



WARWICK ECONOMICS

Bulletin

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Stephen Broadberry

Rethinking England's
economic past

Nicholas Crafts

Modern lessons from the
Great Depression

Peter Hammond

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unpredictable

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Celebrating five years

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Celebrating five years

Introduction

In the opening lines of a new publication begun five years ago, Professor Mark Harrison posed a thought-provoking question about the work of economists. "Why do we write research papers?" he mused. He settled on an answer that transcended both economics and academics. In essence, he concluded, we seek immortality.

With these thoughts, an undertaking entirely new to the University of Warwick Department of Economics began. The venture was called the *Bulletin of the Economic Research Institute*. In essence, its four pages represented our first attempt to explain what we do to the rest of the world. What began as something of an experiment conceived by Prof. Harrison has since become a fixture of every academic term and a regular reminder of the breadth and reach of the ongoing research of this department, in particular, and the discipline of economics as a whole.

This magazine celebrates the *Bulletin* at five. These pages contain highlights of research articles – still resonant – from past editions, as well as new reflections by Professor Andrew Oswald, whose research agenda, conducted at the border between economics and behavioural science, has led our profession and our policy-makers to think anew about the ways in which we measure prosperity. As Prof. Oswald observes, when one examines how economic progress and human happiness interact, "... it is necessary to have a yardstick that is as psychological as it is economic."

The *Bulletin* originally began under the auspices of the Economic Research Institute, a centre within the department. Over the years, both the institute and the *Bulletin* expanded their reach to take on a broader spectrum of the department's agenda, and now, their names are changing to reflect their scope. Thus, they are being re-christened the Warwick Economics Research Institute and the *Warwick Economics Bulletin*.

From its first edition in the autumn of 2007, the *Bulletin* established a firm tradition of summarising thought-provoking and often surprising work. That first issue discussed prevailing beliefs that hold sway in foreign exchange markets, how incentive pay for managers could improve worker productivity, and insights from a newly discovered, verbatim transcript of a 1927 Russian Politburo meeting in which Stalin persuaded Bolsheviks not to abandon market incentives.

Over the years, the *Bulletin* highlighted research from this department that addressed major issues on the world stage – the global financial crisis, monetary policy, and the effects of trade. At the same time, it has also shed light on issues one might not necessarily associate with economics – matters such as education policy, women's influence in elected office, even religion's effect on suicide.

The *Bulletin's* anniversary offers an occasion to reflect on a select sample of the compelling work this department has produced over the years. At the same time, it sets a high standard for the years ahead.

Abhinay Muthoo

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HISTORY LESSONS

Nicholas Crafts explains what the Great Depression of the 1930s taught the economics profession, and how these insights proved invaluable in facing the Great Recession of this century.

The Great Recession of 2008-9 came as a big shock to economists as well as to the general public. Many policy experts and economists had become accustomed to the serene conditions of the so-called Great Moderation, which had led to triumphalist claims that cycles of boom and bust had been abolished and a complacent belief that monetary policy guided by an independent central bank would inevitably deliver steady growth with low inflation.

These delusions were shattered by the financial crisis that erupted in 2008. In the panic that ensued, the frighteningly real possibility loomed of a repeat of the Great Depression of the early 1930s, when real GDP and prices both fell by more than 25 percent in the United States, one in three American banks failed and a seventh of bank deposits were wiped out.

Because the current crisis caught the economics profession unawares, some viewed it as a sign that economics had not learned from the Depression. Indeed, in 2008, when Queen Elizabeth II asked why no one had seen the crisis coming, she spoke the question on the minds of many and reflected an undercurrent of broader unease about the capabilities of modern economic science.

In some senses, the recession of our times underscored weakness and the strengths of state-of-the-art economics. The lack of foresight does represent a failure of economics, that will foretell the next crisis, and "early warning" models on threats to financial stability remain far from satisfactory.

Yet, at the same time, the crisis demonstrated just how many important insights and policy tools economists gained by analysis of the 1930s. These policy lessons, learned in the wake of the modern world's deepest economic crisis, were sufficiently understood that contemporary economic science arguably prevented the Great Recession from becoming another Great Depression.

The most essential tools in fighting a banking crisis prove to be an aggressive central bank and regulation to limit excessive risk-taking.

This represents an enormous triumph of economic science. Yet, at the same time, some of the most important lessons have been learned in

theory by the profession, but have yet to be put into meaningful practice in public policy.

A look back at the American Great Depression gives us a useful perspective on these issues. Then, too, the crisis was not forecast. But economic analysis after the Depression has revealed its sources, its consequences and its policy implications.

With the benefit of hindsight, there is no great mystery about what went wrong in the United States in the early 1930s. We know that the American banking system was fragile. It was undercapitalised and badly regulated. Banks had made many bad loans. So-called unit banking prevented banks from establishing networks of branches. There was no federal deposit insurance, and the US Federal Reserve Bank, the lender of last resort, was inexperienced and incompetent.

These weak banks were unable to withstand a recessionary shock. Bank failures led to a credit crunch and a collapse of the money supply. Real interest rates soared into double digits as the result of monetary shocks and deflationary price expectations. Investment virtually ceased. In the absence of deposit insurance, there was a scramble to hold cash rather than to put money into bank deposits. This put even more pressure on banks.

The catastrophic outcome was the result of a passive response by the Federal Reserve. Recovery required regime change. The United States left the gold standard. Banks were re-capitalised and re-regulated. Federal deposit insurance was established. Expansionary monetary policy created strong demand growth.

To develop models to forecast sequences of events such as these would be extremely difficult if not impossible, but to learn from these experiences is necessary and very possible.

Two key lessons emerge.

First, the Great Depression showed the unrivalled importance of a central bank's aggressive response to crisis. This lesson was well understood and well executed in the recent recession, especially by the Federal Reserve led by Ben Bernanke, a scholar who has made seminal contributions to research on the period. Aggressive policy responses prevented a collapse of the banking system and

The most essential tools in fighting a banking crisis prove to be an aggressive central bank and regulation to limit excessive risk-taking.



The Author

Nicholas Crafts is a Professor in the Department of Economics at the University of Warwick. He directs the Centre on Competitive Advantage in the Global Economy (CAGE). This article is adapted from "Lessons from the 1930s", the *Oxford Review of Economic Policy*, vol. 26, no. 3 (2010), which he edited. An introductory essay, co-authored with Peter Fearon, economist at the University of Leicester, is also available as University of Warwick CAGE Working Paper no. 23/10, available at http://www2.warwick.ac.uk/fac/soc/economics/research/centres/cage/research/papers/23.2010_crafts_lessons.pdf

injected fiscal and monetary stimulus which limited the downturn. Similar actions in 1930-31 would have averted the economic catastrophe that followed for the United States. However, at that time, the state of economic analysis available to policymakers was not up to the task. So, when the 2008 banking crisis began, the historical lessons offered guidance to limit the impact to the level of Great Recession rather than Great Depression.

A second key lesson from the Great Depression involves regulation and the need to confront the pervasive problem of moral hazard – lending on the basis that the bank management takes any upside but losses are borne by someone else (taxpayers, depositors, shareholders). During the 1930s, as today, reliance on market discipline appeared unrealistic.

From the 1930s, the standard response to these market-failure problems was a combination of partial deposit insurance together with regulation of bank behaviour. There is a trade-off, since very tight regulation may achieve financial stability but impose high costs through preventing the realisation of economies of scale and scope or inhibiting valuable innovations.

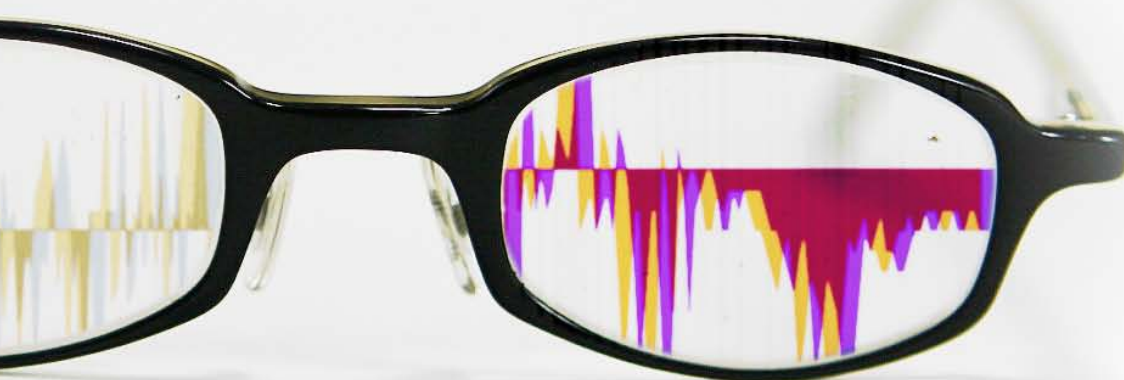
Over time and after several decades of financial stability, these costs seemed increasingly onerous. The strict regulation that stemmed from the debacle of the 1930s was relaxed in countries such as the United States. However, the idea that

systemically important banks were "too big to fail" and would always be bailed out by government ensured that moral hazard was alive and well. In this circumstance, a banking crisis becomes more likely and, if it can't be prevented, then the requirement of policymakers is to make an effective response to contain the crisis.

