16 September 2005

The Financial Markets Group, together with its collaborative partner institutions completed a significant European research programme, culminating in the final conference as reported in this review. The conference was organised by Ronald W Anderson, Pierre Pestieau, Ian Tonks and David Webb and was hosted by the London School of Economics and Political Science.

This conference was the final networking event of the Research Training Network on 'Financing Retirement in Europe: Public Sector Reform and Financial Market Development'. It dealt, from different perspectives, with the reform of systems of financing retirement and was intended to discuss the results of the research conducted by the RTN teams and to disseminate these to fellow academics and practitioners working in the area.

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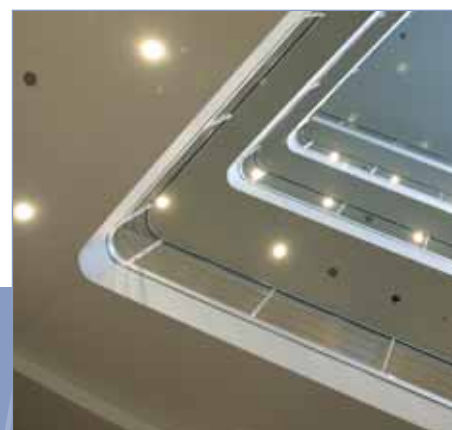
FMG Empirical Finance Research

Understanding The Origins Of Stock-Market Volatility

As part of the initiative to communicate and present research updates on the programmes of the Financial Markets Group, the previous Quarterly Review (number 66) carried an extensive reporting of the Corporate Finance and Governance Research Programme. The feedback received has been most encouraging

and we intend to cover the other programmes within the Group in subsequent Reviews. Antonio Mele, member of the FMG Empirical Finance Research Team prepared a non-technical perspective on financial volatility for this issue of the FMG review.

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Helmuth Cremer (GREMAQ and IDEI, University of Toulouse) presented the first paper, 'Social security and retirement decision: A positive and normative approach', joint with Jean-Marie Lozachmeur (GREMAQ, University of Toulouse) and Pierre Pestieau (CREPP, Université de Liège, CORE, Université Catholique de Louvain and Delta). This paper is a partial survey of the authors' work on the design of retirement systems done in the FINRET network. Their research started from the observation that there are biases towards early retirement, and that social insurance for the elderly is generally judged responsible for this widely observed trend. In a world of laissez-faire or in a first-best setting, there would be no such trend. However, the authors pointed out that when first-best instruments are not available, because health and productivity are not observable, the optimal social insurance policy may imply a distortion of the retirement decision.

The main point is that while there is no doubt that retirement systems induce an excessive bias towards early retirement in many countries, a complete elimination of this bias (ie, a switch to an actuarially fair system) is not the right answer for two reasons, one normative and one positive. From a normative point of view, some distortions are second best optimal. From a positive point of view, the elimination of the bias might be problematic for political reasons. Depending on the political process, such reforms may either not be feasible or alternatively may tend to undermine the political support for the pension system itself.

Marie-Louise Leroux (GREMAQ, University of Toulouse), presented the second paper, 'Social Security and uncertain lifetime', joint with Antoine Bommier (GREMAQ, University of Toulouse) and Jean-Marie Lozachmeur (GREMAQ, University of Toulouse). In this paper, the authors study the optimal pension design when individuals differ in their length of life. Life duration takes the form of a survival probability (in this sense life expectancy is uncertain) and individuals may have a higher/lower survival probability depending on some random characteristic (eg health, gender, socio-professional category). The individual's utility function is of multiplicative form with per period consumption and age of retirement as functional arguments. The multiplicative form accounts for a possible risk aversion towards length of life. The authors first transform the individual's lifetime utility into an expected utility function and then derive the problem of a utilitarian social planner who would like to compensate individuals for different life expectancies. In a first best setting where the social planner is



Marie-Louise Leroux (GREMAQ, University of Toulouse)

perfectly able to observe survival probabilities – the high type individual will consume less at each period and retire later than the low-survival probability individual. In a second best framework, they find the usual result of 'no distortion at the top' for the high survival probability individual while there exists a tax on consumption in earlier periods of life for the low type individual – however, it remains that there is no tax on work for this individual. The paper was discussed by **Debora Kusmerski** (Timbergen Institute and University of Amsterdam), who questioned whether adding another dimension of risk to the analysis, and so introducing the fear of outliving lifetime resources, could influence the results of the paper.

Researchers under the LSE Team made substantial progress in understanding the effects of shifts from defined benefit (DB) to defined contribution (DC) pension systems on individual behavior and incentives. In 'What do defined contribution pensions mean for retirement?'

Sarah Smith (LSE, IFS and University of Bristol) examines two popular perceptions about the effect of the increasing importance of defined contribution pension accounts – that it will leave people with lower incomes in retirement, and it will cause them to delay their retirement. The author simulates pension wealth and accrual for stylized individuals in typical DB and DC schemes in order to compare the value of the pension they are likely to get and predict retirement probabilities at different ages. Contrary to popular perceptions of a pensions' crisis, the figures presented here show that pension values are broadly similar under DB and DC

schemes, at least for a 'low education' type who experiences lower lifetime earnings growth. DC schemes are relatively less generous for those with higher earnings growth over their working lives. DB schemes typically concentrate retirement around normal or early retirement ages, while DC schemes are associated with a smoother spread of retirements. It is less clear, however, that retirement will occur much later. While DB schemes strongly encourage retirement at the normal or early retirement age, they provide strong incentives to stay in work until then. 'Lifestyling' investment and compulsory annuitization both reduce the incentive to delay retirement in DC schemes. The discussant, **Ian Tonks** (University of Exeter and FMG), pointed out that the estimated replacement rates are highly sensitive to the assumptions on the contribution rates and the earnings profiles, and therefore could affect the robustness of the results on the optimal retirement age.

In general, early retirement is predominantly considered to be the result of incentives set by the pension system. However, **Monika Bütler** (University of St Gallen and CEPR) presented joint work with Olivia Huguenin (Université de Lausanne) and Frederica Teppa (Università di Torino) which demonstrates that, in the Swiss example, the incidence of early retirement has dramatically increased even in the absence of institutional changes. In 'High Pension Wealth Triggers Early Retirement even in a Funded Scheme' the authors go on to argue that the wealth effect also plays an important role in the retirement decision for middle and high income earners. An actuarially fair, but mandatory funded system with a relatively high replacement rate may thus contribute to a low labour market participation rate of elderly workers. The authors provide evidence using a unique dataset on individual retirement decisions in Swiss pension funds, allowing them to perfectly control for pension scheme details. Their findings suggest that affordability is a key determinant in the retirement decisions. The higher the accumulated pension capital, the earlier men, and – to a smaller extent – women, tend to leave the work force. The fact that early retirement has become much more prevalent in the last 15 years is a further indicator of the importance of a wealth effect as the maturing Swiss mandatory funded pension system over that period has led to an increase in the effective replacement rates for middle and high income earners. However, the discussant, **Ania Zalewska** (Maastricht University and University of Bath) stressed that in order to make such conclusions one should have a better understanding of three key relationships. First, how the pension/non-pension wealth relationship changes as we move across income groups. Second, how the relationship between the amounts of money invested in the second and third pillars of the Swiss pension system has changed over time and across income groups. Third, how have stock markets/property markets changed over time.

