

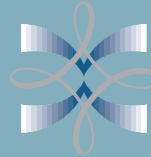
CentrePiece

The Magazine of The Centre for Economic Performance



Volume 8 Issue 3 Autumn 2003

Crime and property



THE QUEEN'S
ANNIVERSARY PRIZES
FOR HIGHER AND FURTHER EDUCATION
2002



FOR
RICHER,
FOR
POORER

Editor Hugh Stephenson
Design Raphael Whittle
Print VIP Print

CentrePiece is the magazine of the Centre for Economic Performance at the London School of Economics.
Articles in this issue reflect the opinions of the authors, not of the Centre. Requests for permission to reproduce the articles should be sent to the Editor at the address below.

Editorial and Subscriptions Office
Centre for Economic Performance
London School of Economics
Houghton Street
London WC2A 2AE

Annual subscriptions for one year (3 issues):
Individuals £13.00
Students £8.00
Organisations (UK and Europe) £30.00
Rest of world £39.00
Visa and Mastercard accepted
Cheques payable to *London School of Economics*

© Centre for Economic Performance 2003
Volume 8 Issue 3
(ISSN 1362-3761) All rights reserved.

CentrePiece is printed on environmentally friendly, totally chlorine-free paper.

CENTRE *for* ECONOMIC
P E R F O R M A N C E

THE LONDON SCHOOL OF ECONOMICS
AND POLITICAL SCIENCE
HOUGHTON STREET LONDON, WC2A 2AE
Tel: 020 7955 7798 Fax: 020 7955 7671
Homepage: www.centrepiece-magazine.com
Email: centrepiece@lse.ac.uk



Contents

- Changing the guard at the CEP** 2
- Poverty and worklessness** 4
Stephen Nickell analyses why poverty remains high in the UK
- Crime and property prices** 16
Vandalism lowers property prices more than burglary, according to **Steve Gibbons**
- Lessons from the Seven Years War** 20
Isabel Schnabel and **Hyun Song Shin** examine two financial crises over 200 years apart showing that all risks cannot be hedged
- Science fiction or the wave of the future?** 30
Stephen Wood, **Richard Jones** and **Alison Geldart** ask the basic questions about the future of nanotechnology



Changing the

John Van Reenen, CEP Director



Centre
for Economic
Performance

guard at the CEP

New Director looks forward to the new research challenges.

Since 1 October the LSE's Centre for Economic Performance has had a new Director and a new Director of Research.

John Van Reenen has taken over from the CEP's founding director, Richard Layard, and his co-director since 2000, Richard Freeman. At the same time, Stephen Machin took over as the CEP's Director of Research from Anthony Venables.

The new director, who has been Professor of Economics at University College London since 1999, is well known for his work on productivity and innovation, for which he has established a programme at the Centre. He has been a senior policy analyst to the previous Secretary of Health, Alan Milburn, and a partner in the economic consultancy, Lexecon. In addition to becoming Director of the CEP, he has also

been appointed Professor of Economics at the LSE.

Stephen Machin, a leading labour economist, has been a member of the CEP since 1991 and has directed the DfES Centre for the Economics of Education, based at CEP, since it was set up in 1999. He has been Professor of Economics at University College London since 1996. He has done pioneering work on inequality, social mobility, minimum wages and crime and is an Editor of the *Economic Journal*.

The Centre was established in 1990 as the ESRC's largest interdisciplinary research centre and has grown to become one of the largest concentrations of applied economic and social research in Europe. Its work on unemployment and poverty, worklessness, education and skills, productivity, globalisation and post-communist reform has had

major impacts on academic economics and government policy alike. This was recognised this year by the award of a Queen's Prize for Higher Education.

Richard Layard, Richard Freeman and Anthony Venables will continue to run programmes of research in the Centre. On taking over as Director of the Centre, John Van Reenen said: "We shall deepen the CEP's commitment to rigorous, world-class economic research that remains relevant to both policy and social science. The UK faces major challenges in the coming years and our research needs to provide original thinking in order both to understand the world and to help change it for the better."

Stephen Machin, Director of Research





Poverty and worklessness

Stephen Nickell provides a profile of poverty in Britain today and argues that it is high by European standards because of our exceptionally long tail of very low skilled adults.

Britain is exceptional in having much more poverty than most of the other countries of Northern Europe. Furthermore, poverty in Britain has increased dramatically since 1979.

Britain also has a particularly large number of working age "workless households": quite surprising in view of its relatively high employment rate. This is reflected in the fact that, if you were not employed in 1996, the probability of your living in a household where no one else worked exceeded 50%, higher than in any other OECD country except Finland. The connection between poverty and worklessness is a strong one. Over 53% of poor children live in workless households, whereas only around 20% of children overall do so.

In Britain today, a little over 20% of people are poor, generally when no one in their household works or when one person works and is not paid very much. If two or more people in a household work and at least one works fulltime, poverty is unlikely to be found (i.e. in less than 5% of cases). The proportion of children in poverty (around 30%) is higher than the overall poverty rate because children are more likely than adults to live in poor households. In particular, they are more likely to live in single parent households and are less likely to live in households where two adults are working.

While poverty is measured in terms of money, it is not just about money. Almost anything bad you can think of, poor people have more of it: more illness, more accidents, more crime, fewer opportunities for their children and the most fantastically expensive credit. So it is important to shed some light on where all this poverty comes from and on what might be done about it.

Table 1. Individual Poverty in Different Family Types, 2000/1 (1997 in brackets)

	% of individuals in each type	% of each type in poverty	contribution to overall poverty
Couple with children	42.4 (44.0)	20.9 (23.0)	40.0 (41.3)
Couple without children	25.5 (26.2)	12.2 (11.3)	14.1 (12.2)
Single with children	10.1 (9.9)	53.8 (62.0)	24.5 (26.0)
Single without children	22.0 (19.9)	21.7 (24.3)	21.4 (20.5)
Total	100	22.2 (23.6)	100

Source: Piachaud and Sutherland (2002), Tables 1, 3.

Table 1 shows how poverty is distributed across households of different types. In the second column we see how single parent households are far more likely to be poor than any other household type, but there are few enough of them to contribute only one quarter of total poverty. Poverty is high in single parent households in

Table 2. Individual Poverty in Households with Different Employment Circumstances 2000/1 (1997 in brackets)

	% individuals in each type	% of each type in poverty	% contribution to overall poverty
Workless	17.0 (19.5)	64.4 (68.4)	51.4 (56.7)
One or more PT	10.0 (9.0)	29.4 (31.9)	13.8 (12.2)
Head self-employed	10.9 (12.2)	24.6 (21.9)	11.6 (11.4)
Couple, one FT	14.5 (14.8)	19.7 (20.5)	13.4 (12.9)
Couple one FT, one PT	17.5 (17.1)	5.1 (4.4)	4.2 (3.2)
Single/Couple, all in FT work	30.1 (27.4)	4.0 (3.1)	5.6 (3.6)
Total	100	21.3 (23.5)	100

Source: Piachaud and Sutherland (2002), Table 4.

part because more than half of the single parents do not work and many rely on state benefits. By and large, any household that has to rely solely on state benefits will be poor on standard definitions. It is worth noting that couples without children are much less likely to be poor than singles without children and that households with children make up just over half of all households, but nearly two thirds of those in poverty.

Table 2 cuts things a different way, focussing on employment status. As we have already noted, worklessness is a key factor. Although only 17% of individuals live in

workless households, because nearly two thirds of them are poor, they contribute more than half of all poverty. It would be a mistake to conclude that these facts point to a "simple" solution to poverty, namely get every adult to work. Workless adults tend, on average, to have significantly lower earning power than those in work. So getting them to work would have much less of an impact on poverty than might be imagined, unless they receive other benefits.

Table 3 focuses on child poverty. Here worklessness is even more important. Over three quarters of children

Table 3. Child Poverty in Households with Different Employment Circumstances, 2000/1 (1997 in brackets)

	% children in each type	% children in poverty	% contribution to overall child poverty
Workless	20.7 (24.6)	77.4 (80.1)	52.8 (58.3)
One or more PT	9.7 (7.8)	42.2 (48.7)	13.5 (11.2)
Head self-employed	11.6 (13.0)	30.8 (28.1)	11.8 (10.8)
Couple, one FT	17.6 (18.3)	25.2 (27.1)	14.6 (14.7)
Couple one FT, one PT	23.5 (22.0)	6.2 (5.5)	4.8 (3.6)
Single/couple, all in FT work	16.8 (14.3)	4.5 (3.3)	2.5 (1.4)
Total	100	30.3	100

Source: Piachaud and Sutherland (2002), Table 5.

Table 4. Workless Households in 1999

	% workless	% of individuals in workless households
Couple with children	7.3	18.1
Couple without children	8.5	12.7
Single with children	56	32.9
Single without children	29	36.3

Source: Dickens and Ellwood (2001).

53% of poor children live in workless households

Poverty is not just about money

Table 5. % Workless

	1979	1999
Couple with children	4.5	7.3
Couple without children	3.4	8.5
Single with children	35	56
Single without children	18	29

Source: Dickens and Ellwood (2001).

living in workless households are poor. It is clear from all this that worklessness and low pay generate poverty. Table 4 shows the distribution of worklessness across household types. Not surprisingly, we see that around 70% of individuals in workless households live in single adult households.

Turning to low pay, we find that 72% of workers in poor households are low paid. Of course, the relationship between low pay and poverty is not strong in the sense that only around 14% of low paid individuals live in poor households. This is because many low paid individuals (e.g. students) live in households where others earn enough to lift the household out of poverty. Nevertheless, there is a strong connection between low pay and worklessness. For example, the probability of working for low pay is nearly 60%, if the individual did not work in the previous year, but only 22% if they did. Alternatively, if someone is low paid in one year, the probability of not working 12 months later is nearly three times greater than if they were not low paid.

As we can see from Table 5, worklessness among working age households has risen within all categories, a fact which was first noted in the seminal work of Gregg and Wadsworth (1996, 2001). This happened despite the fact that the UK employment rate rose between 1979 and 1999 from 70.8% to 71.7% (OECD, 1995, Table A and OECD, 2002, Table B). Since the rate of individual worklessness actually *fell* over this period, what explains this apparent contradiction?