For regulation to work effectively, it is crucial that it be well-designed. Yet a sobering lesson from the 1930s is that it most probably won't be. Vested interests are likely to hijack the politics of regulatory design. Tighter regulation was appropriate then and is still needed now to contain moral hazard. Fears about bank solvency in a world of imperfect information can lead to "bank runs" as depositors seek to withdraw their funds or interbank lending dries up.

Fortunately, banking crises are relatively rare in advanced economies. They are very expensive in terms of the depth and length of the downturns with which they are associated. For governments, the fiscal legacy of a crisis is evidenced through increased deficits and debt-servicing. For individuals, the toll is evidenced in the severe and sustained decline in the well-being of people who join the ranks of the long-term unemployed. For these reasons, policy-makers and the economics profession ought to study and apply the lessons learned from the painful experiences of the Great Depression.

The crisis reveals the weaknesses and the strengths of state-of-the-art economics. While early warning models remain unsatisfactory, contemporary economic science arguably prevented the Great Recession from becoming another Great Depression.



ADAPTING TO THE ENTIRELY UNPREDICTABLE: BLACK SWANS, FAT TAILS, ABERRANT EVENTS, AND HUBRISTIC MODELS

Since the spring of 2007, economic theorist **Peter Hammond** has been working on a Marie Curie research project called "Adapting to the Entirely Unpredictable". Here, he comments on some aspects of a well-known book apparently on the same topic – Nassim Nicholas Taleb's *The Black Swan: The Impact of the Highly Improbable*, published in 2007.

In 82 AD, Juvenal wrote of "rara avis in terris nigroque simillima cygno" (a rare bird upon earth, and exceedingly like a black swan), but that was imaginative irony. In the year 1697, Willem de Vlamingh was the first European to record seeing a real live black swan in its native Australian habitat.

Later, John Stuart Mill wrote: "No amount of observations of white swans can allow the inference that all swans are white, but the observation of a single black swan is sufficient to refute that conclusion." It became a classical example in elementary philosophy.

Nassim Nicholas Taleb's book *The Black Swan: The Impact of the Highly Improbable* provides many vivid examples of events, often related to finance or economics, which he sees as meeting his characterisation of a "black swan" event as an "outlier" with "an extreme impact" for which "human nature makes us concoct explanations after the event".

The book was written before the recent crisis in global financial markets. Nevertheless, it does discuss several earlier crises, such as the stock market crash of October 1987, which are often plausibly blamed on faulty statistical models.

Indeed, at an early stage of his book, Taleb defines a "special case of 'gray' swans", which are rare but expected. More precisely, they have probability distributions described by "Mandelbrotian randomness", a particular class of "fat-tailed" probability distribution following a power law.

These distributions put so much weight on outliers, or extreme values of a random variable v that, for large enough k , the expectation of the k th power of v , otherwise known as the k th moment of the distribution, becomes infinite. This is in stark contrast to the normal or Gaussian distribution, for which the tail of the distribution is so "thin" that all moments exist.

Yet this is typically not the issue with the

random value of an asset, especially a derivative security. For these, there is a positive probability of losing everything. This kind of extreme risk cannot be captured by a Gaussian distribution or by any "smooth" alternative such as a power law.

But there is little really new here, since statisticians and financial economists, along with decision and game theorists, have been coming to terms with probability distributions that do not correspond to a smooth density function.

Much more challenging than these 'gray' swans, however, are the true black swans, which effectively break our existing scientific models. The eponymous example is when Europeans first became aware of the (black) swan species now called *cygnus atratus*, since that broke any of their previous biological models of the genus *cygnus*.

Taleb does recognise that such events could occur, but regards them as "totally intractable", scientifically speaking. Nevertheless, biologists have formulated statistical models intended to forecast probabilistically the likely number of new species that one might expect to find in a poorly explored habitat. And economists have developed many models of economic growth with technical progress, which may be approximately treated as the accumulation of many small but favourable surprises.

More generally, any practical model, especially in the social sciences, must have bounded scope and so must ignore some real possibilities that could occur and have a noticeable impact. Recent examples include several bank failures and the first UK bank run in over 100 years. Other potential examples could be important new scientific discoveries relating to climate change or its mitigation.

These could be described as "aberrant" events which, by definition, lie outside the current model and the occurrence of which effectively breaks the model. Indeed, aberrant events should be distinguished from events within the model, which,

The Author

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like Taleb's 'gray' swans, are recognised but given extremely low or even zero probability.

In his classic book *The Foundations of Statistics*, Leonard Savage discusses "small worlds" and contrasts the proverb "cross your bridges as you come to them" with the almost contradictory "look before you leap."

The first of these recommends a model that temporarily leaves out future bridges, so encountering a river that cannot be forded becomes an aberrant event. What I like to call "hubristic" models may well do this, and so recommend taking short cuts whose lack of viability becomes clear only as a river bank comes into view. A more cautious route would be along well-marked paths that lead to a usable bridge whenever a significant river is encountered.

As the statistician George Box wrote: "Essentially, all models are wrong, but some are useful." Like engineers, it might be wiser to allow some safety margins rather than lurching between successive small-world and insufficiently imaginative hubristic models that never even consider the possibility of an aberrant event.

So, while all useful statistical decision models are no doubt incompletely specified, it would be

wise to allow for the possibility that they are sure to need serious re-specification at some time, possibly in the near future.

Meanwhile, despite its title, Taleb's book is mostly about how statistical models, especially in finance, should pay more attention to low-probability 'gray' swans. It would be much more interesting – though undoubtedly challenging – to discuss truly aberrant black swan events, to which no probabilities are attached because the model we use does not even contemplate their possibility.

As for whether less hubristic modelling could help forestall economic crises or deal better with climate change, it seems indisputable that we should at least try. But that is a topic for later discussion.

Publication details

The full title of Peter Hammond's Marie Curie research project is "Adapting to the Entirely Unpredictable, and Other Aspects of Dynamic Behaviour: Beyond the von Neumann Standard Paradigm in Games and Economics." The title alludes to John von Neumann's pioneering 1928 paper, which offers a "game in extensive form" as a complete mathematical description of many single or multi-person decision problems.

In theory, computers can play chess perfectly; in practice, computers can currently guarantee perfect play only when no more than six pieces remain on the board. Similar limitations apply to all difficult decision problems, including how to model economic and financial systems. So any decision model should be flexible enough to allow graceful adaptation to potential changes that any practical model must otherwise ignore.

Less "hubristic" modelling could help forestall economic crises or deal better with climate change

RETHINKING ENGLAND'S ECONOMIC PAST

Living standards in medieval England exceeded those in poor nations of the 21st century, according to research by **Stephen Broadberry** and colleagues.

Living conditions in England during medieval times were far better than previously has been believed, with average incomes twice those of people in the world's poorest nations today, our recent research shows.

Our work, which sheds new light on the British economic past, reveals that per capita incomes in medieval England were substantially higher than the "bare bones subsistence" levels experienced by people living in poor countries in our modern world. The majority of the British population in medieval times could afford to consume what we call a "respectability basket" of consumer goods that allowed for occasional luxuries. By the late Middle Ages, the English people were in a position to afford a "respectable lifestyle", with a varied diet including meat, dairy produce and ale, as well as the less highly processed grain products that comprised the bulk of the "bare bones subsistence" diet.

Our research provides the first annual estimates of GDP for England between 1270 and 1700 and for Great Britain between 1700 and 1870. Far more data are available for the pre-1870 period than is widely realised. Britain after the Norman conquest was a literate and numerate society that generated substantial written records, many of which have survived. As a result, our research was aided by a wide variety of records – among them manorial records, tithes, farming records, and probate records, all of which can be used in an economic framework. Our team used these records and compared them with modern national accounts to reconstruct the path of per capita income over most of the second millennium.

Living standards in medieval England were far above the "bare bones subsistence" experience of people in many of today's poor countries.

In addition, our research shows that the path to the Industrial Revolution began far earlier than commonly has been understood. A widely held view

of economic history suggests that the Industrial Revolution of 1800 suddenly took off, in the wake of centuries without sustained economic growth or appreciable improvements in living standards in England from the days of the hunter-gatherer.

By contrast, we find that the Industrial Revolution did not come out of the blue. Rather, it was the culmination of a long period of economic development stretching back as far as the late medieval period. Our findings paint a picture of a Western Europe that was on a very different path of development from Asia long before the Great Divergence of the Industrial Revolution. By 1700, the structure of the Western European economy had shifted away from agriculture towards industry and services, and living standards were twice as high as in 1270.

How should we interpret the approximate doubling of per capita income between 1270 and 1700? Gains in food consumption per capita over this period were relatively modest, at least measured in terms of kilocalories. The gains in material living standards should thus be seen as arriving more through the consumption of industrial goods and services. This shows up in the path of average wealth at death and the growing urbanisation of the British economy.

It is instructive to consider Britain's historical economic experience in an international perspective. The figure of \$400 annually (as expressed in 1990 international dollars) commonly is used as a measure of "bare bones subsistence", and is seen in many poor countries in the late 20th and early 21st centuries. As expressed in 1990 dollars, English per capita incomes in the late Middle Ages were on the order of \$1,000. This is an amount well above the widely accepted per capita income estimate of \$400 for English per capita incomes in the year 1000. Even on the eve of the Black Death, which first struck in 1348-9, we find per capita incomes in England of more than \$800 using the same 1990 dollar measure. Estimates



Living standards in medieval England were far above the "bare bones subsistence" experience of people in many of today's poor countries.



for other European countries also suggest late medieval living standards well above \$400.