Still within the subject of pension systems and labour markets,

Joachim Inkmann (Tilburg University and FMG) presented his work on 'Compensating Wage Differentials for Defined Benefit and Defined Contribution Occupational Pension Scheme Benefits'. The author presents an empirical analysis of the theory of compensating wage differentials for occupational pension scheme benefits in the UK, using the newly available English Longitudinal Study of Ageing. The theory of equalizing differences suggests that employer provided pension benefits should be compensated by reduced wage benefits for an employee's given productivity potential. The data allows the author to differentiate between Defined Benefit (DB) and Defined Contribution (DC) schemes and to consider different measures of pension benefits based on current contributions and changes in accrued pension benefit rights. In his preferred specifications the author finds clear evidence for perfect compensating wage differentials for both occupational DB and DC pension scheme benefits. However, **Phillipe De Donder** (GREMAQ, University of Toulouse) illustrated his reservation with the theory of compensating wage differentials by illustrating simple numerical examples where the theory's predictions do not hold.

With the increase in defined contribution pension plans, it is also important to understand how consumers will allocate the accumulated pension wealth during retirement. In theory the optimal choice is to annuitize their wealth in order to insure against the chance of outliving their resources. However, in practice few consumers choose to do so. **Alex Michaelides** (LSE and CEPR) presented joint work with Paula Lopes (FMG, LSE) entitled 'Rare Events and Annuity Market Participation'. The authors revisit the annuity market participation puzzle. Using standard, time-separable preferences, the authors compute the optimal saving and annuity demand choices of a household at retirement and illustrate that positive levels of annuities are demanded even in the presence of a bequest motive and a social security payment that mimics an annuity payout. They evaluate the conjecture that a rare event (default of the annuity provider) may substantially affect the demand for annuities. The authors find that for low levels of risk aversion (consistent with the empirical evidence), a probability of default of around five percent can eliminate annuity demand for a substantial number of households, given the observed financial wealth distribution in the US at retirement. In his discussion, Frank de Jong (University of Amsterdam) argued that the assumption of 0 per cent recovery in the event of such a default is unrealistic and that an annual probability of default of 5 per cent is too high to be realistic.



Otto van Hemert (Swedish Institute for Financial Research and University of Amsterdam)

The next session mainly focused on the intergenerational risk sharing implicit in pension schemes and on the financial aspects of pension funds. **Otto van Hemert** (Swedish Institute for Financial Research and University of Amsterdam), presented his paper on 'Optimal intergenerational risk sharing' in the context of stochastic labour income and capital returns. He

develops a stylized two-period overlapping-generations (OLG) model where a central planner implements pay-as-you-go transfers. Then, he calibrates the model parameters to US data, allowing for autocorrelation in the labour income and skewness in the capital return. The author shows that state-contingent transfers facilitate intergenerational risk sharing in a way that is similar to portfolio insurance using put options: the working generation provides downside risk insurance to the old on their savings. In addition, when no risk-free asset is available, these transfers improve utility by substituting for this missing asset. Finally, he finds that imposing an incentive constraint for the working generation has little impact when transfers also have this substitution role. However, imposing an incentive constraint causes the transfer scheme to collapse to the zero-transfer scheme when a risk free asset is available. The subsequent discussion by **Emmanuel Thibault** (GREMAQ, University of Toulouse and GEREM, University of Perpignan) focused on the calibration of the model, in particular suggesting alternative values for the equity premium, for capital return and for the length of period in the OLG model.

The second contribution was the paper 'The value of intergenerational transfers within funded pension schemes', presented by **Frank de Jong** (University of Amsterdam). The paper is a joint work with Jiajia Cui (University of Amsterdam, ABP Pension Fund and Timbergen Institute) and Eduard Ponds (ABP Pension Funds and Netspar, Tilburg University). Their analysis, while focused on intergenerational transfers, is from a different perspective. They seek to evaluate and compare the transfers of value between different generations in a funded pension scheme for alternative

sets of risk-allocation. Value-based generational accounting is used as the framework of the analysis. First, they find that a pension deal is a zero-sum game in value terms; then, by introducing a welfare analysis of pension deals, they show that a pension deal is potentially a positive-sum game in welfare-terms. Moreover, pension schemes that provide safer and smoother consumption streams turn out to be ranked higher in utility terms. Given that a smoother consumption stream can be achieved by allowing risk shifting over time, they show that intergenerational risk sharing is welfare-enhancing compared with pure individual pension schemes. Finally, they argue that in order to absorb the risk it is better to use a combination of adjustments in both contribution and benefit indexation instruments, rather than only one instrument. The paper was discussed by **Sabrina Buti** (GREMAQ, University of Toulouse and FMG, LSE). She pointed out that in comparing collective/individual pension schemes a demographic risk should be added to the analysis. Moreover, the government structure and the entrance policy of the pension scheme, not specified in the model, could influence the results.

The final contribution, 'Strategic Asset Allocation with Liabilities: Beyond Stocks and Bonds', was presented by **Peter Schotman** (Maastricht University and CEPR) and is joint work with Roy Hoevenaars (Maastricht University and ABP Investments), Roderick Molenaar (ABP Investments) and Tom Steenkamp (ABP Investments and Vrije Universiteit Amsterdam). This paper now focused on the investment policy of the pension fund. In particular, the authors consider the strategic asset allocation of long-term investors who face risky liabilities and who can invest in a large menu of asset classes including real estate, credits, commodities and hedge funds. The analysis is performed by using a VAR for returns, liabilities and macro-economic state variables from US data. First, they focus on the impact of liabilities on the optimal asset allocation and show that the costs of ignoring the liabilities are substantial and increase with the investment horizon. Secondly, they consider the potential value-adding role of alternative asset classes relative to stocks and bonds. They analyse the potentially different risk-return term structure, the eventual diversification benefits, and the hedge against liability risk. They obtain that the augmented asset menu adds value from the perspective of hedging the liabilities. In particular, commodities are good risk diversifiers, credits are a good alternative to treasuries, hedge funds are interesting for return enhancement, while listed real estate does not have any special advantage compared to stocks and bonds. The discussion by **Anthony Neuberger** (University of Warwick) reinforced the importance of alternative assets to hedge against liability risk.



Marcello D'Amato (Università di Salerno)

The Network has also made substantial contributions in applying recent developments in dynamic portfolio analysis in the presence of market frictions, political economy and principal/agent analysis in complex stochastic environments. In the paper 'Social Security and Portfolio Choice with Political Constraints' **Marcello D'Amato** (Università di Salerno) joint with Vincenzo Galasso (IGIER, Università Bocconi and CEPR), analyse, in a stochastic economic environment, the behavior of a mixed pension system formed by a Pay-As-You-Go (PAYG) and a funded pillar – composed of a risk-free and a risky asset. Economic agents with mean variance preferences select their optimal portfolios by evaluating the distribution of the returns to the risky asset and the expected pension policy chosen by the politicians. Pension policies are determined as a Markov equilibrium of a probabilistic voting game played by a sequence of governments. Low returns on the risky asset induce politicians to increase the PAYG component of the system to compensate the old. This policy encourages forward-looking young agents to increase the share of risky assets in their portfolio – hence creating a moral hazard problem. If the vote by old agents has non-negligible value in the election, the political system will induce an intergenerational risk-sharing arrangement through a mixed system. In his discussion, **Thomas Steinberger** (Università di Salerno), provided a simulated simplified version of the model to predict some parameter values.