Some relevant facts are the following. Overall, neither unemployment nor inactivity changed greatly from 1979 to 1999. Unemployment among low skill men (with no qualifications) rose from 7.0% in 1979 to around 12% in 1999. There was no significant change for low skill women. Inactivity among working-age men rose substantially (4.7% to 15.9%). To compensate, inactivity among working age women fell from 34.6% to 26.9%.



What seems to have happened is that the increase in female participation in work is among married women whose partners are typically working. At the same time, participation of single women with children has fallen. This is, in part, a composition effect arising from the increase in the proportion of single parent households where the head is a never-married woman who is living apart from her own parents and, therefore, with less access to childcare.

The rise in inactivity among men has been concentrated on married men whose partners are not (or cease) working and among single men. Among couples, we have seen a substantial rise in households where both partners are working (from 55 to 64% of all two adult working age households from 1979 to 1999). We have also seen a substantial rise in households where neither partner is working (from around 4% in 1979 to around 8% in 1999).

Perhaps the most interesting feature of these changes is the significant rise in inactivity among men of working age.

In Figures 1 and 2, we can see the overall picture. The key feature here is the rise in the median relative to the 10th percentile, where many in poverty are located. These changes mean that the UK has a much more dispersed pay distribution than nearly all northern European countries (France being the notable exception). Even in 1979, the UK pay distribution was dispersed; since then, the gap has widened further (see OECD, 1996, Table 3.1).

For much of the period from 1979, state benefits for workless individuals were indexed to prices. Thus, over a period where median real wages were rising, it should be no surprise that benefit increases did not greatly moderate the rise in relative poverty. During the 1990s, however, average real benefits did rise quite significantly, because of the operation of the housing benefit system. By and large, housing benefits can be thought of as indexed to rents. In-work benefits also became more generous in the

later 1990s and the trend continues, particularly for households with children.

Wage dispersion in the UK, already in 1979 higher than in much of northern Europe, has since increased substantially, both absolutely and relative to most OECD countries (the US being a notable exception). Analysis of this increase suggests that the increase in demand for skilled workers relative to unskilled, in the 1980s in particular, outstripped the increase in the supply of skilled workers, relative to unskilled.

While the relative demand for skilled workers has been rising in the UK, so has their relative supply. The outcome in the labour market in any period will depend on which side is winning the race. In the UK (and the US), the evidence suggests that the demand side was winning during the 1980s and the early 1990s (see Nickell and Layard, 1999, Table 24). In most of northern Europe, this was not the case. The consequence of the demand side winning was that, *relative to supply*, the demand for skilled workers was rising and the demand for unskilled workers was falling. The

Figure 1. Real Wages in Britain for Males Working at Least Half Time

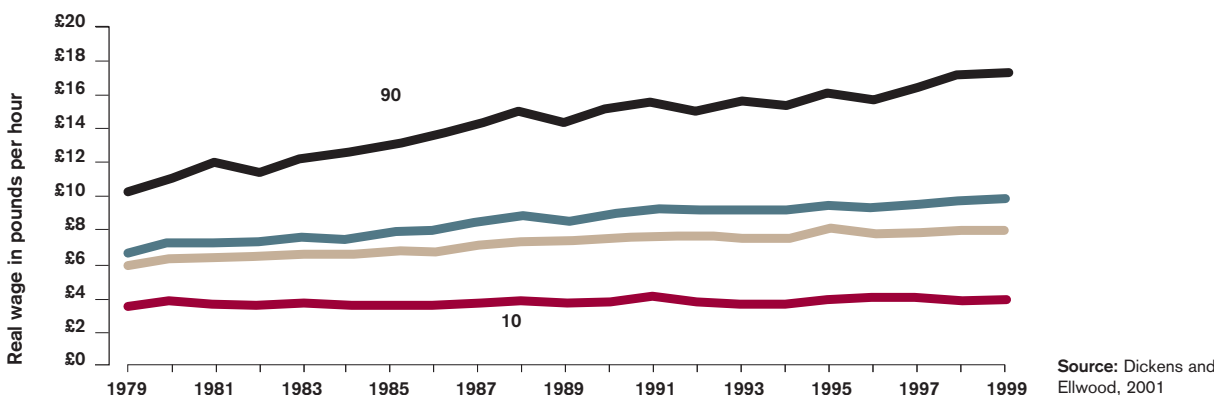
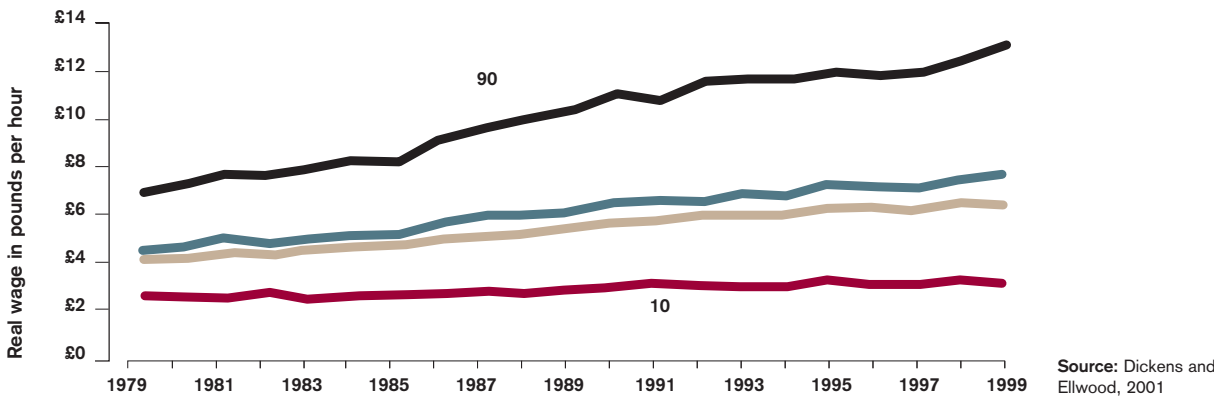


Figure 2. Real Wages in Britain for Females Working at Least Half Time



consequence was a weakening labour market for the unskilled with relative wages falling and jobs becoming harder to find.

This is a very simple story and additional factors may be important, notably the falling minimum wage (relative to the mean) in the United States in the 1980s and the decline in private sector unions in the UK over the same period. Some argue that the contrast between northern Europe and the UK/US is explained by the (in)famous European labour market institutions, which compress wages and raise unemployment among the low skilled. In fact, when unemployment rose in most European countries in the 1980s, it rose proportionately as much or more among the skilled as among the unskilled.

A particular feature in the UK exacerbated the decline in the unskilled labour market. The UK has a particularly large number of very low skill individuals. This is apparent for the whole adult population and there is no sign of any improvement in younger age groups (see Table 6). The comparison with the other north European countries is very telling and

suggests that, relative to the UK, their education systems have managed to raise a higher proportion of young people above a decent minimum threshold.

The disadvantage of the long tail in the UK skills distribution is that, when labour demand shifts towards those with higher skills, the problems this generates are going to be seriously exacerbated for the over 20% of the population of working age with very low skills.

Table 7 shows that the rise in male worklessness is not just concentrated among older men but has occurred among the prime aged as well. The patterns of increase are, however, different. For older men, the rise in inactivity was concentrated in the 1970s and 1980s, particularly following the recession of the early 1980s, but stopped in the 1990s. By contrast, for the prime aged, inactivity has continued to rise up to the present, despite the relatively buoyant labour market in the last eight years.

The weakening of the low skill labour market suggests that we might expect relatively larger increases in inactivity

Table 6. Is Literacy Getting Better in the Adult Population?

Age	Prose Literacy % in Level 1			Quantitative Literacy % in Level 1		
	16-25	26-35	36-45	16-25	26-35	36-45
US	23	20	19	26	20	18
Germany	9	12	14	4	5	6
UK	17	18	17	22	20	19
Netherlands	8	6	9	8	7	10
Sweden	4	5	7	5	4	7

Source: OECD (1997).
Note: Level 1 is the lowest of five and close to functional illiteracy. The levels are based on tests as part of the Adult Literacy Survey in many OECD countries in the mid-1990s.

Table 7. Inactivity Rates of Men (%), 1972-2002

Ages	25-54			55-64		
	GHS	LFS	LFS (ILO)	GHS	LFS	LFS (ILO)
1972-76	1.6	1.1		11.9	9.1	
1977-78	2.1	2.0		14.2	14.2	
1979-81	2.6	2.5		18.7	18.2	
1982-86	3.4	4.7		28.3	31.1	
1987-91	4.0	5.7		32.4	33.1	
1992-96	5.9	5.7	6.9	37.7	35.3	36.0
1997-99	7.9	7.2	8.3	39.9	36.0	36.6
2000-01	8.1	7.4	8.5	38.9	35.2	35.7
2002		7.5	8.6		34.5	35.0

Notes:

- (i) GHS is the General Household Survey, LFS is the Labour Force Survey.
- (ii) Data are available as follows: GHS, 72-96, 98, 2000. LHS, 75, 77, 79, 81, 83-2002. LFS (ILO), 92-2002.
- (iii) The inactive are those who are not working and not unemployed. LF unemployed are those without a job who are (a) looking for work in the reference week or (b) prevented from seeking work by temporary sickness or holiday or (c) waiting to start a job or (d) waiting for the results of a job application. ILO unemployed are those without a job who are available to start work in two weeks and (a) have looked for work in the previous four weeks or (b) are waiting to start a job.
- (iv) The GHS uses the LF definition up to 1996, the ILO definition in 98, 2000. The LFS series uses the LF definition. The LFS (ILO) series used the ILO definition.

There is a strong connection between low pay and worklessness

Table 8. Inactivity Rates for Men in and Outside the Bottom Skill Quartile (%), 1972-2002

Ages	25-54				55-64			
	GHS		LFS		GHS		LFS	
	BSQ	NBSQ	BSQ	NBSQ	BSQ	NBSQ	BSQ	NBSQ
1972-76	2.2	1.4			12.7	11.6		
1977-78	2.9	1.8			14.9	14.0		
1979-81	3.5	2.3	4.3	1.9	20.7	18.0		
1982-86	5.8	2.6	7.4	3.8	30.9	27.4	33.0	30.5
1987-91	8.1	2.6	9.6	4.4	36.6	31.0	37.8	31.5
1992-96	11.7	4.0	13.4	3.1	42.4	36.1	43.4	32.6
1997-99	15.4	5.4	17.7	3.7	50.6	36.3	47.4	32.1
2000-01	15.8	5.5	18.1	3.8	45.4	36.7	48.0	30.9
2002			18.8	3.7			47.6	30.1

Notes:

- (i) As in Table 7.
- (ii) BSQ (the bottom skill quartile) is based on educational qualifications. Until the early 1990s, those in the bottom skill quartile are a subset of those without qualifications. Later, those without qualifications are less than 25% of prime age men. So the bottom quartile also includes some proportion of the next education group, i.e. those with some GCSEs. NBSQ represents those outside the bottom skill quartile.