Although agriculture was the largest sector in 1381, it was not as dominant as has often been imagined. By 1700, industry already accounted for a larger share of the economy than agriculture. The British economy seems to have been stimulated by the growing population density in urban areas. This promoted infrastructure projects in urban areas and raised productivity by permitting the reorganisation of agriculture in the counties surrounding London.

Ultimately, we are interested in what happened to GDP per capita, the most widely accepted indicator of material living standards over the long run. English per capita GDP grew at an annual rate of 0.20 percent between 1270 and 1700, which resulted in an approximate doubling of per capita incomes. However, growth was episodic. GDP per capita grew substantially during the Black Death crisis of the mid-14th century, when almost half the population was wiped out by the plague. Per capita incomes then remained on a plateau between 1450 and 1650, before resuming growth during the second half of the 17th century.

England's economic breakthrough, the Industrial Revolution, took root far earlier than commonly had been believed.

Our findings help us to understand why some parts of the world are far more developed than other parts. They show that the roots of this divergence lie much further in the past than people suppose.

England's economic breakthrough, the Industrial Revolution, took root far earlier than commonly had been believed.

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Professor **Stephen Broadberry** is a Research Theme Leader at the Centre for Competitive Advantage in the Global Society (CAGE). After nearly 25 years in the Department of Economics at the University of Warwick, he moved to the London School of Economics in 2011.

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Mark Overton is a Professor at the University of Exeter. **Bas van Leeuwen** is a Senior Research Fellow in the Department of Economics at the University of Warwick.

Publication details

This summary is based on a preliminary research paper, "British Economic Growth, 1270-1870." The paper is part of an ongoing project looking at historical patterns of development and underdevelopment. It is among the first projects undertaken by Warwick University's Centre on Competitive Advantage in the Global Economy (CAGE). The full paper is available at:

<http://www2.warwick.ac.uk/fac/soc/economics/staff/academic/broadberry/wp/britishgdplongrun8a.pdf>

THE ILLUSION OF STABILITY: LOW INFLATION IN A BUBBLE ECONOMY



The Bank of England was granted independence in 1997 with a remit to control consumer price inflation. Research by **Marcus Miller** and colleagues shows that, while this narrow focus preserved the semblance of stability for some time, neglect of the growing bubble in the housing market meant that stability was always an illusion.

Economists are deeply divided on how deregulated housing markets work. Some take an "efficient market" view, where house prices satisfy the arbitrage relationships of households making decisions in the light of current and future fundamentals. This is in line with the current mainstream "dynamic stochastic general equilibrium" (DSGE) perspective of how the economy as a whole functions.

Robert Shiller of Yale University, on the other hand, warns that house purchase is an area where "social contagion" plays a large role and buyers can easily lose sight of economic fundamentals.

This perspective finds support from behavioural economics. Using examples from US regional housing markets to show that arbitrage

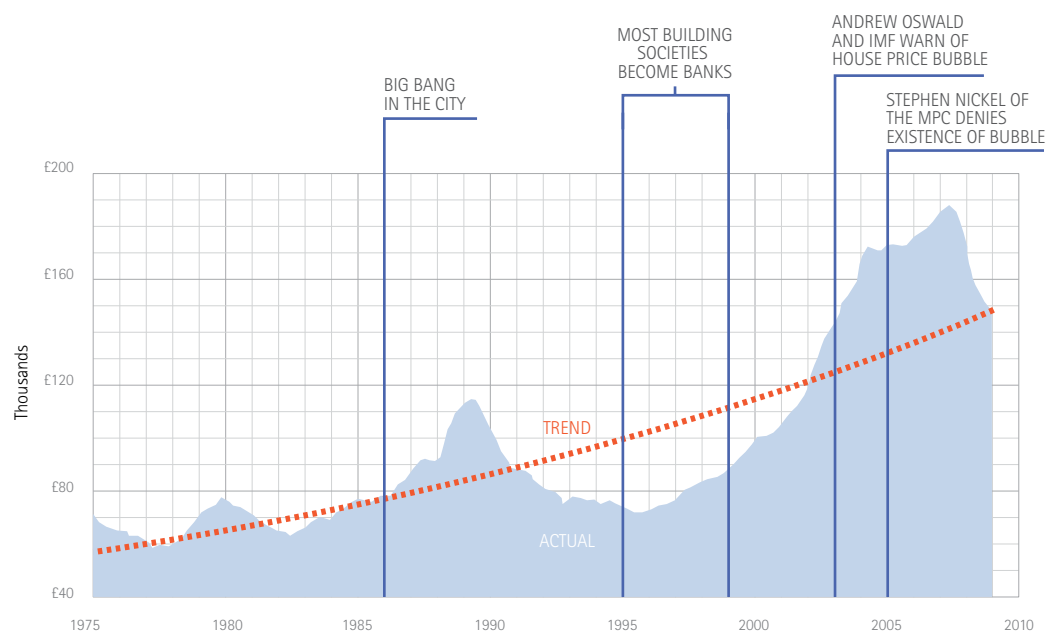
relationships have, in fact, been "broken", David Laibson of Harvard University argues that the prevalence of "trend-chasing" and the acceptance of "social proof" can promote prolonged asset price bubbles – and have done so.

What about the UK, where house purchase and finance have been progressively deregulated since mortgage rationing ended in the late 1970s? As Figure 1 shows, house prices adjusted for inflation show two pronounced surges above trend since then, with peaks in 1988 and 2007 (when prices stood about a third above the trend line for the last 30 years).

While Robert Shiller's index of real home prices in the United States (the Case-Shiller index) increased 85% between 1997 and the peak in 2006,

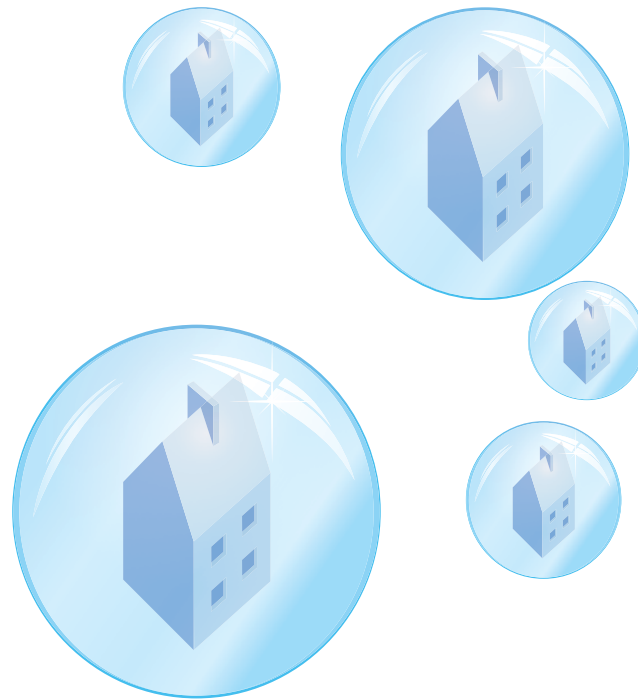
Neglecting house prices is as sensible as ignoring icebergs when steaming across the North Atlantic

Figure 1. Real House Prices in the UK, 1975 to 2009



Source: Nationwide Building Society. Average house prices are deflated by the change in the Retail Price Index, based on 2009 (Q1) = 100. The upward trend is 2.9% per year.

New policy instruments require closer coordination between the Bank, the Treasury and the Financial Services Authority



real house prices in the UK more than doubled from 1997 – when the Bank of England was granted independence with a narrow remit to control consumer price inflation.

In both countries, the “doctrine of denial”, espoused by Alan Greenspan (Federal Reserve chairman, 1987–2006), prevailed: since bubbles are difficult to detect and control, the central bank should restrict itself to coping with the after-effects of bubbles that burst.

Studies confirm that changes in real house prices in the UK have a momentum that can lead to prolonged departures from the trend or “equilibrium” prices. For example, a report by the International Monetary Fund (IMF) in 2003 provides evidence of excess valuation after deregulation in the 1980s, and of growing “disequilibrium” after 2000.

The IMF gave a clear public warning of asset price disequilibrium four years before UK real house prices peaked, as indicated in Figure 1. So too did our University of Warwick colleague Andrew Oswald, who, in early 2003, forecast a coming fall of 30%.

Two years later, however, Stephen Nickell, then the longest-serving member of the Bank of England’s Monetary Policy Committee (MPC), took a very different view – effectively endorsing the efficient markets perspective.

What if a housing bubble affects aggregate demand via a “wealth effect”, boosting consumer spending excessively as rising house prices make people feel better off? Our research shows that a narrow focus on consumer price inflation – while neglecting a growing bubble in housing – may preserve the semblance of stability for some time.

But with the bubble-distorting policy on the way up and wreaking havoc on the banking system when it bursts, this is an illusion. A policy of neglecting house prices in these circumstances is about as sensible as ignoring icebergs when steaming across the North Atlantic!

What should be done? As Charles Bean, Deputy Governor of the Bank of England, has recently acknowledged, new instruments of policy, such as dynamic capital requirements and loan-to-value limits, are needed as a complement to interest rate setting for a bubble-prone economy. Effective use of these new instruments will surely require closer policy coordination between the Bank, the Treasury and the Financial Services Authority.

The Authors

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Publication details

This article summarises “The illusion of stability: low inflation in a bubble economy”, by Marcus Miller, Ishita Mohanty, and Lei Zhang, published in in 2009 in *The Manchester School* 77, Supplement 1, pp 126–149.