Paola Profeta (Università Bocconi and Università di Pavia) presented joint work with Ma Marko Koethenbuerger (Center for Economic Studies, University of Munich, and CESifo) and Panu Poutvaara (University of Helsinki, CEPR and HECER) entitled 'Why are More Redistributive Social Security Systems Smaller? A Median Voter Approach'. In this paper the authors suggest a political economy explanation for the stylized fact that intragenerationally more redistributive social security systems tend to be small. The authors relate the stylized fact to an 'efficiency-redistribution' trade-off to be resolved by a political process where the inefficiency of social security financing is due to endogenous labour supply. Using data for eight European countries, they find that the stylized fact and a considerable degree of cross-country variation in contribution rates can be explained by the median voter model. The discussant, **Edmund Cannon** (Bristol University) pointed to the fact that when comparing different countries, one has to take into account that in some countries the privately funded component of the pension system is more important than in others and this might affect the results.

Within the topic of intragenerational risk sharing **Gabrielle Demange** (PSE and CEPR) presented work on 'Sharing Aggregate Risks Under Moral Hazard'. In this paper the author discusses some of the problems associated with the efficient design of insurance schemes in the presence of aggregate shocks and moral hazard. The paper considers the population as divided into groups, each one composed of ex ante identical individuals who are subject to idiosyncratic shocks. A group may be, for example, the labour force in a given sector with workers being subject to the risk of unemployment. Without moral hazard, optimality requires (1) full insurance against idiosyncratic shocks, which gives rise to a representative agent for each group and (2) macro-economic risks to be shared between these representative agents. The question investigated in this paper is what remains of this analysis when the presence of moral hazard conflicts with the full insurance of idiosyncratic shocks. In particular, how is the sharing of macro-economic risks across groups affected by the partial insurance against idiosyncratic risks? The design of unemployment insurance schemes in different economic sectors, and the design of pension annuities in an unfunded social security system are two potential applications. The discussant, **Sudipto Bhattacharya** (LSE and CEPR) focused on the difficulties of implementing such insurances across groups.



Georges de Menil (PSE)

'Assessing the Paygo Tax Rate and Saving Rate in Eight OECD Countries' presented by **Georges de Menil** (PSE) was joint work with Fabrice Murtin (CREST-INSEE and PSE) and Eytan Sheshinski (Hebrew University of Jerusalem and Princeton University). The authors show how the PAYG tax rate and the rate of private saving which maximize the expected lifetime utility of a representative household in the steady state depend on the stochastic characteristics of the rate of growth of the wage bill

and the return to capital. These steady state characteristics are inferred with bootstrap techniques from annual historical data on real GDP and the real return to capital in eight OECD countries. The optimal tax rate and rate of private saving out of labour income are then estimated for each country by taking expectations over Monte Carlo simulations of the lifetime utility of a representative household. The preliminary results suggest that observed differences in the dynamics of GDP and the return to capital explain some of the differences in the provision of retirement income. The discussant, **Marco Pagano** (Università di Napoli Federico II and CEPR), suggested that the time horizon in interest rate term structure and its correlation with labour income should be taken into account.

Emma Aguila (UCL) concluded the two-day conference by presenting 'Pension Reform and Savings'. This research provides evidence from the Mexican pension reform which could contradict the proposition that a shift from a pay-as-you-go scheme to a funded defined contribution system promotes savings. The main results of this analysis show that the pension

reform increased consumption and crowded out savings of low income workers, who are the majority of population affected by the reform. These findings are consistent with the Life Cycle model predictions as the theoretical analysis shows that the pension reform caused an income and a pension wealth effect particularly for low income employees. The empirical evaluation is conducted using a nonparametric difference-in-differences estimator implemented with propensity score matching. The discussant, **Paula Lopes** (FMG, LSE) pointed out that the Mexican pension reform incorporated elements of income redistribution and it is therefore essential to separate effects on consumption resulting from income redistribution versus the effects resulting from the shift from a defined benefit to a defined contribution scheme. ■

FINRET is a Research Training Network funded through the Fifth Framework Improving Human Potential Programme of the European Commission. The research undertaken by the network combines the latest techniques of financial economics and public economics to address the concrete questions of institutional design posed by reforming the system of retirement funding in Europe. It carries the study of retirement finance beyond the insights afforded by traditional tools (classic overlapping generations (OLG) models and demographic simulation) in order to obtain policy conclusions regarding specific institutional features of pension finance. Specifically, this involves applying recent developments in dynamic portfolio analysis in the presence of market frictions, political economy, and principal/agent analysis in complicated stochastic environments.

The member institutions of FINRET are:

Centre of Economic Policy Research (CEPR), CORE, Université Catholique de Louvain; Institut d'Economie Industrielle (IDEI); The Financial Markets Group at the London School of Economics (FMG/LSE); Universiteit van Amsterdam; Università di Salerno; Universitat Pompeu Fabra (UPF).

For more information please visit the programme website www.cepr.org/research/Networks/FINRET/

Research Student Fellowships

The FMG places great emphasis on its role in the training of young researchers and in their career development. The Centre supports selected LSE economics and finance doctoral students by providing them with a rich research environment. Students have the opportunity to interact closely and work together with senior faculty members and academic visitors, to attend advanced research seminars and debates, and have direct access to the FMG research resources.

The involvement of the corporate sector in this mission is particularly active. In collaboration with our corporate partners we have been able to support

young researchers through Fellowship grants. In Michaelmas term 2005, FMG launched a new Fellowship Programme:

The Concordia Research Student Fellowship is established with the generous support of Concordia Advisors LLP in UK. The Fellowship will be awarded annually by Concordia and the Financial Markets Group at LSE to an outstanding PhD student. This contribution from Concordia is intended to encourage research in the wider area of Asset Pricing and Portfolio Management. The Concordia Fellowship will provide a stipend of £15,000 to support tuition fees or/and research and living expenses.

Research Projects

Evaluation and Comparison of Risk Forecasts using High Frequency Data

The two main inputs to a decision involving an investment in a risky asset are the expected return on the asset and a measure of the risk of the returns. Dr Andrew Patton of the FMG has been awarded a research grant by the Leverhulme Trust to undertake research on methods to improve forecasts of the second input: risk.

Given the numerous risk forecasting models available in the academic literature and employed in practice, there is strong demand for methods to evaluate and compare these models. The evaluation of forecasts of the risk in returns, in contrast to returns themselves, is complicated by the fact that risk is not observable, even *ex-post*.

This research will contribute to our ability to discern good risk forecasts from bad ones, by making use of high frequency (intra-daily) data on asset returns. Intra-daily data (such as five minute returns) can often be useful even if the horizon of interest is much longer: a day or a month for example.

The project will last 18 months starting from 1 September 2005. The outcome of the research will be discussed in various publications and in a conference that will take place in FMG towards the end of the project. In addition to Dr Andrew Patton as the principal researcher, other research staff involved include Mr Runquan Chen and Mr Sheng Li, both research students in the FMG.

Dynamic Corporate Finance

In September 2005 the FMG launched a new two year programme to promote applied research in the area of Dynamic Corporate Finance supported by the Frederik Paulsen Foundation. Dynamic corporate finance research is based on the idea that the way a company structures its finances now must be forward looking and take into account not only future changes of its existing businesses but also its future business opportunities. A consistent question concerning business financing is how much cash a business ought to be holding. Despite the apparent simplicity of the question, there is no research consensus about its answer. This research project aims to address that issue. Among the questions that the project will focus on, are:

How much liquidity should a firm hold rather than investing in current business prospects that seem to promise a higher return?

For a firm with multiple lines of business and/or multiple geographic bases when is active risk management through hedging or matching cash stocks with investment needs more effective than centralised financing to reduce slack overall?