Table 9. % of Men Affected by Chronic Illness

Ages	25-54		25-54		55-64	
	LLSI	LHPD	LLSI	LHPD	LLSI	LHPD
1972-76	15.0		11.2		28.1	
1979-81	18.7		14.7		32.8	
1982-86	18.2	12.7	14.0	8.7	33.2	27.1
1987-91	19.0	14.8	14.8	10.4	35.0	31.8
1992-96	20.0	16.5	16.2	12.2	35.5	34.3
1997-99	20.0	17.0	16.6	13.3	33.6	36.6
2000-01	18.9	18.5	15.0	14.6	32.9	37.3
2002		18.1		14.1		36.3

Notes:

- (i) As in Table 7.
- (ii) LLSI refers to a limiting long-standing illness. This is reported in the GHS, where people are asked if they suffer from a long-standing illness that limits things that they would normally do. LHPD refers to a limiting health problem or disability. This is reported in the LFS and refers to a health problem or disability that affects the kind of work the person does.
- (iii) The GHS failed to ask a consistent question of this type in 1977-78. The LFS question was changed in 1997 and we have made some slight adjustment to the data post-1997 to correct for this.

There has been a significant rise in inactivity among men of working age



among unskilled men. Table 8 shows that this is indeed the case, particularly for prime age men. Among the older age group, the higher skill groups have access to good early retirement packages. The consequence of these changes is that some 50 to 60% of inactive prime age men are now in the bottom skill quartile. Furthermore, the relative situation of the low skilled has worsened substantially since the 1970s. Indeed, since the early 1980s there has been no increase in prime age inactivity among those outside the bottom skill quartile, whereas the inactivity rates of the low skilled have risen over 2½ times.

Inactive men over the age of 25 report themselves as being in one of four major categories: full-time student; looking after family; early retired; and sick or disabled. In the prime age group, around 70% of the inactive report themselves as sick or disabled. In the older age group, the equivalent figure is over 50%, with another 35% being early retired. So “disability” is a key factor in understanding the rise in male inactivity.

To pursue this, we must first find out how many people report themselves as chronically ill. In Table 9, we see that just under 20% of men aged between 25 and 64 report themselves as having a limiting long-standing illness (LLSI), with around 18% reporting a limiting health problem or disability (LHPD). This difference appears to be systematic among the prime aged, perhaps because, in the case of LLSI, the illness limits “things people normally do”, whereas with LHPD the illness limits “the kind of work the person does”.

Table 9 shows that the proportion reporting LLSI has not risen systematically since the late 1970s. By contrast, the numbers reporting LHPD have risen steadily. The different patterns of incidence observed for LLSI and LHPD may, perhaps, arise because LLSI is less responsive to a decline in labour demand than LHPD, which directly refers to work. Either way, what is absolutely clear is that the rise in self-reported illness or disability in the 1980s and 1990s is relatively small compared with the rises in inactivity.

In the light of this, is the typical person with an LLSI or an LHPD inactive? The short answer is no. As we can see from Table 10, the majority of prime age men with a limiting illness or disability are economically active. However, whereas in the 1970s a mere 10% of this group were inactive, by the late 1990s this number had risen to around 35% (LLSI) or 43% (LHPD). Inactivity among prime age men without an LLSI has also risen, but among those without an LHPD there has been no significant change since the early 1980s.

If we use these data, plus changes in the incidence of long-standing illness in the working age population (Table 9), we can work out what proportion of the dramatic rise in inactivity among prime age men is “explained” by the rise in inactivity among those with a limiting illness or disability. The answer is that around 70% of the rise in prime age male inactivity since the 1970s can be accounted for by rising inactivity among those with an LLSI and that more or less *all* the rise since the 1980s can be accounted for by rising inactivity among those with an LHPD.

Among older workers, the situation is different, with around half the rise in inactivity since the 1970s “explained” by rising inactivity among those without any reported limiting illness. This expanding group would tend to report themselves as inactive because of early retirement rather than because of sickness or disability. They would consist mainly of occupational pensioners taking early retirement (i.e. prior to age 65), an option widely available, particularly in public sector occupations (e.g. teachers, doctors, police, civil servants).

The question, however, arises as to why all this rise in non-employment has been so heavily focussed on inactivity as opposed to unemployment? For example, the unemployment rate among those without qualifications fell from 19% in the early 1980s to around 12% in the late 1990s, whereas the inactivity rate among the same group rose by a multiple of around three.

Table 10. Inactivity Rates Among Men (%)

Ages	25-54				55-64			
	With		Without		With		Without	
	LLSI	LHPD	LLSI	LHPD	LLSI	LHPD	LLSI	LHPD
1972-76	10.0		0.4		32.0		4.0	
1979-81	11.9		0.7		39.7		8.4	
1982-86	15.9	28.8	1.2	1.9	53.4	66.6	16.4	18.4
1987-91	19.2	28.5	1.3	1.5	59.1	65.0	18.6	16.6
1992-96	26.3	36.3	1.8	1.5	66.0	68.6	23.2	17.7
1997-99	33.8	43.1	2.8	1.9	64.6	72.8	29.6	18.5
2000-01	34.5	41.8	3.2	2.0	70.9	70.2	25.1	18.7
2002		43.6		2.1		70.2		18.3

Notes: See the notes to Tables 7 and 9. LLSI is a limiting long-standing illness. LHPD is a limiting health problem or disability.

To answer this question, let us first consider another. Given the weakening labour market for the low skilled, which group would one expect to be particularly badly hit? A plausible answer is that it would be the group that has an additional disadvantage, namely those who suffer, or potentially suffer, from a long-term illness or disability, which limits the sort of work they can do.

The story would then proceed as follows. Back in the early 1970s, even the men in this group with low skills did not tend to withdraw from the labour force. Around 87% of men in this category were economically active at that time. However, they did find it harder to get work. Back in the 1970s, those with a long-term illness or disability were three times as likely to be unemployed as the remainder of the work force. So, once the low skill labour market started to weaken, those unskilled men with an actual or potential chronic illness or disability were particularly badly hit. Because the low skill group found it much harder to get work, those operating the social security system found it much easier to shift them onto incapacity or invalidity benefit. Further, doctors, whose certification was required for benefit entitlement, were influenced by their assessment of the probability of patients finding a job.

These might be termed "push" factors, forcing men into inactivity. "Pull" factors include the fact that invalidity benefits were considerably higher than those available to the unemployed. This gap increased from the mid-1980s to the mid-1990s, before falling back in the later 1990s. This occurred because of the operation of the Additional Pension system, an earnings related supplement to invalidity benefit.

Another factor on the "pull" side is the fact that, once in the invalidity or incapacity benefit system, the pressure to take up work is minimal. For example, Beatty and Fothergill (1999) report that, in their survey of working age men who had not worked for six months, only 5% of those reporting themselves as long-term sick were looking for a job. The upshot of all this was that the number of male invalidity benefit claimants doubled from the early 1980s to the mid-1990s.

It is clear from our discussion that public policy can be used

to reduce significantly and, indeed, eliminate poverty. To achieve this, people in poverty must earn more, work more or receive higher transfers.

"Earning more" centres on the longer term issue of education and the shorter term question of low pay. With education, the key problem is how to eliminate the long tail in the skill distribution. From Table 11, we see that public expenditure on education in the UK has fallen substantially since the mid-1970s, reaching a minimum in the late 1990s. We know also that the relative pay of schoolteachers fell significantly over the same period and there is some evidence of a decline in quality among new entrants to the profession.

Against this rather gloomy background, increased expenditure on schools is necessary. This is happening, but recent research indicates that it is far from sufficient. First, in order to attack the long tail problem, employing the best teachers and heads in the poorest schools would seem sensible. This would, of course, require significant financial incentives.

Second, curriculum and teaching policy must follow the evidence. For example, literacy and numeracy hours appear to have had some success in reducing dispersion in skill levels at the primary school stage (see Table 12). However, the Improving Primary Mathematics project, initiated in Barking and Dagenham by researchers at the National Institute for Economic and Social Research, indicates that things could easily be a lot better. The methods used, based on those current in Switzerland, can generate substantial improvements in primary school mathematics attainment even in the poorest schools. Third, a lot of evidence suggests that heads are crucial to success and failure in schools. The conclusions to be drawn from this are obvious.

While education is the key policy area for attacking poverty in the long run, what are we to do in the mean time? The obvious short-run method of raising pre-tax earnings is to pass laws to prevent low pay. These may be in the form of minimum wage or fair wage legislation. The obvious potential danger here is that this will cut the employment of the

Table 11. Public Expenditure on Education in the UK (% of GDP)

	Public	Total
1975-9	6.02	6.42
1980-4	5.40	5.90
1985-9	4.88	5.36
1990-4	5.02	5.72
1995-9	4.90	5.94
2000-3	5.03	

The number of male invalidity benefit claims has doubled

Source: Glennerster (2002), Table 1. 1998-2000 were the years with the lowest public expenditure in the last quarter of the 20th Century (4.5% of GDP).

**Table 12. Scores of Schools 1995-2000,
Maintained Schools Key Stage 2:11 years, Level 4+**

	% Reaching Expected Levels			
	1995	1997	1999	2000
Maths				
75th percentile	63	78	83	85
median	47	65	72	74
25th percentile	31	50	59	60
English				
75th percentile	65	78	84	88
median	50	67	73	78
25th percentile	35	52	61	64

Source: Glennerster (2002), Table 5.

low skilled, thereby raising worklessness and poverty from another direction. While simple economics suggests that raising wages above the equilibrium level will reduce employment, this is not necessarily the case. For example, low pay establishments, such as fast food outlets, often operate with very high turnover and a permanent level of vacancies. Under these circumstances, a forced increase in pay could even raise employment.