THE CUT-PRICE WARS



The number of military conflicts is increasing, and a key reason is that waging war has become cheaper than ever, according to research by **Mark Harrison and Nikolaus Wolf**.

In some respects the world is more peaceful today than it has been for many years. We tend to forget how much bloodier were the conflicts of the past. In World War II, for example, 300 US troops were killed per day; this fell to 50 a day in Korea, 20 a day in Vietnam, and two a day in Iraq. Obviously, Americans are not the only people who die in wars, but American statistics vividly illustrate the trend.

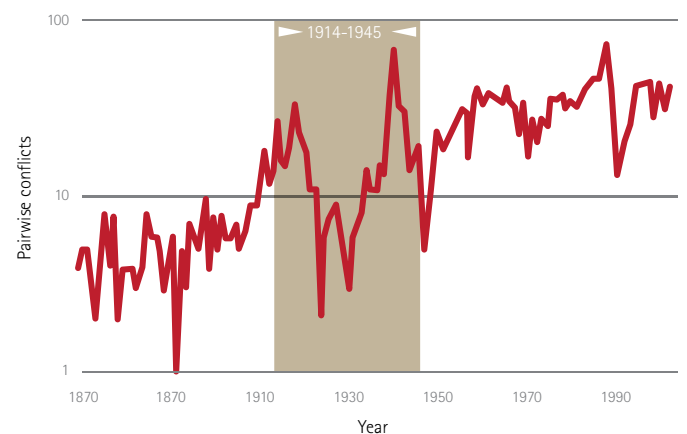
Some other trends are less comforting. The end of the Cold War allowed hundreds of millions of people to dream more freely of national self-determination. But just at the moment when hundreds of millions of people believed that a more peaceful world was around the corner, wars and civil wars broke out in many parts of the world.

Our research was inspired by the discovery of a new and simple fact, illustrated in the chart at left. The number of conflicts between pairs of states around the world has been rising since 1870. "Pairwise conflicts" are measured by the number of pairs of countries in conflicts. Conflicts include everything from full-scale shooting wars and uses of military force to displays of force such as sending warships and closing borders. Because we look only at wars between states, civil wars are not counted.

The number of conflicts has been rising on a stable trend; meaning there has been a significant tendency for the year-on-year increase of about 2 percent, a figure that has remained relatively constant over the whole period. Because of two world wars, the series is quite disturbed between 1914 and 1945. Remarkably, after 1945, the frequency of wars continued on the same upward path as before 1913.

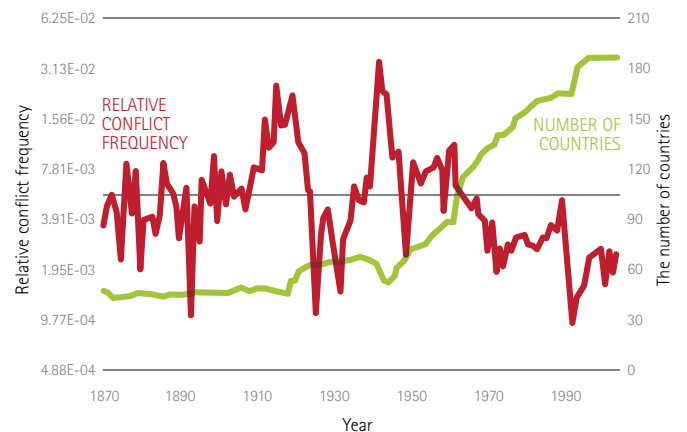
Our research examines the causes of this 130-year trend. The number of pairwise conflicts is driven arithmetically by the probability that any one country will be drawn into conflict with another multiplied by the number of countries. Since 1945 the number of countries has risen dramatically – so

Figure 1. Democratisation: Militarised disputes between pairs of states since 1870



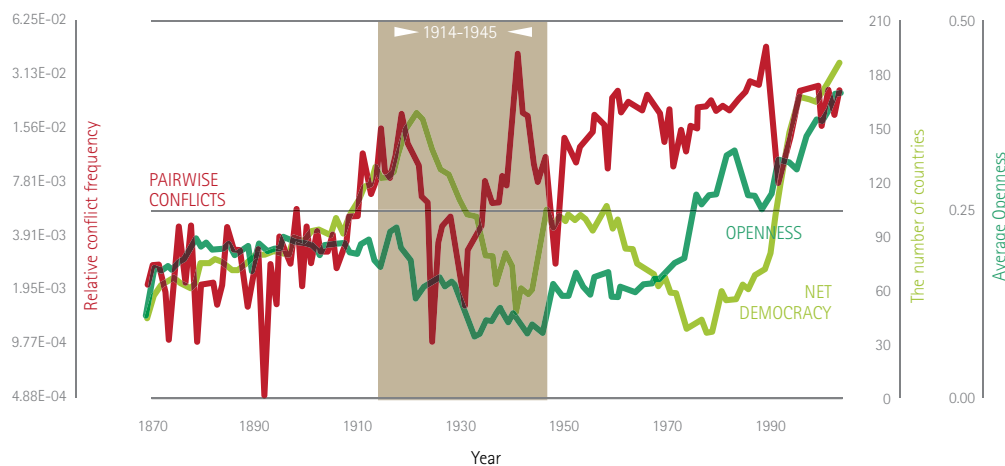
Source: The Militarised Inter-State Disputes dataset, version 3.1, at www.correlatesofwar.org, described by Ghosn, Palmer and Bremer, 'MID3 data set'.

Figure 2. The relative frequency of pairwise militarised disputes and the number of independent states since 1870



Source: Conflict data as Figure 1. Openness data from Martin, Mayer, and Thoenig, 'Make trade not war'.

Figure 3. Democratisation and trade: political competition, executive constraint and trade openness since 1870.



Sources: Conflict data as Figure 1. Net democracy: the Polity2 variable from the Polity IV dataset at <http://www.systemicpeace.org>, described by Marshall and Jaggers, 'Political regime characteristics'. Openness data from Martin, Mayer, and Thoenig, 'Make trade not war'.

much so that, over the whole period, the probability of any two countries being in conflict has not risen. That is, more pairs of countries have clashed because there have been more pairs.

This is not reassuring: it shows a close connection between wars and the creation of states and new borders. As the experiences of our two world wars suggest, you never know which little conflicts will suddenly snowball into much wider, more deadly struggles.

This somewhat alarming finding presents a puzzle. Much of what we think we know says this should not be happening. The countries of the world have tended to become richer, more democratic, and more interdependent. Much political science is built on the idea that the political leaders of richer, more democratic countries have fewer incentives to make war and are more constrained from doing so.

We do not think these ideas are wrong, but our findings suggest that they are incomplete. Without being certain of the answer, we think the focus has been too much on preferences for war (the "demand side") and not enough on capabilities (the "supply side").

Capabilities may be the missing factor in the story of the rising frequency of wars. We argue that the same factors that should have depressed the incentives for rulers to choose conflict are also increasing the capacity for war. Drawing on our own and others' historical research, we reach four conclusions.

First, productivity growth has cheapened destructive power to the point where mass

destruction comes out of a suitcase. This process began in Europe and has been going on for more than half the past millennium.

Second, the key to modern states' acquisition of destructive power is the ability to tax and borrow more than ever before. Since the 17th century the growth of fiscal capacity has been revolutionised, first by the rule of law, and then by modern dictators.

Third, war is disruptive of trade, but globalisation has reduced the trade costs suffered by countries that wish to fight their neighbours.

Fourth, globalisation has reduced the fixed costs of statehood. As more ethnic minorities aspire to independence, they create more borders and more opportunities for conflict that in turn draw in more powerful trading partners and sponsors.

In other words, the very things that should make politicians less likely to want war – productivity growth, democracy, and trading opportunities – have also made war cheaper. We have more wars, not because we want them, but because we can.

The Authors

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Publication details

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Today, mass
destruction can
come out of
a suitcase.

THE ECONOMICS OF HAPPINESS

Andrew Oswald offers his reflections from the frontier of a pioneering research agenda that is re-defining the ways in which we measure economic progress.

Since the mid-1990s, the University of Warwick has played a prominent role in the development of a set of ideas that, little by little, and in a way nobody originally expected, has changed the discipline of economics and is currently shaping policy-makers' thinking in the UK and elsewhere. It would be fair to say that the University has helped lead the world in the study of what is often now called the economics of happiness.

You might believe that the words "economics" and "happiness" do not go together very naturally in a sentence. These days, however, you would be wrong.

To do their statistical work, economics researchers in this field examine random samples of people from nations across the world. We are interested in understanding what explains the patterns of happiness and mental health that emerge among different sorts of human beings and among different sorts of nations. Researchers look hard at the influence of economics factors, but also at other kinds of forces. Some researchers think it will soon be possible to make whole countries happier.

In this area of inquiry, two questions are central. One is: should our goal for the rest of this century be, as it more or less has been for the past 50 years, to try to maximise GDP? Should we have that aim, of four BMWs for everybody, by the end of the century? In the spirit of the Stiglitz Commission report (www.stiglitz-sen-fitoussi.fr), which led to the establishing of the Commission on the Measurement of Economic Performance and Social Progress, this path would be the wrong one. The creation of the commission reflects growing concerns about the limits of traditional economic measures. It underscores that emotions, not just pound notes, should be measured.