How does financial structure lead managers to extend effort to 'sweat' existing assets versus creating future growth opportunities?

This programme will support research outputs including conferences and publications. The research is led by Professor Ron Anderson, Director of the FMG 'Risk Management and Fixed Income Markets' Programme.

New Research Projects

Integrating Historical Data and Market Expectations in Risk Assessment for Financial Institutions

This two year project was launched in September 2005 with funding from the Engineering and Physical Sciences Research Council. It focuses on how historical information traditionally used in actuarial calculations can be combined with forward-looking information contained in financial market prices. The goal is the development of a consistent statistical methodology for integrating historical information and expectations imbedded in market prices. The methodology will be applied to a series of risk management problems confronting financial institutions where both types of information are available: credit risk, asset liability management, operational risk and integration of co-dependent risks. The research team involves: Professor Ron Anderson, Dr Antonio Mele and Dr Andrew Patton. The project's dissemination programme will culminate in a final conference to debate the outcomes of the research.

Stability of the Global Financial System: Regulation and Policy Response

This programme is financed by the ESRC in the context of the Council's World Economy and Finance research programme. This research project was launched in April 2005 and will last for 36 months. The programme's research team is lead by Professors Hyun Shin and Charles Goodhart and includes: Dr Jon Danielsson, Dr Amil Dasgupta, Dr Bernardo Guimaraes and Dr Jean-Pierre Zigrand. The issues addressed in this project are currently being debated actively by the policy and academic communities. The world has experienced a series of financial crises in recent years, each unfolding in one emerging market country with knock-on effects elsewhere around the globe. Systemic crises feed on the endogenous amplification of financial distress through collateral constraints, declines in market values of assets, currency mismatches on the balance sheet, and limited liquidity. The precise channels of propagation of the crisis determine the appropriate policy response ex post, and also the appropriate preventative regulatory measures ex ante. This project proposes a programme of concentrated research that will shed light on the causes and dynamics of crises, and hence on the correct policies, both ex ante and ex post. In addition, this research has implications for the debate on the reform of the institutions of the global financial system. The programme aims to contribute to the following significant questions:

What are the precise mechanisms that make systemic financial crises so devastating?

What principles should crisis management policy follow? In particular, how should monetary policy be conducted?

How can regulation be better designed so as to balance stability and efficiency of financial markets?

How can the institutions governing the global financial system be reformed to promote well-functioning capital markets?

Workshops

Regulation and Financial Stability Workshops

The Financial Markets Group has been awarded a grant by ESRC to organise a series of workshops in the area of Regulation and Financial stability over the next 24 months. The series will build on the established FMG London Financial Regulation seminar, which has run since 1999. The ultimate purpose of the workshops will be to clarify the principles on which financial regulation should be based, and to advance practical proposals for improving the organisation and conduct of such regulation. The series will be launched in Lent term 2006 with a workshop on **Measurement and Modelling of Financial Stability** to be organised by Dr Rosa Maria Lastra (Centre for Commercial Law Studies, Queen Mary). More details will be announced on the FMG website in the following months.

The workshop series leader is Professor Charles Goodhart of FMG and the organisational committee has an intercollegiate and interdisciplinary profile involving Professor Philip Davis (Brunel University), Dr Rosa Maria Lastra (Queen Mary, University of London), Dr Alistair Milne (Cass Business School), Mr Andrew Winckler (Ernst and Young) and Professor Geoffrey Wood (City University Business School). The workshops will target the academic, policymaking and professional communities and will encourage and support the participation of young researchers and research students.

Corporate Governance at LSE

The corporate governance seminar series is our latest initiative to stimulate research in Corporate Finance, in which we are bringing together a series of high profile scholars from around the school to study issues surrounding Corporate Governance. This interdisciplinary group with backgrounds in Finance, Law, Economics, and Management, actively seeks a dialogue with practitioners and policy makers in order to maximise the research impact on policy making and the implementation of best corporate governance practices by firms. In this context we will be introducing a dedicated workshop series to facilitate interaction with practitioners and policy makers. The series will be launched on 1 December 2005 with a seminar by **Professor Antoine Faure Grimaud** of FMG on **'Corporate Governance in the UK: Could One Size Fit All?'**. **Sir Howard Davies**, LSE Director, will open the proceedings. More details will be posted on the FMG website soon.

Pensions Public Lecture

Responding to the demographic challenge: deciding the appropriate role of government

Adair Turner

Chairman, Pensions Commission

1 February 2006

6pm, Hong Kong Theatre

The London School of Economics
and Political Science

This event is sponsored by the

UBS Pensions Research Programme at LSE

In its first report the Pensions Commission concluded that faced with the increasing proportion of the population aged over 65, society and individuals have to choose between pensioners becoming poorer relative to the rest of society, increased taxes, higher savings, and/or later retirement. Speaking recently to the Trade Union Congress, Adair Turner, Chair of the Pensions Commission, promised only one thing: that there are no easy answers to the pensions challenge.

Speaking at the LSE on 1 February 2006, Lord Turner will outline and discuss how the Commission's long-awaited recommendations, due to be published on 30 November 2005, are designed to create a sustainable and equitable future for pensioners in the UK.

The lecture is part of the UBS Pensions Research Programme Public Lectures.

More information and registration details will be published soon on the FMG website.



Understanding Stock-Market Volatility¹

Antonio Mele The London School of Economics and Political Science

Introduction

Understanding the origins of stock-market volatility has long been a topic of considerable interest to both policy makers and market practitioners. Policy makers are mainly interested in the main (possibly real) determinants of volatility and in its spillover effects on real activity. Market practitioners such as investment bankers are mainly interested in the direct effects time-varying volatility exerts on the pricing and hedging of plain vanilla options and more exotic derivatives. Forecasting stock-market volatility constitutes a formidable challenge but also a fundamental instrument to manage the risks faced by these institutions.

In this short essay, I accomplish three tasks. First, I review some (and uncover additional) stylized facts about the dynamics of stock-market volatility on a wide business cycle perspective (in Section 1). Second, I succinctly overview some *rational* explanations of these volatility patterns (in Section 2). Third, I investigate whether stock-market volatility contains any useful information about the evolution of the business cycle (in Section 3). There are many other exciting topics left over from this essay. For example, I do not tackle statistical issues related to volatility measurement (see, eg, Andersen, Bollerslev and Diebold (2002) for a survey on the many available statistical techniques to estimate volatility). Nor do I consider the role of volatility in risk-management, portfolio selection, or derivative pricing (see, eg, Lewis (2000) for a thorough analysis of these issues). At a more fundamental level, the focus of this essay is to explore the extent to which stock-market volatility movements can be given a wider macroeconomic perspective, and to highlight some of the rational mechanisms underlying them.

1. Asymmetric volatility cycles

Why does stock-market volatility vary over time? Financial economists have been intrigued by this issue for decades. For example, Schwert (1989) found that the volatility of no single macroeconomic variable could help to explain low frequency movements of aggregate stock-market volatility. Yet stock-market volatility is related to the business cycle. Additionally, there is strong evidence that risk-premia (ie the investors' expected return to invest in the stock-market) are counter-cyclical. Table 1, for example, confirms Schwert

(1989) results that returns volatility is counter-cyclical in the US. And Figure 1 confirms previous results in the literature that aggregate risk-premia are also counter-cyclical (see, eg, Fama and French (1989) and Ferson and Harvey (1991)). There is another relatively less known stylized fact: not only are price-dividend ratios pro-cyclical. Over the last fifty years, price-dividend ratios movements in the US have also been asymmetric over the business cycle: downward changes occurring in recessions are much more severe than upward movements occurring in expansions. The basic descriptive statistics in Table 1 suggest that price-dividend ratios fluctuate nearly two times more in recessions than in expansions. Similarly, Figure 1 reveals that expected returns and returns volatility behave asymmetrically over the business cycle.