The introduction of the National Minimum Wage in the UK in 1999 appears to have generated little overall job loss. Machin et al. (2002), in a "before" and "after" analysis of UK care homes, discover some evidence of employment and hours reductions as a result of the minimum wage. In this sector, minimum wages had a substantial impact on the wage structure because around a third of workers were paid below the minimum level prior to its introduction. Relative to this, the employment effects were small.

Overall, however, the impact on employment seems to have been minimal. This suggests that the best policy should be of the "suck it and see" type. The statutory wage floor should be raised slowly, relative to the general level of wages, until employment effects become noticeable. To some extent, this is indeed the existing policy where, from 1999 to 2004, the rise in the National Minimum Wage from £3.60 to £4.80 per hour represents a rise of around 5.7% per annum, slightly higher than the rate of increase of average earnings. However, a somewhat faster rate of relative increase would probably be safe on the employment front and have more of an impact on low pay.

What about "working more"? Dickens and Ellwood (2001) calculate that, if work patterns returned to the 1979 level and if work were made to pay enough so that no child living in a household with at least one full-time worker was poor, then child poverty would fall by 60%. So the combination of increased work and take-home pay is potentially very effective in reducing poverty. Both "push" and "pull" policies are relevant here.

The standard push policy used in the UK is the New Deal, combined with Job Centre Plus. The idea here is to provide a strategy for each individual in the target group that leads on to some form of training, job search assistance, subsidised employment and so on. This job finding process is integrated with the benefit system so that each individual has a single personal adviser who will deal with all work, benefit and related issues. The process also includes the possibility of benefit sanctions for individuals who fail to participate in the programme or turn down suitable employment.

The workless groups in the UK for whom New Deals are available include young people (18-24) who have been out of work for 6 months, adults (25-59) who have been out of work for 18 months, over 50s who have been on any benefit for 6 months, the disabled and single parents. The schemes are compulsory for the first two groups. The New Deal for young people started in January 1998 and evaluations published so far indicate that it has generated 20,000 extra jobs each year and has significantly reduced unemployment rates among young persons. Furthermore, there is no evidence as yet of a significant adverse impact on the labour market prospects of groups outside the programme.

The standard policy of the pull type is the tax credit. This is essentially an in-work benefit or pay top up that depends on family circumstances. Such a policy raises both employment and take-home pay for the target group. For any given policy, the bigger the employment effect, the smaller the take-home pay effect and the size of the former will depend on the extent to which pre-tax pay falls in response to the increase in labour supply. By and large, if tax credits are focussed on individuals whose pay is at or near the wage floor (minimum wage or minimum union rate), the employment effect will be small and the take-home pay effect correspondingly large.

In the UK, the Working Families Tax Credit (WFTC) was fully phased in from April 2000, replacing Family Credit

(FC), a benefit paid to low earners with dependent children. The WFTC was substantially more generous than FC, increasing both credits for younger children and the threshold as well as reducing the withdrawal rate. Furthermore, it included a new childcare credit. While the overall employment effects appear to have been small, when combined with the tight labour market, it has helped raise the employment rate among lone parents, which is now over 50% (up from 38% in 1993). However, the major gain from WFTC and its successor tax credits has been their contribution to reducing child poverty without negative labour supply effects. From 1996/7 to 2000/1, child poverty fell by around 3.5 percentage points, with the WFTC making a significant contribution to this reduction.

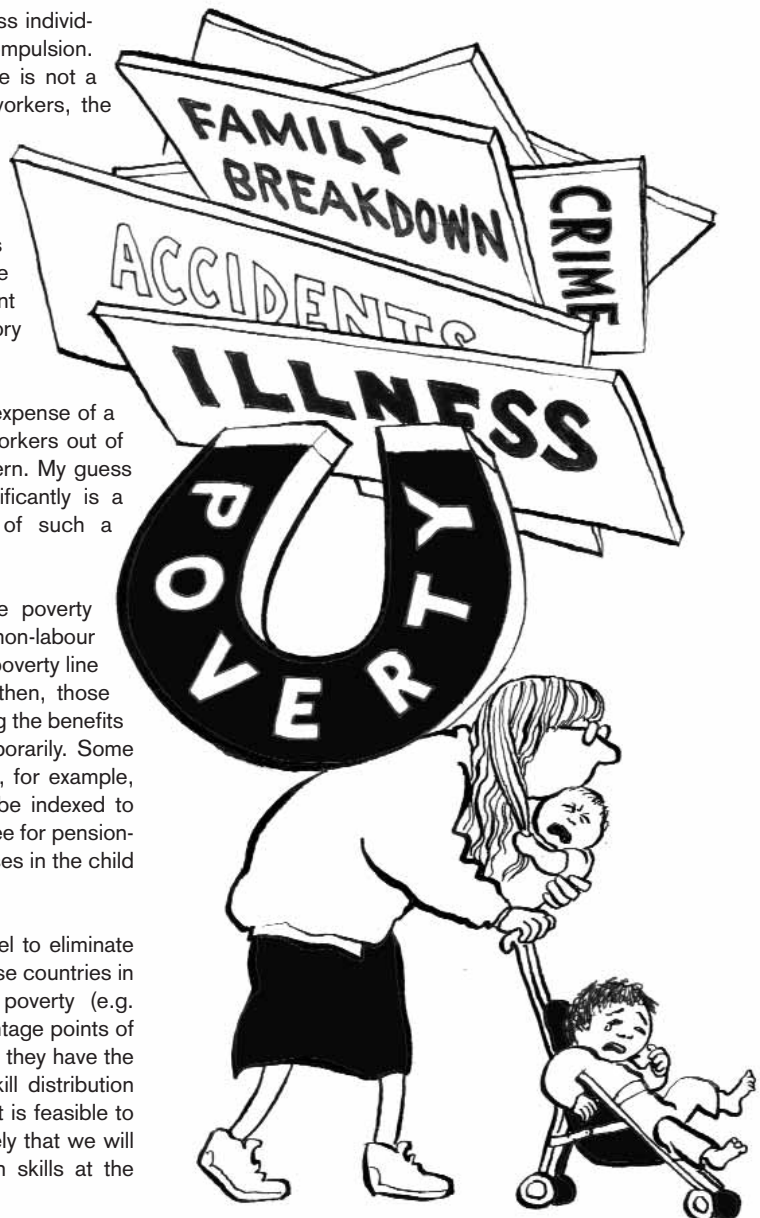
The National Minimum Wage appears to have generated little overall job loss

The basic issue with policies to push workless individuals into employment is the extent of compulsion. Currently, entry into a New Deal programme is not a condition for receipt of benefits for older workers, the disabled and lone parents. This is related to the fundamental question of who in society is expected to work and who is allowed to receive benefits without looking for a job. Not surprisingly, this topic arouses great passions and a great deal more could be done to smooth the path of older, lone parent and disabled benefit recipients into satisfactory employment.

The basic issue with in-work benefits is the expense of a fully comprehensive system that will lift all workers out of poverty, given the UK's skill distribution pattern. My guess is that cutting the long low skills tail significantly is a necessary condition for the introduction of such a generous system in the UK.

It remains a fact, though, that to eliminate poverty among those without alternative sources of non-labour income benefits will have to be raised to the poverty line and then indexed to median wages. Even then, those who, for one reason or another, are not getting the benefits will typically remain in poverty, at least temporarily. Some elements of this policy are being introduced, for example, part of the new Child Tax Credit is set to be indexed to earnings, as is the Minimum Income Guarantee for pensioners. Also, there have been substantial increases in the child elements of the benefit system.

Overall, however, to have benefits at the level to eliminate poverty would be enormously expensive. Those countries in northern Europe with very low levels of poverty (e.g. Denmark, Sweden) collect at least 10 percentage points of GDP more in taxes than we do in the UK and they have the advantages of much shorter tails to their skill distribution and higher overall employment rates. While it is feasible to move further in that direction, it seems unlikely that we will get far without a significant improvement in skills at the bottom end.



Stephen Nickell is a member of the Bank of England's Monetary Policy Committee and a member of the CEP.

This article is an edited version of his paper "Poverty and Worklessness in Britain", (CEP Discussion Paper No. 579), which was his Presidential Address to the Royal Economic Society.

References & further reading

Brewer, M., Clark, T. and Goodman, A. (2003), "What Really Happened to Child Poverty in the UK under Labour's First Term?", forthcoming, *Economic Journal* (Features), IFS mimeo.

Danziger, S. and Waldfogel, J. (2000), "Investing in Children: What Do We Know? What Should We Do?", CASE paper 34, Centre for the Analysis of Social Exclusion, LSE.

Dickens, R. and Ellwood, D. T. (2001) "Whither Poverty in Great Britain and the United States?: the Determinants of Changing Poverty and Whether Work will Work", CEP Discussion Paper No.506.

Dickens, R. and Manning, A. (2002), "Has the National Minimum Wage Reduced UK Wage Inequality?", CEP Discussion Paper No.533.

Faggio, G. and Nickell, S. (2003), "The Rise in Inactivity among Adult Men", forthcoming in P. Gregg, P. and J. Wadsworth (eds.), *The Labour Market Under New Labour: The State of Working Britain II*, (London: Palgrave Macmillan).

Gregg, P. and Harkness, S. (2003), "Welfare Reform and Lone Parents Employment in the UK", Leverhulme Centre for Market and Public Organisation, Bristol University, February.

Hanushek, E. A. (2003), "The Failure of Input-Based Schooling Policies", *Economic Journal*, 113, February, pp.F64-F98.

Krueger, A. B. (2003), "Economic Considerations and Class Size", *Economic Journal*, 113, February, pp.F34-F63.

Krugman, P. (1994), "Past and Prospective Causes of High Unemployment" in *Reducing Unemployment: Current Issues and Policy Options. Proceedings of a Symposium in Jackson Hole, Wyoming*, published by The Federal Reserve Bank of Kansas City.

Machin, S., Manning, A. and Rahman, L. (2002), "Where the Minimum Wage Bites Hard: the Introduction of the UK National Minimum Wage to a Low Wage Sector", CEP Discussion Paper No.544.