A second area of inquiry is: what shapes human well-being? This is the subject matter of an empirical literature in which many different sorts of researchers look at well-being by using the standard empirical and mathematical tools used throughout

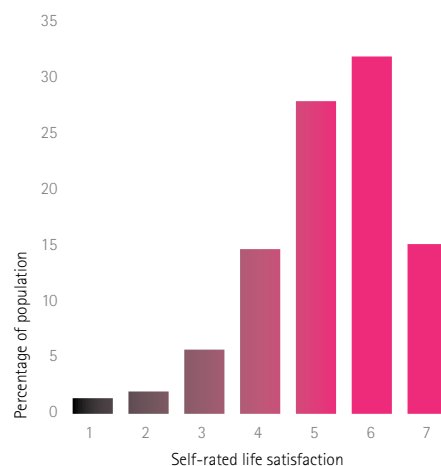


Figure 1.
The distribution of life-satisfaction levels among British people
Source: BHPS, 1997-2003.
N = 74,481

contemporary economics research – but with well-being as a variable in the equations.

To assess genuine emotional prosperity, it is necessary to have a yardstick that is as psychological as it is economic. The simplest approach has been to ask survey questions about how content people are with their lives.

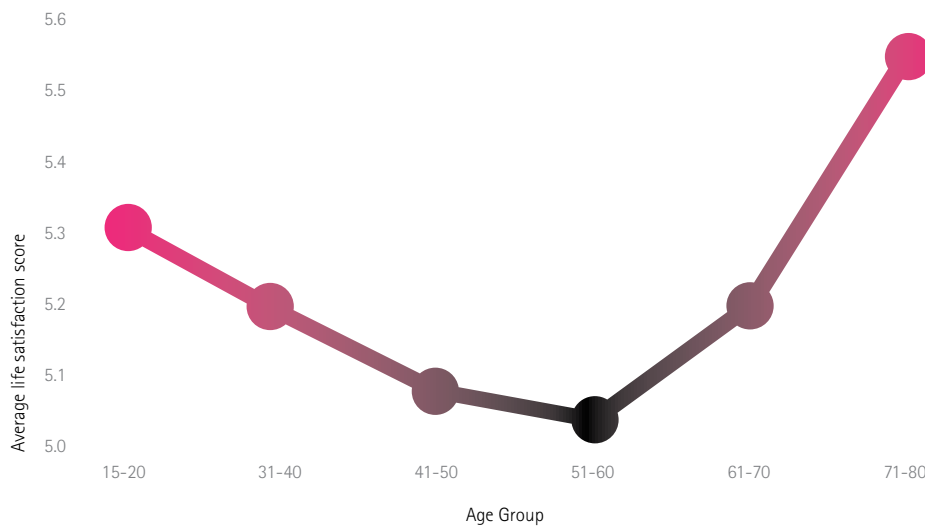
In western countries, most individuals say they are rather happy with life. As an example, in Britain, people were asked, "How satisfied are you with your life overall?", and told to answer by using a scale from 7 ("I am completely satisfied with my life") down to 1 ("completely dissatisfied"). The majority of respondents' answers put them in relatively high levels, at rankings 5 and 6.

Researchers are not dominantly interested in the exact words that interviewees use. Instead, we are interested in the ordering of answers across categories and why some sorts of people mark themselves high and others low.

Unemployment has been shown to have a huge, negative impact on people's well-being. The size of this effect goes far beyond that of the drop in take-home income. Researchers such as Rainer



Figure 2
The pattern of a typical
person's happiness
through life



Winkelmann at the University of Zurich have demonstrated this in German panel data: they find that approximately 80 percent of people's measured decline in mental well-being after being made unemployed stems from non-pecuniary rather than pecuniary sources. The decline may stem from the loss of face and self-esteem.

Longitudinal data offer a way to study lots of other life events. Before couples divorce, we see a low level of well-being, and then eventually a rise in their levels of happiness. Before a first baby is born, there is a surge in reported well-being, but after that a marked drop to below the earlier levels.

A striking life-cycle pattern emerges from these data. A typical person, in a developed economy, will slide down a giant U-shape of happiness through life. Work conducted by the economist Nick Powdthavee, a former Warwick PhD who now works at LSE, demonstrates that this is true among a random sample of British people, for instance. The general U-shape has appeared in the published literature since the early work of mine with Andrew Clark at the Paris School of *Economics in the Economic Journal* in 1994. (Clark had then recently graduated with a First in Economics from Warwick, and I was about to move to the Warwick department.) The U-shape itself is, of course, an approximation, based on statistical averages traced out from survey data. But this shape has been replicated in huge numbers of papers – for more than 50 countries. The U-shape remains unexplained conceptually, so much more work will be needed.

Some of the earliest approaches to the formal measurement of human happiness and well-being relied upon a survey such as the General Social Survey of the US. It asks individuals, randomly sampled, "Taken altogether how would you say that things are these days?" Do you think of yourself as very happy, pretty happy or not too happy?" Quickly, researchers found that approximately one third of Americans will tick the box saying they feel very happy with their life, and around 10 percent to 20

percent will tick the "I'm not too happy with my life" box.

Another potential measure of emotional prosperity is a General Health Questionnaire (GHQ) score. It is an indicator of psychological distress and mental strain. This measure originally was used by epidemiologists and doctors; it is a summary statistic that aggregates people's answers to a particular string of queries. In one version of this measure, individuals answer 12 separate mental-distress questions: "Have you lost much sleep over worry?"; "Been able to concentrate on things?"; "Felt you are playing a useful part in things?"; "Felt capable of making decisions about things?"; "Felt constantly under strain?"; "Felt you could not overcome your difficulties?"; "Been able to enjoy your normal day-to-day activities?"; "Been able to face up to your problems?"; "Been feeling unhappy and depressed?"; "Been losing confidence in yourself?"; "Been thinking of yourself as a worthless person?"; "Been feeling reasonably happy all things considered?". It has been shown that these patterns correlate well with simpler happiness-survey patterns. Work going on today by psychiatrists and economists at Warwick Medical School is developing new GHQ well-being measures to capture a fuller range of emotions.

Well-being researchers take information on life-satisfaction numbers and GHQ scores and then estimate regression equations – in everyday language, the researchers take large numbers of data points and estimate best-fitting lines – and in that way they try to uncover the relationships between income and education, gender, having children, and reporting whether or not people are happy with life and have good mental health. Given the evident complexity of a concept such as human well-being, it is natural to be concerned with the issue of whether this can be done in a believable,

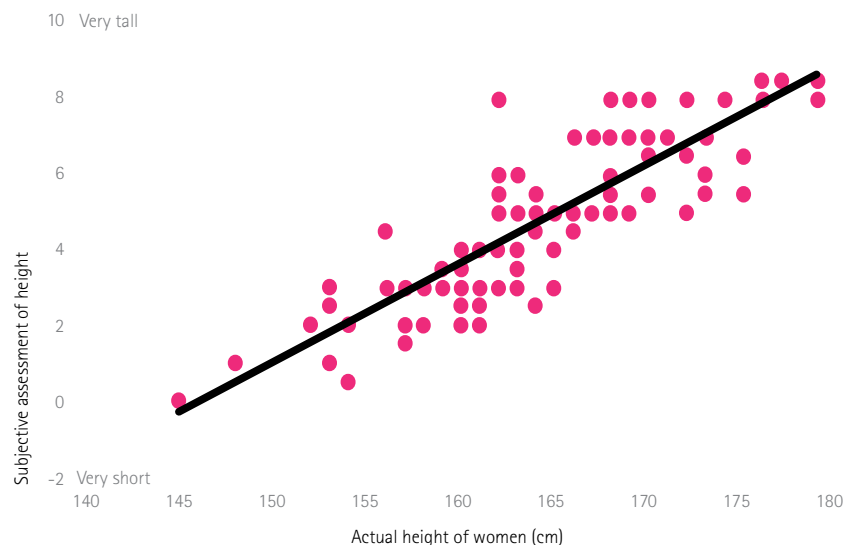
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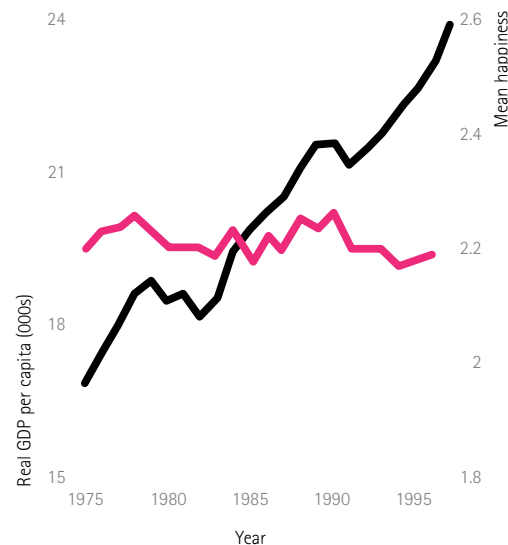


Figure 3.