To what extent can these empirical findings be explained by models with fully rational expectations? A simple possibility of this asymmetric behaviour in returns volatility, expected returns and price-dividend ratios is that the economy has been hit by *exogenous* shocks displaying precisely this kind of behaviour. But previous studies such as Schwert (1989) demonstrated that this channel is unlikely. Another possibility is that the economy has a nonlinear *endogenous* mechanism activating the previous phenomena. In the first part of this essay, I explore the possibility that these nonlinearities emerge because the investors' required return to invest in the stock-market changes *asymmetrically* in response to variations in the economic conditions. I emphasize that this point is not simply a re-statement that risk-premia are counter-cyclical. Rather, the crucial point I investigate is whether risk-premia increase more in bad times than they decrease in good times. Figure 1 summarizes basic pieces of evidence in support of this new idea. The evidence from Figure 1 is unambiguously striking. In good times, risk-premia and stock-market volatility do not vary too much. In bad times, risk-premia and stock-market volatility fluctuations are more pronounced². So why?

2. Understanding the empirical evidence

Why do asymmetries in risk-compensation generate counter-cyclical volatility? The economic intuition underlying this issue is simple. Intuitively, the price of a long-lived security is the risk-adjusted discounted expectation of the future dividends stream. Other things being equal, this price increases

* The empirical finance research team in FMG includes: Gregory Connor, Jon Danielsson, Andrew Ellul, Mohammed Fawaz, Anisha Ghosh, Cristian Huse, Michael Kollo, Robert Kosowski, Sheng Li, Oliver Linton, Antonio Mele, Alex Michaelides, Bob Nobay, Andrew Patton, Francisco Penaranda, Christian Reusch, Enrique Sentana, Michela Verardo'

(decreases) as expected returns (and hence risk-adjusted discount rates) decrease (increase); according to this mechanism, price-dividend ratios are pro-cyclical because risk-adjusted discount rates are counter-cyclical.

Next, suppose that risk-adjusted discount rates are also a *convex* function of some variable tracking the business cycle conditions – just as the pieces of empirical evidence gathered in Figure 1 would suggest. The economic meaning of this convexity property is that in good times, investors are relatively insensitive to changes in the state-variables driving the business cycle conditions; therefore, future dividends are discounted at approximately the same order of magnitude, and price-dividend ratios do not vary too much. But as business-cycle conditions deteriorate, investors raise sharply their discount rates, and future dividends are discounted at rapidly increasing orders of magnitude. Price-dividend ratios should now be highly responsive to changes in economic conditions in bad times. In other terms, price-dividend ratios should fluctuate more in bad times than in good times. This is precisely the evidence from Table 1. In one paper (Mele (2005)), I provide a theoretical description of the previous phenomenon within a general class of models with rational expectations. A key result in that paper is that counter-cyclical volatility may well emerge in equilibrium if the previous asymmetry in discounting is sufficiently strong. More precisely, it is possible to show that if this asymmetry in discounting is sufficiently strong, the price-dividend ratio is an increasing and concave function of variables tracking the business cycle conditions. It is this concavity feature of the price-dividend ratio to make returns volatility increase on the downside³.

2.1 Fluctuating compensation for risk

The previous results on counter-cyclical volatility hold in a fairly general continuous-time framework (see Mele (2005, Proposition 2)), but their proof is quite technical. I now offer a quantitative illustration of these results – through familiar tools. I develop a tree model. This model is very simple and in some dimensions also very poor, but it can be solved with straight forward maths. I consider an infinite horizon model with a representative investor who in equilibrium consumes (state by state) all the dividends promised by some asset. I also assume that there exists a safe asset elastically supplied so that the safe interest rate is some constant $r > 0$. In the initial state, a dividend process takes a unit value (see Figure 2). In the second period, the dividend equals either $e^{-\delta}$ ($\delta > 0$) with probability p (the bad state) or e^{δ} with probability $1-p$ (the good state). In the initial state, the investor's coefficient of constant relative risk-aversion (CRRA) is $\gamma > 0$. In the good (bad) state, the investor's CRRA is γ_G (γ_B) > 0 . In the third period, the investor receives the final payoffs in Figure 2, where M_S is the price of a claim to all future dividends discounted through a CRRA γ_S , and $S \in \{G, B, GB\}$ with $\gamma_{GB} = \gamma$ (the 'hybrid' state). This model is thus one with constant expected dividend growth, but random risk-aversion.

I calibrate this model through the same US data in Table 1, and report the results in Table 2. (The Appendix provides all details on the calibration.) In spite of its overly simplifying assumptions, the model does reproduce volatility swings similar to those we observe in the data – although it may overstate the expected returns levels by some percentage points. Importantly, this calibration exercise illustrates in an exemplary manner the asymmetric feature of expected returns and risk aversion. In this simple experiment, both expected returns and risk-aversion increase much more in bad times than they decrease in good times.

2.2 Alternative stock-market volatility channels

Rational explanations of stock-market fluctuations must necessarily rely on some underlying state variable affecting the investors' decision environment. Two natural ways to accomplish this task are obtained through the introduction of 1) time-varying risk-premia; and 2) time-varying expected dividend growth. The previous tree model is one simple example addressing the first extension. (More substantive examples of models predicting time-varying risk-premia are the habit formation models mentioned in footnote 3.)

Models addressing the second extension have also been produced. For example, Veronesi (1999) and Brennan and Xia (2001) have proposed models in which fluctuation in stock-market volatility is a learning induced phenomenon. In these models, the growth rate of the economy is unknown and investors attempt to infer it from a variety of public signals. This inference process makes asset prices also depend on the investors' guesses about the dividends growth rate, and thus induces high returns volatility. (In Veronesi (1999) stock-market volatility is also counter-cyclical.) Finally, Bansal and Yaron (2004) formulated a model in which expected dividend growth is affected by some unobservable factor. This model also generates counter-cyclical stock-market volatility. This property follows by the model's assumption that the volatilities of dividend growth and consumption are counter-cyclical. In contrast, in models with time-varying risk-premia (such as the previous tree model), counter-cyclical stock-market volatility emerges without the need to impose similar features on the fundamentals of the economy. Remarkably, in models with time-varying risk-premia counter-cyclical stock-market volatility can be *endogenously* induced by rational fluctuations in the price-dividend ratio.

3. What to do with stock-market volatility?

Both data and theory suggest that stock-market volatility has well pronounced business cycle patterns. A natural purpose at this juncture is to exploit these patterns to perform two (in-sample) forecasting exercises. I consider two exercises. In the first one, I forecast stock-market volatility from past macroeconomic data (long-run inflation, and long-run industrial production growth). In the second one, I forecast long-run industrial production growth from past stock-market volatility. Both exercises are entirely original.