National Audit Office (1989), *Invalidity Benefit: Report by the Comptroller and Auditor General*, (London: HMSO).

Nickell, S. J. and Bell, B. (1996), "Changes in the Distribution of Wages and Unemployment in OECD Countries", *American Economic Review* (Papers and Proceedings), 86, pp.302-08.

Nickell, S. J. and Quintini, G. (2002), "The Consequences of the Decline in Public Sector Pay in Britain: A Little Bit of Evidence", *Economic Journal*, 112, February, pp.F107-F118.
OECD (1996), *Employment Outlook*, (Paris: OECD).

OECD (1998), *Employment Outlook*, (Paris: OECD).

OECD (2001), *Employment Outlook*, (Paris: OECD).

Ritchie, J., Ward, K. and Duldig, W. (1993), "GPs and IVB", DSS Research Report no.18, (London: HMSO).

Stewart, M. (1999), "Low Pay, No Pay Dynamics", in J. Hills (ed.), *Persistent Poverty and Lifetime Inequality: The Evidence (Proceedings of a workshop at H.M. Treasury)*, CASE Report 5, LSE, March.

Stewart, M. (2001), "The Impact of the Introduction of the UK Minimum Wage on the Employment Probabilities of Low Wage Workers", University of Warwick, mimeo.

Van Reenen, J. (2000), "Active Labour Market Policies: the British New Deal for the Young Unemployed in Context", NBER Conference, 'Seeking a Premier League Economy', LSE, December.

Whitburn, J. (2002), "Mathematical Attainments in Primary Schooling: Raising Standards and Reducing Diversity", *National Institute Economic Review*, 179, January, pp. 64-75.

Crime and property prices

Steve Gibbons uses Metropolitan Police figures for reported crime to show that vandalism and graffiti have a significant impact on house values, but burglary and violent crime levels in an area do not.

Crime prevention and control are top of the political agenda in developed countries. This is particularly the case in the urban environment, where fear of crime and the direct costs associated with property crime are seen as having particularly severe consequences by discouraging local regeneration and provoking a downward spiral in a neighbourhood's status.

Policy makers in Britain apparently share this view, arguing that

neighbourhoods have been stuck in a spiral of decline. Areas with high crime and unemployment rates acquired poor reputations, so people, shops and employers left. As people moved out, high turnover and empty homes created more opportunities for crime, vandalism and drug dealing. (Social Exclusion Unit, 2001, p.7)

Certainly, anecdotal evidence suggests that persistently high local crime rates deter potential new residents and cause those who can to move to move out to neighbourhoods with lower crime rates.

There is some evidence from the US, suggesting that crime rates do affect property values. For the UK, however, there is no existing evidence on the subject. This study uses crime data provided by the Metropolitan Police in London to estimate the effect of crime rates have on property prices in the Inner London area.

The rather surprising conclusion is that burglaries have no measurable impact on property prices. However, criminal damage to property, such as vandalism, graffiti and arson, has a huge impact on the value of property in a given area. A possible explanation of this finding is that obvious signs of criminal damage may be taken by potential property buyers as general evidence of instability in a community, of lack of social cohesion and of a general neighbourhood deterioration.

A simple statistical association between property prices and local crime rates is unlikely to tell us much about how crime – or any other aspect of the community – determines house prices. This is because there are many things about the neighbourhood that we do not observe, but which have an effect on housing costs and crime rates. Consider land prices, for example: low local land prices attract low-income residents; if low-income residents are prone to commit crimes in their own neighbourhood, we shall find more crime in low land-price neighbourhoods. Unless we can allow for land prices, regression estimates of the impact of crime

Lansdowne Place
£390,950
UNDER OFFER
Ground floor 1 bed flat
Easy access for intruders
Modern kitchen
Communal parking with high incidence of car crime
Gas central heating

Middle Road
£360,000
NEW INSTRUCTION
Opposite Queen's Park
Crime against the person common
Rear Patio garden
Front garden is local job hangout

Florence Road
£250,950
Potential for improvement
High incidence of burglary
Up and coming neighbourhood
Violent crime and mugging within 5 minutes walk

Kingsbury Street
£409,450
22' Lounge Diner
Near to A&E department
Hot-spot for street crime

Port Hall Street
£100,950
White rendered walls
Graffiti target
Frequently broken windows
Freshly planted front garden – used a public

Albert Road
£115,950 *REDUCED*
Criminal damage is common in this street
Regular fresh graffiti
Possibility of arson
Ideal for first time buyer

The propensity to report a crime varies with the characteristics of the victim



on property prices will be biased towards finding a negative relationship.

On the other hand, burglars will target properties where the expected return in terms of the value of stolen goods is highest. Since high land-price neighbourhoods will have high proportions of high-income residents, the returns to burglary here will be high. We should expect to find high burglary rates in these areas, other things equal. So we must pay careful attention to the unobserved components of property values that are area specific and attempt to control for them.

The detail of the equations used to structure the relationship between crimes and property prices is set out in my paper "The cost of urban property crime", CEP Discussion Paper No. 574. In particular, they allow for factors that may jointly influence both crime levels and the prices of properties in a particular geographical area.

Many police forces in the UK record crime at a geographically localised level. However, it is nearly impossible to obtain this data at the present time in a form that is useful for mapping to other area characteristics and to properties. One exception is the Metropolitan Police in London, which has made available to us a unique data set recording property-based crime on an annual basis for the period April 1999 to March 2001. The numbers of property-based crimes are recorded across the London area on 100m grid references.

The Met data lists by five types of crime: burglary in a dwelling; burglary in other buildings; criminal damage to a dwelling; criminal damage to other buildings; and theft from shops. Criminal damage includes graffiti and vandalism, but excludes damage committed in the course of a burglary, which is recorded under burglary. Unfortunately, it seems that the Metropolitan Police is unable to postcode other offences accurately.

Although this Met data has exceptional geographical detail, it is far from perfect in other ways. It is well known from comparisons of victimisation surveys and recorded crime statistics that the latter understate the true incidence of crime – the so-called *dark figure*. Unsurprisingly, the probability of a crime being reported varies with the severity of the incidence. However, the propensity to report a crime also varies with the characteristics of the victim. Only about

45% of burglaries involving a loss, but without injury or loss of earnings, seem to be reported, though that figure rises to nearly 100% for burglaries that do involve injury and loss of earnings. No information is available for reporting rates for criminal damage. Our main data source for property transactions is a sample provided by Ekins Surveyors. Ekins is the trading name of Woolwich Surveying Services Ltd, a wholly owned but independent subsidiary of Woolwich plc operating in the residential and commercial property sectors. In addition to its work with the Woolwich, Ekins receives survey and valuation instructions from over 100 other lending organisations. The full Ekins sample contains data from December 2000 to July 2001 for 10,464 properties in the Inner London Area, covering the E, EC1, N, NW, SE, SW, W and WC postcode areas. We geo-code these properties with National grid references based on their postcode. After geo-coding and dealing with missing data problems, our final sample is some 8,100 properties.

Our next task is to match crimes to properties. Since the aim is to obtain a measure of the expected crime level within a few blocks of a property, the calculations are based on the number of crimes of each residential crime type recorded within a 250-meter radius of the property and on the implied crime level per square kilometre. For non-residential crimes, the distance was doubled to compensate for the lower density of non-residential properties.

Table 1 summarises the key variables in the property price and crime data. The top panel summarises the property valuation sample. The focus of our work is on recorded crimes in the categories "burglary in a dwelling" and "criminal damage to a dwelling".

Taking these crimes for the London area between April 1999 and March 2001 and plotting them within a 1 km radius on a 500-meter grid indicates burglary hot spots north of Islington in North London and around Brixton in South London.

Criminal damage, also, is high in these areas, but the hot spots are more dispersed. They extend north from Islington and towards Tottenham on the west side of the Lea Valley; east into the East End of London; and on the south side of the River Thames towards Woolwich. Recorded property crime rates are generally low in the Central London area, rise in the inner city areas and fall away again towards the suburbs.

Table 1. Summary statistics

	Mean	s.d.	Min / Max	Obs.
Ekins property valuation data				
Property prices, 12/00-07/01 (£000)	235.4	244.8	14 / 4500	8084
Criminal damage in a dwelling (per km ² per year)	50.5	30.5	0.63 / 155.8	8084
Burglary in a dwelling (per km ² per year)	121.6	79.4	1.2 / 565.3	8084
Eastings	53091	676	51470 / 54840	8084
Northings	18064	664.6	16690 / 19590	8084



Recorded property crime rates are low in the Central London area

The key results are summarised in Table 2. Taking account of basic differences in housing types and broad differences in geography, we find that prices fall by nearly 4% for an additional five reported incidents of criminal damage per year. Five reported incidents is an extra 10% on the average number of incidents recorded. Surprisingly, at face value, domestic burglaries appear to *push up* property values. This implausible result almost certainly reflects unobserved property, household and neighbourhood characteristics. Higher returns to burglaries in higher priced dwellings and the higher propensity for better-off households to report crime could bias these estimates.

We continue to find very significant effects from criminal damage, even once we take more care in controlling for local amenities, community and geography – distance to underground stations, green spaces, police stations and school truancy rates for example. But burglaries remain unimportant, even in our best models.

Table 2. The effect of a 10% increase in crime near the average property

	Basic model	Adjusting for local amenities and geography	Predicting from the location of public houses
Criminal Damage	-3.9%	-2.0%	-2.4%
Burglary	+1.0%	Not statistically significant	Not estimated

Consideration of the possible cultural factors underlying the incidence of graffiti, vandalism and other forms of criminal damage suggests another approach to our analysis. Alcohol consumption is an associated factor in many types of crime, although the lack of official statistics for the UK makes it difficult to quantify the link. A study in one town in England found that 88% of people arrested for acts of criminal damage, over a period of five months, had been drinking in the four hours prior to the incident (Jeffs and Saunders, 1983). Official statistics for local prisons in the United States indicate that 33% of inmates convicted for a property crime (and some 56% of inmates convicted for a public order offence) had been drinking prior to the offence.

Although the link between alcohol consumption and crime is not necessarily directly causal, alcohol is often a contributory factor in violent crimes and acts of public disorder. This may be because alcohol encourages aggression, induces psychotic states, or decreases inhibitions. Or it may be that some certain social environments encourage both excessive drinking and disorderly or criminal activity. In any case, a link between the location of crimes and the location of licensed premises, and the time of offences and the end of licensing hours is widely recognised.