Feelings of height and actual height in 106 female students

**Figure 4.**

Average Happiness and Real GDP per Capita for Repeated Cross-sections of Americans



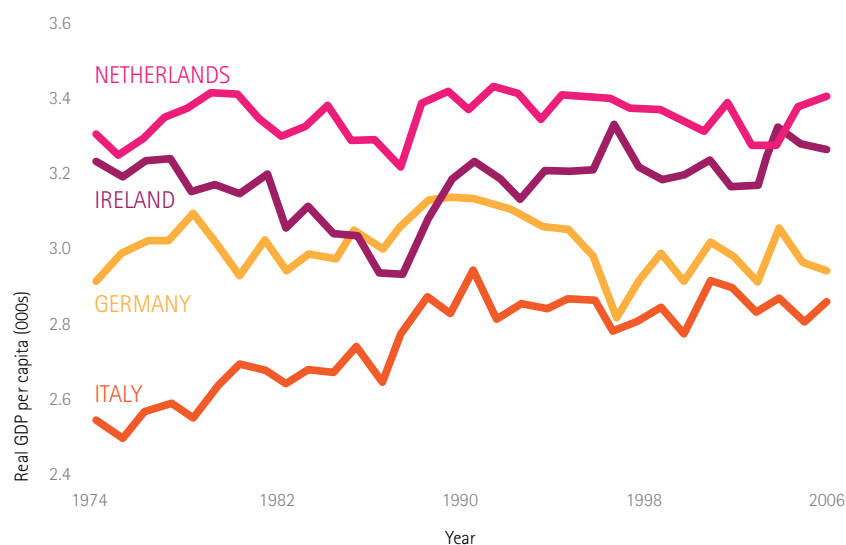
systematic manner. Debates about that continue. One thing we know is that, if researchers look at the brain, visible while people are in an MRI scanner, emotions such as happiness and sadness do show up in distinct ways in different parts of the brain. So, there at a physiological level, we know something about what looks like high happiness relative to low happiness. We know also that well-being scores are correlated with blood pressure and heart-beat. Recent evidence has uncovered a statistical relationship between happiness and hypertension at national levels. Countries in which people say they are happy are also the countries in which people report less hypertension (high blood pressure). Hence these subjective responses of people in surveys are correlated with objective well-being criteria.

A recent Warwick study on an utterly different subject addresses a question that frequently surfaces in happiness studies: whether objective and subjective data match. In that study, the simple question asked of individuals was, in a similar kind of spirit to happiness-questionnaire inquiries, "How tall do you feel you are (put a cross on the line)? Very short Very tall." Height may seem a strange variable to study, but it has the scientific advantage that it is verifiable in a way that is not open to dispute. The results show that there is a strong correlation between subjective tallness and actual tallness. This is a light-hearted subject, but it makes a serious point: people's subjective views contain lots of real information.

The most important issue under current debate in the economics of happiness is over the accuracy of Easterlin's Paradox. The paradox takes its name from Richard Easterlin, a University of Southern California professor (and a former visiting professor at Warwick), who has observed that extra economic growth in the developed countries is not making people happier. This concept is underscored by differences in life satisfaction that emerge from various countries. For instance, as one example of a paradox, Germany is more prosperous than

Ireland, but people in Ireland are happier than people in Germany. If Easterlin is correct, and many researchers think he is, this paradoxical relationship between economic progress and happiness may be because humans care dominantly about relative income and status, and, unfortunately, there is only a fixed amount of status to go around at any one time in a society.

As a result, the economics of growth and happiness would then be a bit like the spectators at an exciting football match. The first one to stand up gets a better view of the match for a few moments. But, by the time neighbouring spectators arise, nobody is better off. Indeed, they may simply be more tired, en masse. This is the spectre that haunts conventional economics and conventional policy-making. Whether or not the paradox is confirmed empirically, the main reason to study economics is surely that we care about human happiness and how it might be improved.

Figure 5.
Life-satisfaction country averages



Publication details

This article draws on a number of research articles, among them:

"Happiness and Economic Performance" by A.J. Oswald, published in the *Economic Journal*, 1997.

"Unhappiness and unemployment" by A.E. Clark and A.J. Oswald, published in the *Economic Journal*, 1994.

"Objective confirmation of subjective measures of human well-being: evidence from the USA" by A.J. Oswald and S. Wu, published in *Science*, 2010.

"Happiness and economics" by B.S. Frey and A. Stutzer, published by Princeton University Press, 2002.

"Stumbling on happiness" by D. Gilbert, published by Alfred A. Knopf, 2006.

"Explaining happiness" by R.A. Easterlin, published in the *Proceedings of the National Academy of Sciences*, 2003.

"Does economic growth improve the human lot? Some empirical evidence" by R.A. Easterlin in "Nations and Households in Economic Growth: Essays in Honor of Moses Abramowitz", 1974.

"Relative income, happiness, and utility: an explanation for the Easterlin paradox and other puzzles" by A.E. Clark, P. Frijters and M.A. Shields in the *Journal of Economic Literature*, 2008.

"Economic growth and subjective well-being: reassessing the Easterlin paradox" by B. Stevenson, and J. Wolfers, published in the *Brookings Papers on Economic Activity*, 2008.

"National accounts of well-being" by E. Diener, R.E. Lucas and U. Schimmack published by Oxford University Press, 2008.

"Social comparison affects reward-related brain activity in the human ventral striatum" by K. Fließbach, B. Weber, P. Trautner, T. Dohmen, U. Sunde, C. Elger and A. Falk, published *Science*, 2007.

"Can the 12-item General Health Questionnaire be used to measure positive mental health?" by Y.J. Hu, S. Stewart-Brown, L. Twig and S. Weich in *Psychological Medicine*, 2007.

"The reliability of subjective well-being measures" by A.B. Krueger and D.A. Schkade, published in the *Journal of Public Economics*.

"Positive affect and health-related neuroendocrine, cardiovascular, and inflammatory processes" by A. Steptoe, J. Wardle, J., M. Marmot, *Proceedings of the National Academy of Science of the United States*, 2005.

THE ELECTION CONNECTION

Reports of crimes against women soar after females are elected to office in local governments in India, research shows. The finding is good news, reflecting women's greater willingness to tell authorities about the crimes rather than an increase in actual incidence.

Anandi Mani and colleagues report.

In 1993, India ushered in a radical political reform by introducing a mandate that women hold one third of all seats in its system of local government, called the Panchayati Raj.

Our research examines a 22-year period before and after these political reforms, which brought women into local government to an unprecedented degree, and the possible impact on crimes against women.

We find that the presence of female leaders in local government leads to large and significant increases in reported crimes against women. Our research shows that this is not because of an increase in the rate of crimes against women, but because of an increase in the willingness of women to report such crimes.

Overall, reports of crimes against women grew by 36 percent when female elected leaders were present in elected political roles, even when their roles had nothing to do with government response to crime. Having female leaders in local government triggered a 19 percent increase in reports of rape, and a 13 percent increase in reports of kidnapping of women. Arrests for these crimes also rose commensurately.

Our findings suggest that the political reforms lend women a stronger voice in society, as evidenced by their greater willingness to come forward to report such crimes.

We believe our project is the first to examine this link between political representation and crime against groups of people who have been traditionally under-represented in the political sphere.

Violent crime against women is a subject of particular interest because it offers a useful barometer of women's socio-economic status and level of empowerment in broader society. It also suggests the extent to which the presence of political leaders of under-represented groups can lead to changes in attitude towards the group.

Our analysis includes results from the 17 major

states of India, covering more than 97 percent of the population, over the period from 1985 to 2007. For various practical reasons, the timing of the implementation of political reforms across Indian states differed. These states also had different pre-existing levels of crimes against women and other minorities. These differences in timing of reform implementation and in pre-existing levels of crime allowed us to identify the impact of the reform across areas with and without female leaders.

In analysing the overall effects of such policies on the incentives of criminals and victims, we considered several opposing forces that could be at work. On the one hand, criminals may be deterred because of the increased likelihood of facing punishment for their actions as the result of elected political leaders perceived to be more



The presence of female leaders in local government triggered a 36 percent increase in reported crimes against women

sympathetic to their victims. But, on the other hand, victims may be encouraged to report crimes more often for these same reasons. In addition, the police may be more inclined to record crimes against women when a woman is in elected office.

While our research found a spike in reported crimes against women, we found no significant effects whatsoever on any categories of crime not specifically targeted against women, such as kidnapping of men, crimes against property or crimes against public order.

As a result, we believe that our evidence makes a strong case for the view that the growth in crimes against women was the result of increased reporting rather than an increased incidence of such crimes, and that the increased reporting stemmed from changes in political representation.

We should note that the constitutional

amendment that mandated women's elected seats did not give local bodies any real control over the law-and-order machinery, and therefore is unlikely to have an effect on crime through channels other than politicians' identity.

However, state office-holders do play a role in determining punitive action for crimes. Our research finds that having a woman as the head of a state government, rather than a local council, creates a substantial reduction in the actual rates of crimes against women. We speculate that these contrasting effects of having women in state or local elected positions stem from the stronger power to take punitive action vested in an office-holder at the state level.