Table 3 reports the results for the first forecasting exercise. Volatility is positively related to past growth. This is easy to understand. Bad times are followed by good times. Precisely, in my sample high growth is inevitably followed by low growth. Since stock-market volatility is counter-cyclical, high growth is followed by high stock-market volatility. Stock-market volatility is also related to past inflation, but in a more complex manner. Please note that once I control for past values of volatility, the results remain highly significant. Figure 3 (top) depicts stock-market volatility and its in-sample forecasts when the regression model is fed with past macroeconomic data only. This fit can even be improved through the joint use of both past values of volatility and macroeconomic factors. Nevertheless, it is remarkable that the fit from using past macro information is more than 60 per cent better than just using past volatility (see the R^2 s in Table 3). These results are somehow in contrast with those reported in Schwert (1989). But the key issue here is that I am predicting stock-market volatility within a longer time horizon perspective.

Table 4 reports results from regressing long-run growth on to macro variables and volatility (only R^2 s are reported). The volatility concept I use is purely related to volatility induced by price-dividend fluctuations (ie it is *not* related to dividend growth volatility). I find that the predictive power of traditional macroeconomic variables is considerably enhanced with the inclusion of this new volatility concept and the price-dividend ratio. According to Table 4 and Figure 3 (bottom), stock-market volatility does help predicting the business cycle.⁴

Conclusions

Stock-market volatility is higher in bad times than in good times. The ambition in this short essay is to explain that this well-known empirical feature is consistent with the prediction of the neoclassical model of asset pricing – in which asset prices are (risk-adjusted) expectations of future dividends. The condition activating counter-cyclical volatility is very simple: risk-premia must swing sharply as the economy moves away from good states, just as the data seem to suggest. My focus in this paper is on stock-market volatility *fluctuations*. Accordingly, I simply did not discuss whether the average levels of stock-market volatility and risk-premia are consistent with plausible levels of investors' risk-aversion (see, eg, Campbell (2003) and Mehra and Prescott (2003) for two views on this issue). But as I demonstrated with a basic tree, the neoclassical model seems promising in explaining how volatility switches across states. The final contribution of this essay is to investigate whether these theoretical insights have some additional empirical content. I demonstrated that stock-market volatility can be forecasted through macroeconomic variables. In turn, stock-market volatility contains relevant information related to the evolution of the business cycle. ■

¹ This essay draws upon ideas underlying two papers of mine, 'Rational Stock-Market Fluctuations' (2005 FMG DP 489, LSE) and 'Aggregate Stock Market Risk Premia and Real Activity,' forthcoming as FMG discussion paper. In writing this essay, I have also greatly benefited from ideas underlying a joint project with Valentina Corradi and Walter Distaso. I am very grateful to Bob Nobay for his invitation to write this short paper and to Andrew Patton for his comments on its very first draft. The usual disclaimer applies.

² To obtain the predictive regression in Figure 1, I have run Least Absolute Deviations (LAD) regressions because this methodology is known to be more robust to the presence of outliers than Ordinary Least Squares.

³ Under certain conditions, models with external habit formation predict counter-cyclical volatility along the same lines of arguments (see, for example, Campbell and Cochrane (1999), Menzly, Santos and Veronesi (2004), and Mele (2005)). In a recent paper, Brunnermeier and Nagel (2005) have found that US investors do not change the composition of their risky assets holdings in response to changes in wealth. The authors interpret their evidence against external habit formation. Naturally, time-varying risk-premia do not exclusively emerge in models with external habit formation. Barberis, Huang and Santos (2001) develop a theory distinct from habit formation that leads to time-varying risk-premia.

⁴ In all the forecasting exercises considered here, the independent variables may be nearly integrated. Therefore, the previous significance tests and goodness-of-fit measures should take into account this possibility. I did not consider these corrections in this exploratory study.

Appendix: Calibration of the tree

The initial step of the calibration reported in Table 2 involves estimating the two parameters p and δ of the dividend process. I estimate these parameters by a perfect matching of

$$\mu_D \equiv E \left(\frac{\text{Div}(\text{next_year})}{\text{Div}(\text{this_year})} \right) = pe^{-\delta} + (1-p)e^{\delta} \text{ and}$$

$$\sigma_D^2 \equiv \text{var} \left(\frac{\text{Div}(\text{next_year})}{\text{Div}(\text{this_year})} \right) = (e^{\delta} - e^{-\delta})^2 p(1-p)$$

to their sample counterparts $\hat{\mu}_D = 1.0594$ and $\hat{\sigma}_D = 0.0602$ obtained on US aggregate dividends data. The result is $(p, \delta) = (0.158, 0.082)$. Given these numbers, I fix $r = 1.0\%$ and calibrate the probabilities q , q_B and q_G . To calibrate these parameters, I need an explicit expression for all the payoffs at each node. By standard risk-neutral evaluation,

$$M_S = D_S \frac{q_S e^{-\delta} + (1-q_S)e^{\delta}}{e^r - [q_S e^{-\delta} + (1-q_S)e^{\delta}]}, S \in \{G, B, GB\},$$

where $q_{GB} = q$, $D_G = e^{2\delta}$, $D_B = e^{-2\delta}$ and $D_{GB} = 1$. I calibrate q_S to make the 'hybrid' price-dividend (P/D henceforth) ratio M_{GB} , the 'good'

P/D ratio $\frac{M_G}{e^{2\delta}}$ and the 'bad' P/D ratio $\frac{M_B}{e^{-2\delta}}$ perfectly match the average P/D ratio, the average P/D ratio in expansions, and the average P/D ratio in recessions (ie 31.99, 33.21 and 26.20 from Table 1). Given $(p, \delta, r, q, q_B, q_G)$, I compute the P/D ratios in states G and B . For example, the price of the asset in state B is,

$P_B = e^{-r} [q_B (e^{-2\delta} + M_B) + (1 - q_B) (1 + M_{GB})]$. Given P_B , I compute the (log)return in the bad state as $\log \left(\frac{\tilde{\Pi}}{P_B} \right)$, where either $\tilde{\Pi} = e^{-2\delta} + M_B$ (with probability p) or $\tilde{\Pi} = 1 + M_{GB}$ (with probability $1 - p$). I then compute returns volatility in state B . P/D ratios, expected (log)return and return volatility in state G are computed similarly. (Please notice that volatilities under p and under $\{q_S\}_{S \in \{G, B, GB\}}$ are not the same.) Finally, I recover the risk-aversion parameter γ in the three states $S \in \{G, B, GB\}$ implied by the previously calibrated three probabilities

$$q, q_G \text{ and } q = q_{GB}. \text{ The relevant formula to use is,}$$

$$\frac{q_S}{p} = \frac{e^{\gamma \delta}}{pe^{\gamma \delta} + (1-p)e^{-\gamma \delta}}, S \in \{G, B, GB\}, \quad (A.1)$$

The 'implied' risk aversion parameters in Table 2 are obtained by inverting eq. (A.1) for γ s given the previously calibrated values (p, δ, q_B, q_G) .

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Tables

Table 1 Business cycle properties of P/D ratios and returns

	total		NBER expansions		NBER recessions	
P/D	average	std dev	average	std dev	average	std dev
$\ln \frac{P/D_{t+1}}{P/D_t} \times 12 \times 100$	31.99	15.88	33.21	15.79	26.20	14.89
real returns	2.01	42.02	3.95	37.44	-7.28	58.16
smooth returns (real)	8.22	51.78	9.70	47.86	1.17	66.79
real risk-free rate	8.59	15.86	12.41	13.04	-9.45	15.49
excess returns volatility	1.02	2.48	1.03	2.43	0.97	2.69
	11.34	3.89	10.80	3.59	13.91	4.15

P/D is the S&P Comp. price-dividend ratio. Real returns (\tilde{R}_t say) are $\log(\text{returns})$ on the S&P Comp. return deflated by the CPI. Smooth returns as of time t are defined as $\sum_{i=1}^{12} \tilde{R}_{t-i}$. Excess returns are in returns in excess of the real (one month) risk-free rate and are computed similarly. Volatility is the excess returns volatility; it has been computed as explained in Figure 1. Data are sampled monthly and cover the period from January 1948 through December 2002. With the exception of the P/D ratio levels, all figures are annualized percent.