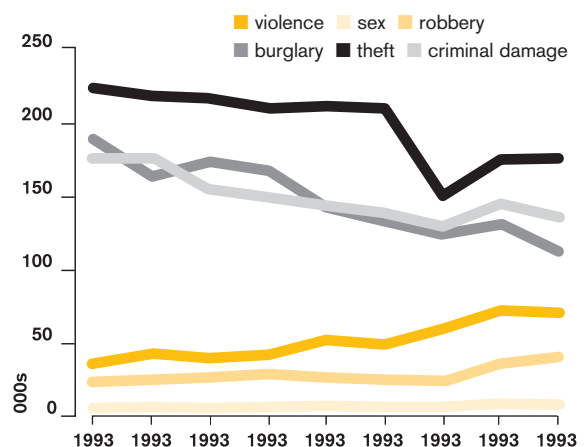
So we would expect the incidence of property crime in our London data to be higher at locations near licensed premises, and for prices to be lower near pubs. Indeed this

is the case. For the average property, criminal damage decreases at the rate of 3.5 crimes per sq km per year as distance to the nearest pub increases by 1km. And there is a decline in house prices near pubs that seems to be linked to this rise in crime.

Why is it that burglaries do not seem to influence property prices, while criminal damage incidents in a neighbourhood do? Of course, homeowners can take preventative action against burglars (alarm systems, barriers etc), which they are less able to do to prevent damage to property. But we should consider to what extent our estimated impact of criminal damage to dwellings picks up the cost associated with a high incidence of other crimes – for example, violent crime, robbery, or vehicle crime.

Our data is slightly limited by the lack of information on crime in other categories. Some unobserved crime categories are cause for concern, because the estimates of the economic costs of these types of crime are high. Brand and Price (2000) estimate that average cost associated with an act of violence against the person is £19,000, with serious wounding carrying total costs of £130,000. For robbery, their figure is £9,700 per incident. We would expect the costs associated with increased risk of such crimes to be capitalised in property values. On the other hand, incidents of assault and robbery may be more important in individual choices about where and when to walk the streets. The location of property crimes is more directly related to choice of residential location.

Figure 1. Crime trends in Metropolitan Police area, 1993-2001



Changes in counting rules can make comparison between pre- and post-1999 figures misleading. Figures are adjusted for overall effect on offence groups, but the Theft and Handling group cannot be corrected accurately. All vehicle-related crimes (including some criminal damage to vehicles) have been deducted from the Theft and Handling category post-January 1998. There were also minor geographical changes to the Metropolitan Police Force boundary in 2000.

Alcohol consumption is an associated factor in many types of crime



Changes in counting rules can make comparison between pre- and post-1999 figures misleading. Figures are adjusted for overall effect on offence groups, but the Theft and Handling group cannot be corrected accurately. All vehicle-related crimes (including some criminal damage to vehicles) have been deducted from the Theft and Handling category post-January 1998. There were also minor geographical changes to the Metropolitan Police Force boundary in 2000.

The crime trends for the Metropolitan Police Force Area in Figure 1 also suggest little association between criminal activity in the criminal damage (crim) category and what we would perceive as serious urban crimes such as violent crime (viol) and robbery (rob). While recorded crimes in the burglary, criminal damage and theft categories have been on a general trend down in the last decade, violent crime and robbery have been on the increase.

What are we to make of our results? On the face of it, the impact of criminal damage on property prices seems high relative to estimates of the direct, physical and emotional costs associated with criminal damage itself. Average costs per incident to the household experiencing it are in the order of £510 (Brand and Price, 2000). In comparison, our estimates translate into a social valuation of criminal damage in the order of £100,000 per incident.

It is quite clear from this that, if incidents of criminal damage affect property prices, then it is for reasons other than the expected costs of the incidents themselves.

A more likely explanation is that incidents of vandalism and criminal damage impact on property prices because they induce fear of crime. Graffiti, for example, comes out as one of the few neighbourhood factors which is consistently significantly correlated with several measures of fear of crime.

Criminal damage is certainly *perceived* as a problem by individuals. In the 2000 British Crime Survey, 32% of respondents agreed that vandalism was a "very/fairly big problem" (Home Office, 2001), although only 10% of these considered it had a negative impact on their quality of life. Nevertheless, in the same study, between 33% and 50% of respondents in owner-occupier neighbourhoods considered that disorder in general has a negative impact on quality of life and 20% of respondents in affluent owner-occupier neighbourhoods thought disorder was increasing.

Perhaps the most plausible interpretation of the results is that incoming residents perceive criminal damage in the neighbourhood as signalling higher crime in the area, or a deteriorating neighbourhood in general. In essence, what we are finding relates to neighbourhood effects of the type described by Wilson and Kelling's *Broken Window Syndrome*. According to this hypothesis – popular in the environmental criminology literature and with advocates of neighbourhood clean-up campaigns – unrepaired damage

to property in the neighbourhood encourages further vandalism, perceptions of community disorganisation, upward spiralling crime rates and downward spiralling neighbourhood status.

If vandalism and graffiti are seen as predictors of neighbourhood decline and precursors of escalating crime rates, then it is not surprising that they impact on property prices. Nevertheless, our evidence is that these disorder-related crimes are weakly to moderately associated with more serious crimes, suggesting that the disorder/crime link is not necessarily causal. Physical disorder like graffiti and vandalism may be symptomatic of deeper disruptions in social cohesion and community expectations.

Steve Gibbons is Lecturer in Economic Geography in the Department of Geography and Environment and a Research Associate at the CEP.

This article is an edited version of his paper "The Costs of Urban Property Crime", CEP Discussion Paper No. 574.

References & further reading

Bottoms, A. E. and Wiles, P. (1997), 'Environmental Criminology', in M. Maguire, R. Morgan and R. Reiner (eds.), *The Oxford Handbook of Criminology*, Oxford University Press:Oxford.

Deehan, A. (1999), 'Alcohol and Crime', *Policing and Reducing Crime Unit, Crime Reduction Research Series Paper*, London, Home Office.

Hellman, D. A. and Naroff, J. L. (1979), 'The Impact of Crime on Urban Residential Property Values', *Urban Studies*, vol. 16, pp. 105-112.

Home Office (2002), 'Home Office Counting Rules for Recorded Crime', London, Home Office Research and Development and Statistics Directorate.

Jefferies, B. W. and Saunders, W. M. (1983), 'Minimizing Alcohol Related Offences by Enforcement of the Existing Licensing Legislation', *British Journal of Addiction*, vol. 78(1), pp. 67-77.

Killias, M. and Clerici, C. (2000), 'Different Measures of Vulnerability in Their Relation to Different Dimensions of Fear of Crime', *British Journal of Criminology*, vol. 40, pp. 437-450.

Lynch, A. K. and Rasmussen, D. W. (2001), 'Measuring the Impact of Crime on House Prices', *Applied Economics*, vol. 33, pp. 1981-1989.

Sampson, R. J. and Raudenbush, S. W. (1999), 'Systematic Social Observation of Public Spaces: A New Look at Disorder in Urban Neighbourhoods', *American Journal of Sociology*, vol. 105(3), pp. 603-651.

Thaler, R. (1978), 'A Note on the Value of Crime Control: Evidence from the Property Market', *Journal of Urban Economics*, vol. 5, pp. 137-145.

Wilson, J. Q. and Kelling, G. (1982), 'The Police and Neighbourhood Safety: Broken Windows', *Atlantic Monthly*, vol. 127, pp. 29-38.



TERRAS
ET TERRAS

TERATIS
PROSTIBONS

THE UNIVERSAL

Lessons from the Seven Years War

A banking collapse in Amsterdam rocked European financial markets in 1763. Isabel Schnabel and Hyun Song Shin draw parallels between that crisis and the events that brought down Long-Term Capital Management in 1998, concluding that liquidity risk was the fundamental weakness in both cases.

A financial crisis swept across northern Europe in 1763, which bears an uncanny resemblance to modern episodes of financial market turbulence. In particular, it mirrors the events of the autumn of 1998, when a severe liquidity squeeze culminated in the near collapse of the American hedge fund, Long-Term Capital Management (LTCM).

Although financial institutions looked very different in 1763, the crisis then shows many features that would be familiar to an observer today. Issues such as the role of high leveraging, liquidity drains in times of crisis and the intertwining of credit and market risk were all clearly evident in 1763. We see financial innovations that allowed nimble players to increase leverage in a buoyant financial market and amass rapid gains at the expense of increased fragility of the system. We see the final failure of these same players leading to fire sales of assets with all their repercussions.

From a theoretical perspective, the events of 1763 pose a challenge to our current models of financial crises. Banks in the 18th century were underdeveloped by today's standards. It was uncommon for them to take retail deposits, or to extend cash loans to the private sector. Their primary role was in the payments system associated with the trade in goods. The most prominent bankers were also merchants, hence the origin of the term "merchant banker". The 1763 financial crisis does not fall neatly into the textbook model of a bank run, where the main issue is the vulnerability of a deposit-funded bank with a maturity mismatch of liabilities and assets.

Agency-based theories that emphasise debtor moral hazard fare little better as an explanation. Holland was the main creditor nation at the time, home to plentiful capital accumulated during its heyday as the pre-eminent trading nation of Europe. Meanwhile, Prussia would be familiar to many bankers today as a typical "emerging market" debtor

country. Hamburg played an intermediary role between Amsterdam and Berlin, channelling funds and exploiting the interest rate differences that existed between Holland and Prussia.

However, in contrast to agency-based theories, the first wave of failures occurred in Amsterdam, followed by failures in Hamburg some two weeks later. The financial crisis in Berlin was severe, but it arrived several weeks after the crises in Amsterdam and Hamburg. More significantly, most of the merchant bankers that failed in Amsterdam and Hamburg were able to re-open their doors within months, suggesting that the crisis was one of liquidity rather than fundamental solvency.

The increased leverage in the balance sheets of the major market participants in 1763 was made possible by the development of bills of exchange. As their name implies, these first emerged as instruments to facilitate trade in goods. However, by the 18th century, they had evolved into a sophisticated instrument of credit – the “acceptance loan” – that allowed capital to be raised on the established financial centres of Amsterdam and Hamburg to finance trade and manufacturing in the newly emerging markets further east, such as Prussia.