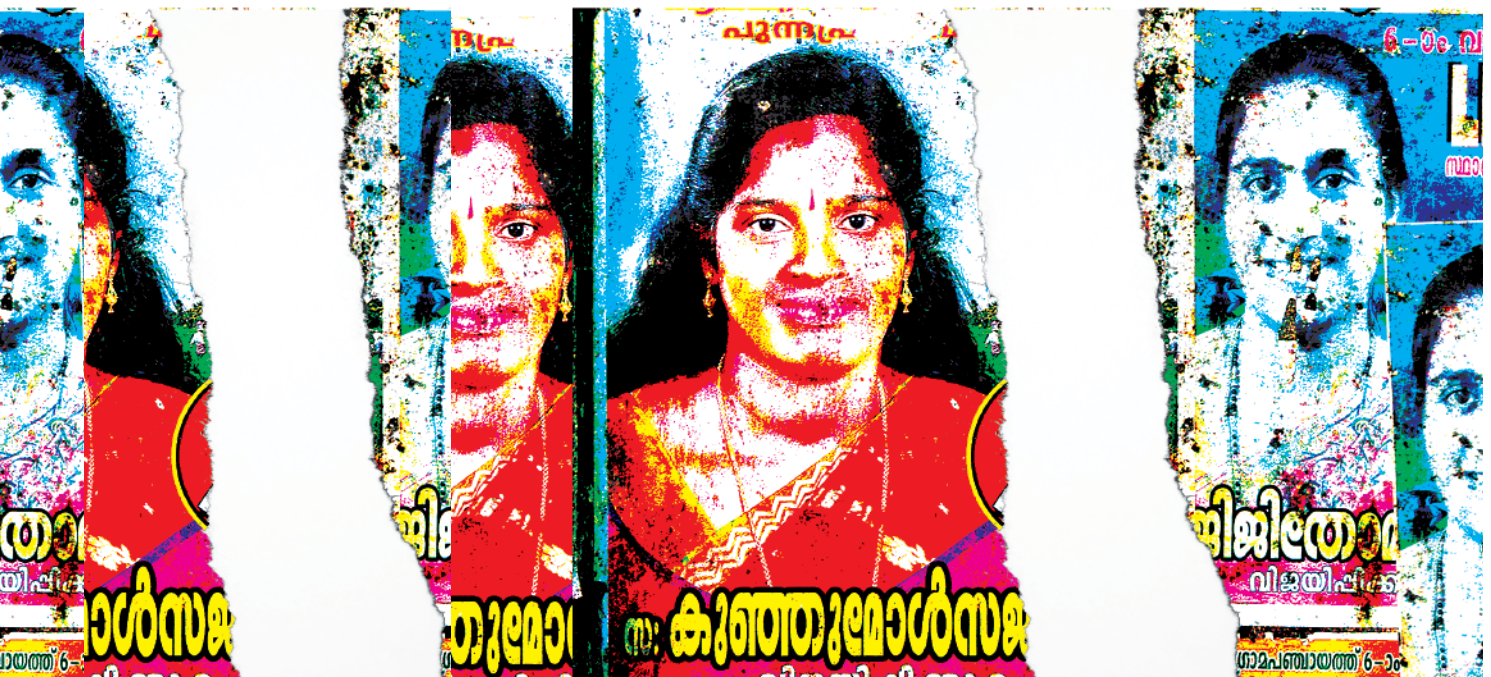
The Authors

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Publication details

This article summarizes a working paper, "Political Representation and Crime: Evidence from India's Panchayati Raj." The article is available at:

http://www2.warwick.ac.uk/fac/soc/economics/staff/academic/mani/immt_crime_oct2009_neudcfull.pdf



WHAT MAKES AN EFFECTIVE TEACHER?

In the debate over whether traditional or modern teaching practices are better, research by **Victor Lavy** finds that effectiveness varies, depending on the gender, ability and background of the students.

The frantic effort to improve education ongoing in many countries often comes down to a quest to discover the essential characteristics of a good teacher. This has been an elusive pursuit to a degree, as research has delved into teacher characteristics and attributes that are difficult if not impossible to measure – among them, personality traits and personal beliefs.

My research aims to re-frame the debate over teacher quality by focusing strictly on what the teacher does in the classroom – that is, by evaluating teacher practices based on results as measured by student academic achievement. Of course, teaching styles and methods also are caught up in the education reform debate. Generally, advocates have veered between two opposing philosophies. In one camp are advocates of traditional teaching, a style that emphasizes an instilment of knowledge and memorisation of facts. In the other camp are advocates of modern teaching, a style that emphasizes giving students improved analytical and critical-thinking skills.

This rivalry is playing itself out in the policy directives being issued to schools in various nations as they struggle to find ways to improve student achievement. In the United States, for example, the National Standards recommend modern teaching practices that engage students in self- and group-learning activities, and in Israel the Ministry of Education unveiled a reform in 2008 that shifted the emphasis of post-primary level schooling away from memorisation and practice, and towards the development of critical thinking skills. By contrast, in 2010, UK Secretary of State for Education Michael Gove announced a reform to reintroduce an emphasis on traditional teaching and learning in schools.

My research examines these two broad methods, and some other aspects of the ways teachers conduct their classes, to see what was the most effective in improving student achievement. My insights are based on studies of students in Israel

who were observed in 2002 while in fifth grade (primary school) and again in eighth grade (middle school). The students were tested in four subjects, English, Hebrew, mathematics and science in both grades as a part of a national testing programme.

Both traditional and modern teaching methods led to strong and impressive levels of student achievement growth. At the same time, differing methods led to differing results, depending on the characteristics of the students.

Traditional teaching's effect was largest for two groups: girls and pupils from low socio-economic backgrounds. The traditional emphasis on an instilment of knowledge was very effective for students who were below the median level of achievement, but its effects dropped sharply once this threshold had been surpassed.



The Author

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Training teachers to use traditional and modern practices is a cost-effective way to improve teacher quality.

Modern teaching also had a high payoff, with strong positive effects for both genders and students from both high and low socio-economic backgrounds. The gains from emphasising analytical skills were most pronounced among students from educated families. It was least effective for students in the lowest quartile of achievement.

Gender differences emerged in another respect. The practice of solving problems in class and teaching based on repetition of the material until most students attain comprehension improved the achievements of girls, but had no effect on boys.

The findings of this study yield insights for the debate about the merit of traditional versus modern approaches to teaching, which are often discussed as rival classroom pedagogical approaches, but need not be. My findings may be the first to demonstrate that one approach need not crowd out the other, and that the two can coexist in the classroom. Indeed, the outcomes suggest that teachers would be best off learning to target styles to certain relevant customers and also to mix the two pedagogical techniques in the classroom.

The results of this research are strong and consistent. If the proportion of classroom teachers using traditional methods increases from the mean to the maximum observed, the average test score in each subject increases by 4 points relative to the average of 63. For modern teaching the gain is 3.75 points.

These findings have important policy implications, with so many countries searching for ways to improve teacher quality, and, in turn, student achievement. Using a certain style of teaching is a relatively inexpensive way to enhance student achievement as compared with other interventions. The effects estimated from relying on these teaching styles are impressive, especially relative to the effect sizes of other, more costly interventions on the school reform menu, such as reducing class size and increasing school hours of

instruction, or providing teachers with increased financial incentives.

Of course, teacher training would be required, but the cost ought to be minimal because education systems around the world routinely engage in on-the-job training of this kind. Therefore, re-directing the syllabus relating to enhancement of teachers' human capital towards training in competent techniques emphasising the "instilment of knowledge and enhancement of comprehension" and "instilment of analytical and critical skills" should be neither too difficult nor too costly. The potential gains seem enormous and worth the effort to sway away teachers from teaching practices that may not be effective.

Publication details

This article is based on "What Makes an Effective Teacher? Quasi-Experimental Evidence."

It is available at:
http://economics.huji.ac.il/faculty/lavy/Teachers_Text and Tables_24_August__2011.pdf



LESSONS ON UNIVERSITY QUALITY GLEANED FROM THE NAZI ERA

Analysis by **Fabian Waldinger** of the Nazis' dismissal of Jewish professors reveals the important role faculty quality plays upon PhD students' careers, and offers insight for fashioning policies to foster research excellence.

In the early 1930s, mathematics departments in German universities had gained unrivalled world renown for cultivating enclaves of successful academic research. But, when the Nazi government seized power, it immediately dismissed all Jewish and "politically unreliable" professors from German universities. Between 1933 and 1934, about 18 percent of all mathematics professors were expelled, among them some of the most eminent mathematicians of the time, such as Johann von Neumann, Richard Courant and Richard von Mises.

Some mathematics departments, those that had not employed Jewish or "politically unreliable" academics, were unaffected, but others were decimated. The then-premier Göttingen University, for example, lost nearly 60 percent of its mathematics personnel. The dimensions of the situation were underscored dramatically in a chilling exchange from a 1934 banquet, where Nazi education minister Bernhard Rust chatted with David Hilbert, one of the most influential mathematicians of the early 20th century. "How is mathematics in Göttingen now that it has been freed of Jewish influence?" Rust asked. Hilbert's reply was stark. "Mathematics in Göttingen?" he said. "There is really none any more."

My research analyses detailed data from this unprecedented chapter of German history as a way to examine the role faculty quality plays on PhD students, in creating their dissertations and in influencing the arc of their careers – a subject that is almost impossible to study in a modern context.

The Nazi dismissals had far-reaching effects on university quality which continue to this day. It also had profound effects on individuals, the PhD students caught in the throes of the turmoil of that era. The academic achievements that outline and define a career – the likelihood of getting a dissertation published, the odds of becoming professor, the number of lifetime

academic citations – all were affected to a striking degree by the calibre of the faculty, and the chain of events that started with the Nazi policy of "cleansing".

For my analysis, I used a large number of historical sources, including a compilation of the universe of students who obtained the PhDs in mathematics from a German university between 1923 and 1938. I find that students with access to high-quality faculty in this period were more successful in all the ways that are key in determining academic success. Specifically, my research shows that an increase in faculty quality by one standard deviation led to a 13 percentage point increase in the probability that a former PhD student published a dissertation and a 10 percentage point increase in the probability of becoming a full professor. An increase in faculty quality by one standard deviation led to 6.3 additional lifetime citations, a significant number given that the average former PhD student has 11 citations.