Table 2 Infinite horizon model

	expansions	Data average	recessions
price/dividend	33.21	31.99	26.20
returns volatility	10.80	11.34	13.91
	good state	Model calibration average	bad state
price/dividend	32.50	31.81	28.15
returns volatility	7.29	8.20	13.03
expected (log)returns	10.16	11.46	18.42
implied risk-aversion	13.69	13.89	14.96

Table 2 – the first two rows contain the same figures as in Table 1. The model calibrated is the tree model in Section 2. Implied risk-aversion is the coefficient of relative risk aversion in the various states implied by the calibrated model. Expected return, volatility and risk-aversion fluctuations are percentage changes from the average.

Table 3 Forecasting stock-market volatility with economic activity

	Past			Future	
Const.	6.92	7.76	2.48	Const.	8.28
Growth _{t-12}	–	0.29*	1.67	Growth _{t+12}	0.21*
Growth _{t-24}	–	0.74	1.09	Growth _{t+24}	1.62
Growth _{t-36}	–	2.17	2.44	Growth _{t+36}	-0.02*
Growth _{t-48}	–	1.77	1.91	Growth _{t+48}	0.12*
Infl _{t-12}	–	10.44	8.05	Infl _{t+12}	3.55
Infl _{t-24}	–	-5.96	-5.49	Infl _{t+24}	-0.81*
Infl _{t-36}	–	-1.42*	-0.97	Infl _{t+36}	-0.54*
Infl _{t-48}	–	3.73	3.31	Infl _{t+48}	4.33
Vol _{t-12}	0.43	–	0.37	R ²	12.79
Vol _{t-24}	-0.17	–	-0.09		
Vol _{t-36}	0.02*	–	0.09		
Vol _{t-48}	0.12	–	0.09		
R ²	16.38	26.01	34.52		

The first part of table 3 ('Past') reports ordinary least square coefficient estimates in linear regression of volatility (Vol) on to, *past* long-run industrial production growth (defined in Figure 1), *past* long-run inflation (defined similarly as growth in Figure 1), and *past* long-run volatility. Growth_{t-12} is the long-run industrial production growth at time $t-12$, etc. Time units are months. The second part of the table ('Future') is similar, but it contains coefficient estimates in linear regression of volatility on to *future* long-run industrial production growth and future long-run inflation. Starred figures are not statistically distinguishable from zero at the 95% level. R² is the percentage, adjusted R².

Table 4 Forecasting economic activity with stock-market volatility

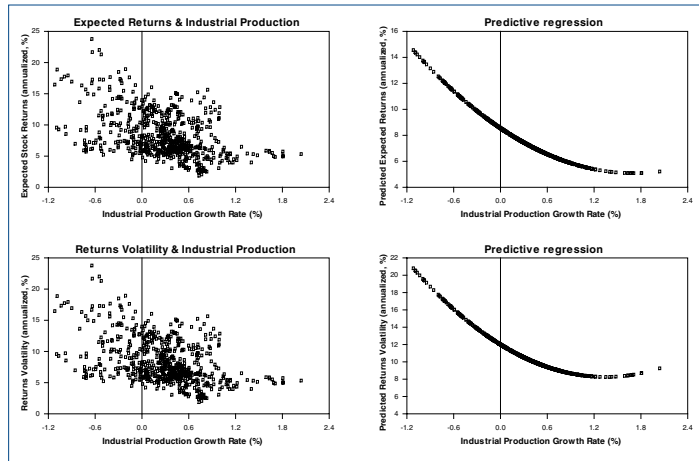
Predictors	R ²
1) P/D Volatility	10.81
2) P/D ratio	15.57
3) P/D Volatility, P/D ratio	20.98
4) Growth, Inflation	21.20
5) Growth, Inflation, P/D volatility	34.29
6) Growth, Inflation, P/D volatility, P/D ratio	41.76

Table 4 reports the R² (adjusted, in percentage) from six linear regressions of 6-months moving average industrial production growth on to the listed set of predicting variables. Inflation is also 6-months moving average inflation. The regressors lags are 6-months, and 1, 2 and 3 years. P/D volatility is defined as a 12 months

moving average of $\text{abs} \left(\log \left(\frac{1 + P/D_{t+1}}{P/D_t} \right) \right)$, where $\text{abs}(\cdot)$ denotes the absolute value, and P/D is the price-dividend ratio.

Figures

Figure 1 Expected stock-returns, volatility and business cycle conditions



The first row, first column of Figure 1 plots a measure of expected returns (π say) against a measure of long-run industrial production growth rate (IP_t). Expected returns are computed through Fama & French (1989) predictive regressions of S&P returns on to default-premium, term-premium and returns volatility (defined below). Long-run industrial production growth rate is defined as $IP_t \equiv (Ind_t + \dots + Ind_{t-11})/12$, where Ind_t is the real, seasonally adjusted industrial production growth rate as of month t . The first row, second column depicts the prediction of the static Least Absolute Deviations regression: $\pi = 8.56 - 4.05 \cdot IP + 1.18 \cdot IP^2 + \omega$, where ω is a residual term, and standard errors are in parenthesis. The second row, first column plots a measure of stock returns volatility in excess of the riskless asset (vol_t) against IP_t . Returns volatility is defined as $vol_t \equiv (|ex_{1t}| + \dots + |ex_{11t}|)/\sqrt{12}$; and ex_{1t} is the demeaned return in excess of the riskless asset as of month t . The second row, second column depicts the prediction of the static Least Absolute Deviations regression: $Vol = 12.01 - 5.57 \cdot IP + 2.06 \cdot IP^2 + \omega$, where ω is a residual term, and standard errors are in parenthesis. In all cases, data span the period from January 1948 to December 2002.

Figure 2 A tree model of random risk-aversion and counter-cyclical volatility

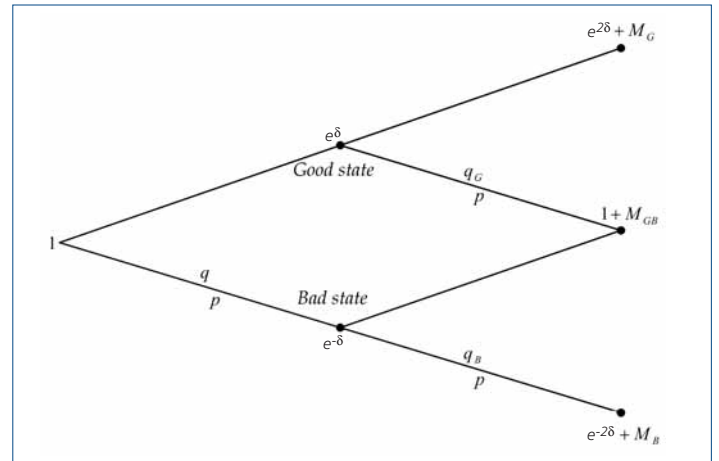
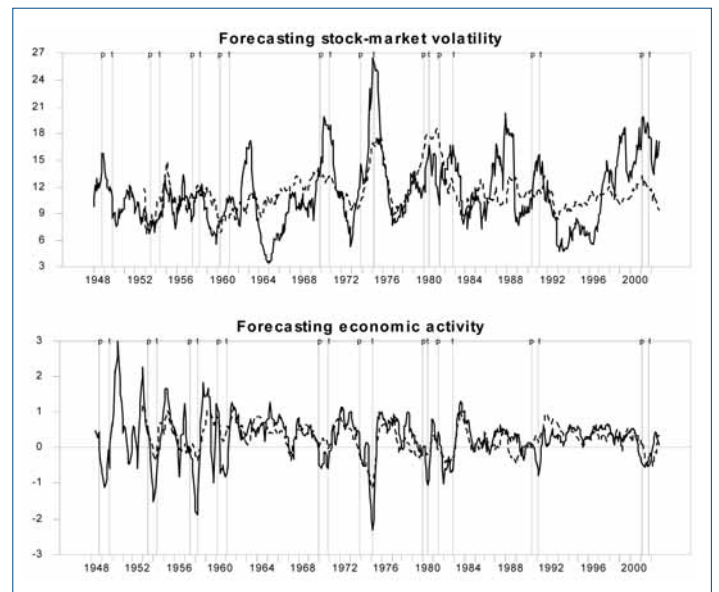