Reputable bankers would make their own creditworthiness available by allowing other persons to draw bills on them, which could then be used for payments to third parties, or be sold on the bills market to raise capital. All the contracting parties’ interests were tied together through rigorously enforced laws on the transferability and negotiability of bills, which meant that contracting parties were better able to commit to repay. This commitment power had the virtuous effect of expanding the universe of possible contracts between interested parties separated by large distances. However, there was also a dark side. The interlocking sets of claims and liabilities bound many market participants together through their balance sheets, even though there were no underlying transactions in terms of trade in goods between them. The combination of highly leveraged balance sheets and interlocking claims and liabilities proved to be vulnerable to the downturn in economic activity that came with the end of the Seven Years War in 1763.

Just as LTCM took centre stage in the 1998 crisis, the events of 1763 are inextricably bound up with the exploits of one institution, the banking house of de Neufville Brothers. Like LTCM, de Neufville’s business practices were initially viewed with suspicion, but their apparent triumphs ensured their meteoric rise and produced many imitators.

The analogy runs deeper than simply the role of a prominent market player. Two features stand out. First, the increased size of balance sheets and the attendant increase in leverage was not viewed with alarm in 1763 because of the offsetting nature of the claims and liabilities. In modern parlance, the balance sheets were “perfectly hedged” to

the extent that each liability was exactly offset by an equal and opposite claim on another party. This is reminiscent of the convergence or arbitrage trades much favoured by modern markets.

Second, the contagious effects of the 1763 crisis were exacerbated by the forced sales of assets to meet liabilities. Merchants suffered direct losses when their counter parties went bankrupt, but they were also affected indirectly through the price declines resulting from the fire sales. The actions of distressed parties attempting to reduce the size of their balance sheets had an impact on the value of others’ assets. Weakened balance sheets generated further forced sales, feeding the vicious circle. The liquidity squeeze generated by such forced sales received particular attention in the aftermath of the LTCM crisis.

This second point underscores an important distinction. The modern treatment of bank runs emphasises the negative externalities on the liabilities side of the balance sheet: it is the run by depositors that precipitates the crisis. In contrast, the crises of 1763 and 1998 are instances of contagion on the asset side of the balance sheet.

There is, however, one important contrast between the events of 1763 and 1998. In 1998, the feared meltdown in the financial system prompted the intervention of the authorities (the New York Fed), which coordinated a buyout of LTCM by its main creditors. In 1763, there was no such intervention by the public authorities in Amsterdam. Although there were attempts to prevent the failure of de Neufville on the part of some of its counter parties, they did not muster enough support. The importance of timely intervention in crisis management (and the coordinating role of a crisis manager) is an important lesson to be drawn from this contrast.

The 18th century marked the slow, but steady, decline of the Netherlands as Europe’s dominant trading nation. Nevertheless Amsterdam remained the major financial centre of northern Europe, followed by London and Hamburg.

Following the example of towns like Venice, Seville and Antwerp, Amsterdam had developed financial institutions that were crucial to the city’s development as a global financial centre. The most important of these was the Exchange Bank of Amsterdam, which was a publicly guaranteed deposit and giro bank (i.e. a payments bank). Adam Smith’s *Wealth of Nations* has a celebrated description of the Bank of Amsterdam, which remains a classic exposition of the functioning of a giro bank in the 18th century. Accounts were kept in a notional currency, called bank money, the largest part of which was backed with the holding of gold or silver. By law, bills of exchange had to be settled in bank money by a transfer from one account to another. Due to the impeccable reputation of Amsterdam bank money, it soon emerged as the key currency in international finance.

Berlin was still a provincial backwater in the 18th century. Its second rung status as a financial centre was also reflected in prevailing interest rates, which were much higher than in Amsterdam and Hamburg. A network of wealthy merchant bankers in Amsterdam and Hamburg maintained correspondent relationships to other financial and trade centres. One important function of these bankers was the intermediation between these different centres. A need for such intermediation arose from the fact that loans were always based on personal relationships and there were few bankers with sufficient contacts and international reputation. The fact that a large part of Prussian trade ran through Hamburg also meant that commodities and other assets of the Berlin merchant passing through Hamburg could be pledged as collateral. Similarly, trade between Hamburg and Amsterdam had traditionally been strong. Hamburg bankers were, therefore, ideally placed to act as intermediaries between Amsterdam and Berlin.



The events of 1763 and 1998 were both bound up with the exploits of one institution

The Seven Years War and the emergence of Prussia as a regional power was accompanied by a shift in the centre of gravity in the growth in trade and manufacturing activity away from Amsterdam and Hamburg towards the interior. An important impetus for financial innovation was the challenge of finding ways to channel funds from established centres such as Amsterdam to the capital-hungry regions further east, especially Prussia.

For the cautious Amsterdam investor, lending money to an emerging market borrower in return for a promise of uncertain quality would be a risky undertaking, even when the Berlin merchant was commonly recognised to be sound. This is a dilemma familiar to investors in emerging markets in the 21st century. A large part of the solution came from the emergence of bills of exchange in the new role of acceptance loans.

Legally, a bill of exchange is an “order to pay” (like a modern cheque) rather than a “promise to pay” (like a modern corporate bond). Thus, in contrast to a modern creditor-debtor relationship, which involves a bilateral contract, there are typically at least four interested parties in a loan contract involving a bill of exchange: the drawer of the bill; the drawee of the bill; the beneficiary of the bill; and the holder of the bill.

Under the terms of a bill, the drawer requires the drawee to pay the beneficiary a sum of money at a given point in time. The bill carries the signatures of both the drawer and the drawee. By signing the bill, the drawee “accepts” the bill, thereby entering into the obligation to the beneficiary. Bills were negotiable instruments, freely transferable from one

party to another, and their transfer was governed by rules for transfer and settlement that were rigorously enforced across all the major jurisdictions.

In the context of the events of 1763, the cast of characters in a typical acceptance credit transaction would consist of the following parties: the drawer – a Hamburg merchant banker; the drawee – an Amsterdam merchant banker; the beneficiary / endorser – a Berlin merchant; and the purchaser / holder – an Amsterdam investor. In practice, the bill would in most cases pass through the Hamburg bill market, but would eventually end up in Amsterdam where most of the capital was. Bill traders could thus exploit the interest differences that existed between Amsterdam, Hamburg and Berlin.

The Amsterdam merchant banker would accept the bill on the understanding that the Hamburg banker would redeem the bill before the redemption date. Typically, the Hamburg banker would maintain a balance on his account at the Amsterdam banker, but this promise by the Hamburg merchant

banker could also be secured on collateral in the form of trading goods. The Amsterdam merchant bank would receive a commission for its service in accepting the bill. This commission typically was very small (around 0.3%), indicating that the incurred risks were judged to be negligible. For his part, the Berlin merchant promised to repay the Hamburg merchant banker before the bill's redemption date, so that the money could be passed on to the Amsterdam merchant banker in time. This promise would also typically be secured on collateral and the Hamburg merchant bank would receive commission from the Berlin merchant for its role in drawing up the bill. In addition, the Berlin merchant would have to pay interest when discounting the bill in the market. Since the bill was secured by the signatures of the Amsterdam and the Hamburg bankers, discount rates would be relatively low compared with the rates that the merchant would have to pay otherwise.

As a result of this sequence of transactions, credit has flowed from the investor in Amsterdam to the merchant in Berlin and the intermediaries have balance sheets in which the liabilities are exactly matched by claims on other parties.

On the balance sheets of the intermediaries, there is an increase on both the assets and the liabilities side, reflecting the increase in leverage. The Amsterdam merchant banker owes money to the holder of the bill, but this liability is matched by his claim on the Hamburg merchant banker. The Hamburg merchant banker also has an extended balance sheet in which the liability towards the Amsterdam banker is matched by a claim against the ultimate borrower

– the Berlin merchant. The intermediaries are remunerated for their increased leverage and credit risk arising from this transaction by the commissions received for drawing up the bill.

Acceptance loans were de jure short-term contracts, just like the traditional loans based on bills of exchange. De facto, they were often used for long-term borrowing as the bills were “paid” by drawing another bill, much like the modern practice of rolling over short-term loans for the financing of long-term projects. In times of crisis, however, the short-term nature of the contract became apparent, with the bill market drying up completely.

In reality, of course, transactions were much more complicated than the stylised picture given. The chains of interlinking obligations were typically much longer, because bills were heavily traded at exchanges. In particular, Hamburg bankers participated very actively in the trading of bills, trying to benefit from the difference in interest rates across markets. In Berlin, too, there would be merchant bankers intermediating loans, just as there also were merchants in Hamburg and Amsterdam in need of financing and investors in Hamburg and Berlin. But the stylised transaction described illustrates the overall direction of capital flows and the nature of the interlinking obligations.

Besides the claims and liabilities “above the line”, the parties to such transactions were also subject to contingent liabilities and claims that were “below the line”. These arose from the strict legal provisions for the transfer and negotiability of the bills, which had two key planks: endorsement and *Wechselstreng*.

The practice of endorsement has survived to today in the regulations governing the settlement of cheques. The beneficiary of the bill could sell the accepted bill in the open market after adding his signature to the bill (thus “endorsing” it). Indeed, any subsequent owner could endorse the bill and sell it on the open market. However, such a transfer was not final. Even after the sale, the new holder of the bill had a contingent claim on the other signatories of the bill in the event that the original drawee was unable to pay. If the drawee was unable to honour the bill, then the drawer and all endorsers of the bill became jointly liable. In effect, when the beneficiary sold the bill by endorsing it, he was selling the claim on the drawee within a “credit insurance wrapper”. The seller of the bill was promising to insure the buyer of the bill against default by the drawee.

The economic rationale for the institution of endorsement is clear. By maintaining a contingent liability, the practice of endorsement was designed to guard against the passing on



Both crises are instances of contagion on the asset side for the balance sheet

of lower quality or fraudulent bills. Also, the fact that all signatories became jointly liable greatly reduced the informational costs related to seeking recourse against default. If, by contrast, there were a strict sequencing of liabilities, the bill would be far less attractive, since the informational demands on demonstrating the insolvency of those higher up the list before claiming redress on one of the signatories would entail delays and uncertainties. There would also be the potential for collusion between sub-groups of the signatories and the drawee.