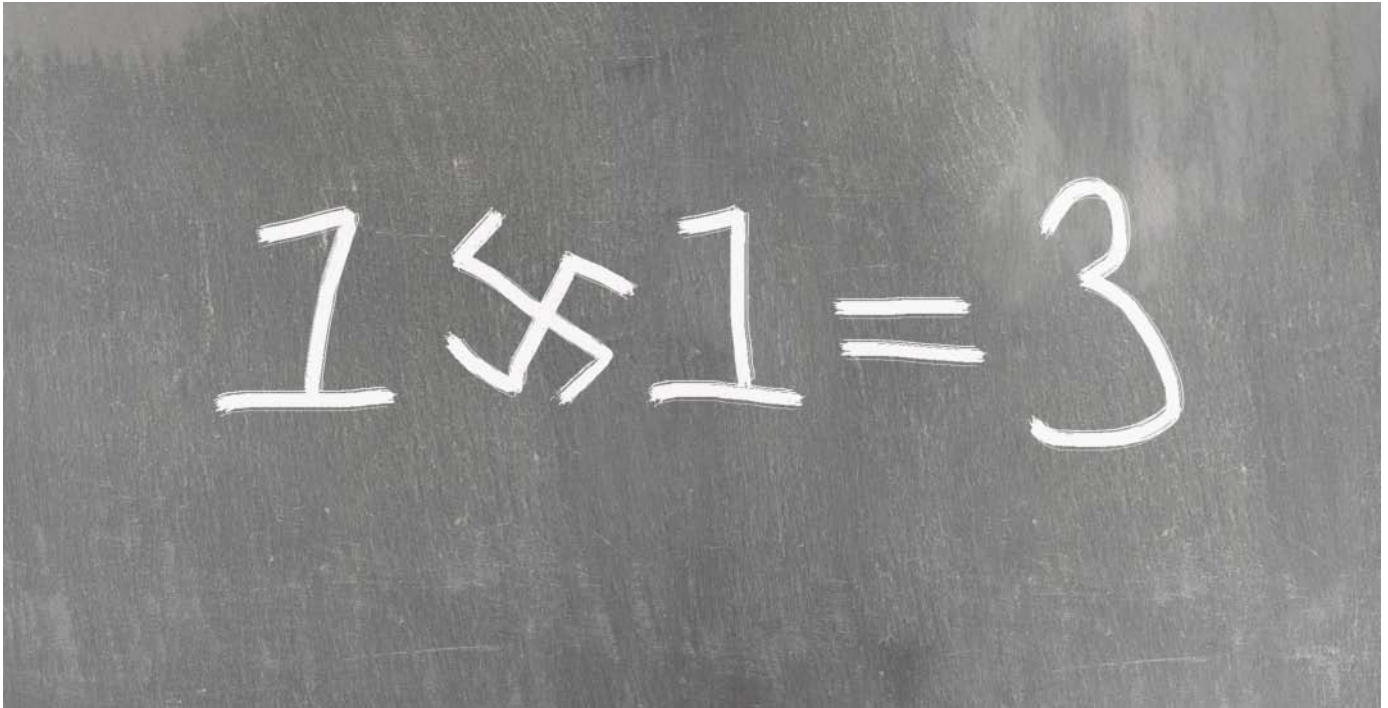
University quality is believed to be one of the key drivers for a successful professional career of university graduates. This is especially true for PhD students. Attending a better university is likely to improve the quality of a student's dissertation and will provide superior skills and contacts. Estimating this effect is very challenging because inherently better students typically graduate from better universities. Observing a positive correlation between university quality and PhD student outcomes, therefore, does not necessarily mean that university quality causes student outcomes to improve.

Economists often look for so-called natural experiments that come close to optimal experiments that are impossible to run, and this is why the data from the annals of this chapter of Nazi history offer such potential research value. The change in university quality in the affected departments was not related to student attributes.

The Author

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The Nazi policy's effect on students lasted a lifetime, influencing the odds of publishing a dissertation, of becoming a professor, and of earning many academic citations



Therefore, it can be used as a natural experiment to measure the effect of university quality on PhD student outcomes. The departments without dismissals serve as a control group with which the changes in PhD student outcomes can be compared.

Before the dismissal of professors, students in departments which would later be affected always did better than students in departments which did not experience any dismissals. After 1933, student outcomes in affected departments dropped sharply. In departments without dismissed professors, however, PhD student outcomes remained constant.

These findings have implications for present-day policy, particularly in an era in which many nations facing budget constraints are reducing funding for higher education. It is widely agreed that inventions of scientists are important drivers of technological progress and economic growth. Therefore, it is important to organize scientific research, including the training of PhD students, in an optimal way.

My research shows that the most efficient way of training PhD students is to have large

PhD programmes in a small number of very high-quality universities. In pre-World War II Germany, Göttingen and Berlin, the two leading universities, jointly produced more than 20 percent of all mathematics PhD students. The best five universities produced about 28 percent of all mathematics PhD students at the time. Today the best five universities in Germany produce only about 8.5 percent of all mathematics PhD students. In fact, none of the best five German mathematics departments (according to the faculty's research output) is among the top five producers of PhD students today. In the United States, however, the best research universities are also the main producers of PhD students. My findings suggest that this is a very productive way of organizing PhD training that should be further encouraged by science policy makers.

Publication details

'Quality Matters: The Expulsion of Professors and the Consequences for PhD Student Outcomes in Nazi Germany' is due to be published in an upcoming edition of the *Journal of Political Economy*.

The findings suggest the best policy course is to establish large PhD programmes in a small number of high-quality universities

MICRO-ENTREPRENEURIAL SUCCESS: IS CAPITAL THE ANSWER?

If poor microenterprise owners in developing countries get better access to capital, could it raise their incomes significantly? **Christopher Woodruff** and colleagues have explored this question through a field experiment in Sri Lanka, which, among other things, reveals notable differences between male and female micro-entrepreneurs.



A quarter or more of all urban workers in low-income countries are self-employed. The great majority work for their own account, without hiring paid employees. Microfinance has come to be viewed as a 'silver bullet' in development, in large part because it provides the capital that enables such self-employed individuals – particularly women – to become micro-entrepreneurs.

But how profitable are investments in microenterprises? Will incomes increase substantially if micro-entrepreneurs invest more capital in their enterprises? Our research set out to answer these questions through an innovative project in Sri Lanka.

Measuring the return to capital in microenterprises is complicated by unobserved factors, such as entrepreneurial ability and demand shocks, which are likely to be correlated with capital stock. We use a randomised controlled trial to overcome this problem, providing cash and equipment grants to small firms in Sri Lanka, and measuring the increase in profits arising from this exogenous (positive) shock to their capital stock.

After controlling for possible spillover effects, we find the average real return to capital to be 5.7 percent per month. This average return is substantially higher than the interest rates charged by micro-lenders, which are around 1-2 percent per month.

But the experiment reveals a surprising outcome with regard to who benefits most from the capital injection. The grants generated large profit increases for male microenterprise owners, but not for female owners. This finding has potentially important implications because most micro-lending organisations target women.

We show that the gender gap does not simply mask differences in ability, risk aversion, entrepreneurial attitudes or reporting behaviour. We do find some evidence that the gender gap is larger in female-dominated industries.

The data suggest that intra-household dynamics have important effects on both the investment decisions and returns earned by women. Bargaining with spouses and other household members appears to be associated with inefficient use of the capital injections by women. The evidence indicates that this inefficiency is reduced in more cooperative households.

Cash and equipment grants to small firms in Sri Lanka produced high returns to capital

The Authors

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David McKenzie is a Senior Economist at the World Bank.

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The University of Warwick

Department of Economics

THE UNIVERSITY OF
WARWICK

The University of Warwick Department of Economics was created in 1965, the same time as the university itself. In the less than 50 years since its founding, the department has become widely regarded as one of the top economics departments in the United Kingdom and Europe. Both economics research and coursework emphasize modern economic analysis and quantitative methods, the key underpinnings of the department since its inception.

The department has an academic staff of 70 people, including 25 professors. It has approximately 1,200 undergraduate students and 230 graduate students. Some 60 percent of students attending are from the UK or the European Union.

The Department hosts four research centres:

The Warwick Economics Research Institute (formerly the Economic Research Institute) was begun in 2007. It promotes quality research and enhanced public understanding of economic issues. It advocates for funding and organisation of research projects that have the potential to offer new insights about difficult economic issues and to lead to better-informed public policies. It supports scholarly activities such as conferences and

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The Centre for Competitive Advantage in the Global Economy (CAGE) was established in 2010 to conduct innovative research about how countries succeed in achieving key economic objectives such as improving living standards, raising productivity, and maintaining international competitiveness – all central to the economic well-being of citizens. CAGE is funded by the Economic and Social Research Council (ESRC).

The Decision Research at Warwick (DR@W) Group was established in 2010 as an interdisciplinary initiative to explore experimental and behavioural science with important implications for economics, psychology, management, marketing and statistics.

The Centre for Research in Economic Theory and its Applications (CRETA) was established in 2006 to encourage research in economic theory and its practical applications, and to explore multidisciplinary projects with mathematics, biology, philosophy and political science.



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Celebrating five years

Celebrating five years