Figure 3 Forecasts



The top picture in Figure 3 depicts stock-market volatility (solid line) and stock-market volatility forecasts obtained through the sole use of the macroeconomic indicators in Table 3 (dashed line). Stock-market volatility is defined as in Figure 1. The bottom picture depicts six months moving average industrial production growth (solid line) and its forecasts based on the 6th regression in Table 4 (dashed line). 'p' and 't' are NBER peaks and troughs.

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The Capital Markets Workshop meets regularly throughout the academic year at 5pm on Wednesdays in room R405, Lionel Robbins Building, LSE.

Michaelmas Term 2005

- | | |
|--------------------|---|
| 5 October | Pedro Santa-Clara (UCLA) with Michael Brandt and Rossen Valkanov
Parametric Portfolio Policies: Exploiting Characteristics in the Cross Section of Equity Returns |
| 12 October | Paola Sapienza (Northwestern) with Luigi Guiso and Luigi Zingales
Cultural Biases in Economic Exchange |
| 19 October | Ayako Yasuda (Wharton)
Reputation as Discipline in Sell-side Research |
| 26 October | Markus Brunnermeier (Princeton)
Market Liquidity and Funding Liquidity
<i>Please note:</i> This workshop will take place in R505, 5th Floor, Lionel Robbins Building |
| 2 November | Adriano Rampini (Northwestern) with Andrea Eisfeldt
Leasing, Ability to Repossess, and Debt Capacity |
| 9 November | Tom Chemanur (BC)
Dual Class IPOs, Share Recapitalizations, and Unifications: A Theoretical Analysis |
| 16 November | Joe Chen (USC)
Downside Risk |
| 23 November | Antoinette Schoar (MIT)
Mixing family with business: Thai business groups and the families behind them |
| 30 November | Lubos Pastor (Chicago)
Technological Revolutions and Stock Prices |
| 7 December | Andrew Ellul (Indiana)
External Governance and Debt Agency Costs of Family Firms |

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Jonathan Leape, Ann Mumford, Ian Roxan, Judith Freedman, Malcolm Gammie and David Oliver

Discussion and Special papers

DP 526 (UBS Pensions Series 031)

Immigration or bust? Options for securing the future viability of the UK state pension system

Les Mayhew and David Blake

As a result of population ageing and declining fertility, the UK state pension system is unlikely to remain viable in the very long run without a steady inflow of young immigrant workers from abroad. However, with prudent economic management and continuing economic growth, immigration requirements can be contained and modest real increases in pensions are a possibility. Beyond 2020, further ageing of the population will lead to fiscal pressures and the need for remedial measures such as the raising of the state pension age. Higher economic activity rates among older people, including deferred retirement, will to some extent ameliorate but not eliminate these pressures. If fertility picks up over the next few years, this will also help, but not until after 2030. Without favourable economic growth, the fiscal problems will appear much sooner and could lead to cuts in pensions or to significantly higher contribution rates.

DP 527 (UBS Pensions Series 032)

Pension Plan Funding Risk Sharing and Technology Choice

David C Webb

The paper presents an analysis of the impact of pension plan funding on workers' saving and portfolio behaviour. It shows that the impact of pension plan funding and asset allocation on the economy's technology choices depends upon the constraints facing workers in the capital market. The failure of equivalence propositions between defined benefit and defined contribution pension

plans derives from the existence of borrowing and short-sales constraints. The two types of plan force workers against the constraints differently yielding an asymmetric impact on risk taking and technological choice in the economy and thereby on the equity premium. The outcome of the market economy is a risk sharing arrangement between the workers and rentiers. This leaves open the question of how best to share risk between generations. The argument that defined contribution pensions and individual savings are an effective market solution to risk sharing may conflict with the institutional arrangements needed to manage effective intergenerational risk smoothing.

DP 528 (UBS Pensions Series 033)

Can the retirement-consumption puzzle be resolved? Evidence from the British Household Panel Survey

Sarah Smith

This paper uses data from the British Household Panel Survey to shed further light on the fall in spending at retirement (the 'retirement-consumption puzzle'). Comparing food spending for men retiring involuntarily early (through ill health or redundancy) with spending for those who retire voluntarily, it finds a significant fall in spending only for those who retire involuntarily. This is consistent with the observed fall in spending being linked to a negative wealth shock for some retirees. Evidence on psychological and financial well-being also indicates that the retirement experience of involuntary retirees is very different to that of voluntary retirees.

DP 529

A Model of Corporate Liquidity

Ron Anderson and Andrew Carverhill

We study a continuous time model of a levered firm with fixed assets generating a cash flow which fluctuates with business conditions. Since external finance is costly, the firm holds a liquid (cash) reserve to help survive periods of poor business conditions. Holding liquid assets inside the firm is costly as some of the return on such assets is dissipated due to agency problems. We solve for the firm's optimal dividend, share issuance, and liquid asset holding policies. The firm optimally targets a level of liquid assets which is a non-monotonic function of business conditions. In good times, the firm does not need a high liquidity reserve, but as conditions deteriorate, it will target higher reserve. In very poor conditions, the firm will declare bankruptcy, usually after it has depleted its liquidity reserve. Our model can predict liquidity holdings, leverage ratios, yield spreads, expected default probabilities, expected loss given default and equity volatilities all in line with market experience. We apply the model to examine agency conflicts associated with the liquidity re-serve, and some associated debt covenants. We see that a restrictive covenant applied to the liquidity reserve will often enhance the debt value as well as the equity value.

Special Paper

SP 160

Defining and Achieving Financial Stability

William A Allen and Geoffrey Wood

The phrase 'financial stability' has in the past decade come to signify an important function of central banks and certain other public

Forthcoming Discussion and Special Papers

authorities. The Bank of England used the term in 1994, to denote those of its objectives which were not to do with price stability or with the efficient functioning of the financial system. We are not aware of any earlier usage of the phrase. Ten years on, there is still no widely-accepted definition of 'financial stability' and therefore, equally, no consensus on what policies should be pursued in the interests of financial stability. In the words of the Governor of the Swedish central bank, 'the concept of stability is slightly vague and difficult to define'.

It is, however, clear what kind of thing financial stability is about. It is about institutions not suddenly collapsing and causing economic damage to people who could not reasonably have been expected to anticipate the collapse. The purpose of this paper is to try to articulate a definition of financial stability, and to discuss what kind of public policies should be adopted in pursuit of financial stability.

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