The second plank of the legal enforcement provisions for bills was *Wechselstreng*, analogous to what is known today as the “holder in due course” provision in US and UK law. It stipulated the legal separation of the obligation related to the bill from any underlying commercial transaction between third parties. It thus ensured that claims from bills of exchange were enforced quickly and rigorously.

Suppose that our Hamburg banker (the drawer of the bill) had repaid our Amsterdam banker (the drawee of the bill) prior to the maturity of the bill, but that the Amsterdam banker went bust before the bill was redeemed. Then, the holder of the bill had the right to take the protested bill to the Hamburg banker and demand payment, since the legal claim of the bill was in force as long as the bill was outstanding. Thus our Hamburg banker was being asked to “pay twice” for the same bill – once to the (now failed) Amsterdam banker and once to the owner of the bill. This feature of *Wechselstreng* is the key to understanding the dynamics of the crisis in 1763. The “holder in due course” provision remains a lively topic of debate with the advent of the Internet and the status of digital signatures.

The Seven Years War brought an economic boom not only to the neutral states, such as Holland and Hamburg, but also to states involved, such as Prussia. This boom was accompanied by a strong expansion of credit through bills of exchange. At the same time, inflation became a widespread phenomenon in northern Europe, as many German states and other countries, like Sweden, financed the war by debasing their currencies. Rapid price changes and uncertainty formed the backdrop to speculative activities, often carried out on the basis of bills of exchange by people with little capital of their own.

Not everybody profited from the war boom to the same extent: huge gains could be made in the money trade, which became more and more popular among merchant bankers, or in the trade of war goods and exotic goods from the West Indies. However, these profitable activities also were

the most risky ones, as the price volatility of exotic and war goods was particularly high. In addition, trade in exotic goods necessitated expensive investment in shipping (much like the capital intensive telecom equipment industry today), so that traders in these goods were particularly vulnerable to a fall in prices.

The key advantage enjoyed by de Neufville and other Amsterdam banks was their base in a mature financial market with an effective legal infrastructure. Although Hamburg bankers may have been wealthy enough to lend directly to the borrowers in Berlin and elsewhere, the range of services that de Neufville was able to offer – such as access to the Amsterdam bills market – was certainly valuable. Likewise, commentators on modern markets in credit default swaps and other instruments observe how the larger international banks that can offer credit as well as investment banking services (such as Deutsche Bank, Citicorp Salomon Smith Barney, or J. P. Morgan Chase) have a competitive advantage over the specialised investment banks.

The banking house of de Neufville was founded in 1751 by Leendert Pieter de Neufville, who was 21 at the time. It was no more than a medium-sized firm at the beginning the war in 1756. However, by taking full advantage of the opportunities that the buoyant war economy provided, it was catapulted into being one of the richest and most prestigious banking houses of Amsterdam. De Neufville's balance sheet reveals an extensive range of projects – in manufacturing, goods trading, shipping, insurance and other financial activities. Thus, as well as being a banker acting as guarantor of loans (i.e., being the drawee of bills), de Neufville was a debt-financed entrepreneur in its own right.

The glamour and fascination associated with such success would be familiar to contemporary observers of the excesses of the late 1990s' bull market. Leendert Pieter's opulent lifestyle was the subject of much comment and gossip. The furnishings of his house were said to be of the finest quality, including chests of drawers made from walnut wood, a drawing room from yellow silk, and a fine collection of paintings. He owned several coaches, horses, a yacht and a manor, but (reputedly) not a single book.

De Neufville's commercial interests were wide, both in the range of goods he traded in and in the wide geographical spread of his business activities. After the conclusion of peace in February 1763 (the Peace of Hubertusburg), de Neufville was party to a major speculative deal with the Berlin merchant banker, Gotzkowsky, who was the pivotal financier and entrepreneur in the Berlin of the day.

The deal involved buying up a large quantity of grain from the departing Russian army in Poland. The purchase price was 1 million Dutch guilders. It should be borne in mind that any bank with capital of 1 million guilders was considered to be a large bank in Amsterdam at the time. The largest

Amsterdam bank, Hope & Co. (which survived the crisis largely unscathed) had a total capital of 4.3 million guilders in 1762.

Grain prices then collapsed in Berlin, falling more than 75% between May and August. Of course, the merchants had known that the end of war would bring about a decrease, but a drop of such magnitude could hardly have been expected. Although de Neufville's equity stake in the project was small (only 6%), the fallout from the crash in grain prices may have been much larger. The details of the financing of the deal are not well documented; but if, as is likely, de Neufville had financed a substantial part of the deal for his partners by extending acceptance loans himself or by drawing bills on other Amsterdam bankers, the losses resulting from the Berlin grain price collapse would have been substantial.

These events affected market participants in two ways. First, falling prices depressed the values of their asset portfolios. Second, it became harder and harder to obtain new loans needed to roll over existing debt. The tightening of the credit market shows up clearly in the levels of discount rates. Discount rates in Amsterdam in normal years had been in the range of 2 to 3%. Now they rose above 4% and fluctuated wildly. The Hamburg credit market showed similar signs of distress, with discount rates of up to 12% instead of the normal 4%. The tight credit markets forced merchants and merchant bankers to sell their assets, such as grain and sugar, to obtain the liquidity needed for the repayment of maturing bills.

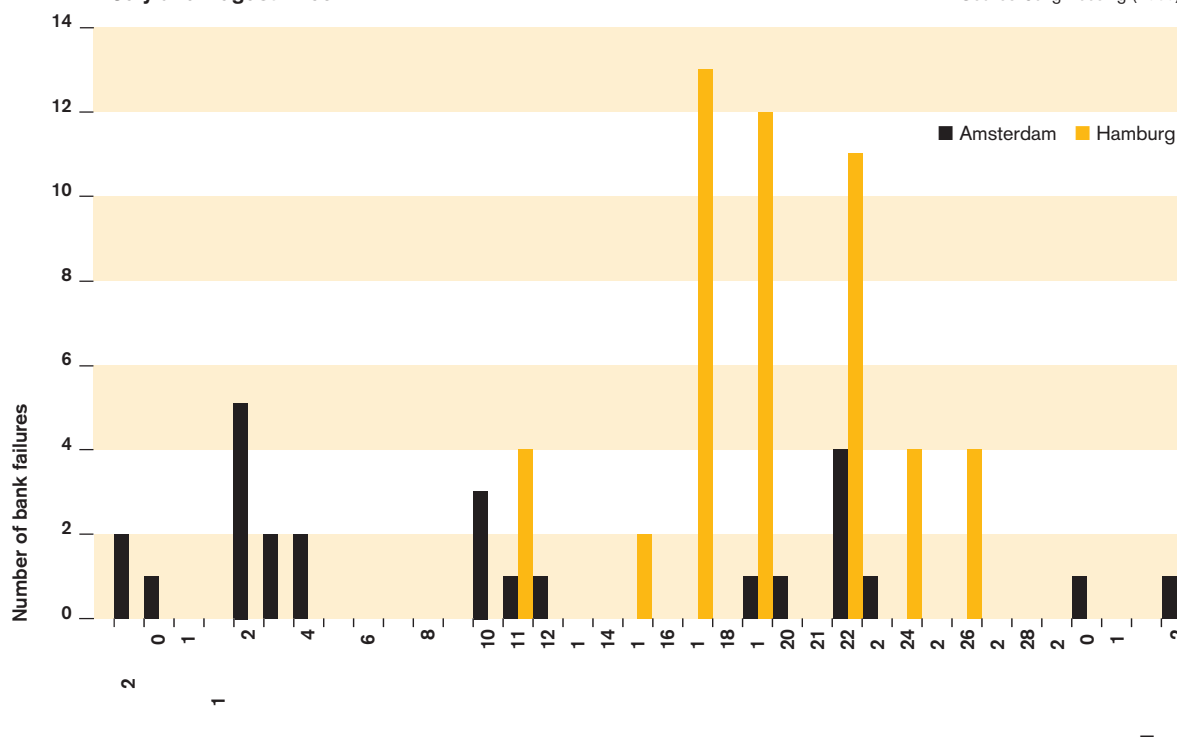
The crisis finally came to a head in Amsterdam on July 29. The first to fail were the Amsterdam houses of Aron Joseph & Co. and, most spectacularly, de Neufville. Some bankers attempted to organise support for de Neufville, but this attempt met with strong opposition from traditional banking houses. The two failures were immediately followed by others in Amsterdam, not only speculators, but also some of the old-established banking houses, which had been creditors of de Neufville.

Two weeks later, on August 11, there was a first wave of bank failures in Hamburg. This was in spite of the frenetic activity on the part of Hamburg merchant bankers to organise an officially sanctioned bailout of the failed bankers in Amsterdam. These failures in Hamburg were in turn followed by a second wave of failures in Amsterdam, which were attributable to those in Hamburg (see Figure 1 overleaf).

The propagation of the crisis followed the links established by the tight web of bills of exchange. When de Neufville and other Amsterdam houses declared themselves bankrupt, the bills drawn on them were protested immediately and presented to the endorsers or drawers of the bills. Due to *Wechselstrenge*, the Hamburg bankers could not refuse payment, even if they had already sent

Figure 1. The number of failures in Amsterdam and Hamburg in July and August 1763.

Source: Jong-Keesing (1939)



remittances to the Amsterdam house to settle the obligations from an acceptance loan. Many Hamburg banks were thus forced to close down.

In turn, Berlin bankers received protested bills from Hamburg and so the wave of bankruptcies spread contagiously from Amsterdam to Hamburg, Berlin and other places. In the end, more than one hundred banks succumbed to the crisis, most of which were located in Hamburg.

In Berlin, the number of initial failures was relatively low. This was due to the fact that Friedrich II – in violation of *Wechselstrenge* – imposed a payments standstill on outstanding bills and even organised outright bailouts. However, many of the Berlin bankers who had just averted bankruptcy in 1763 collapsed in the following depression.

In Amsterdam and Hamburg, there was no direct public intervention, but the giro banks tried to fight the liquidity crisis through the extension of additional Lombard loans. However, the banks' hands were tied by the provision that the ratio of bank money to gold and silver holdings should be kept close to one, so their support was but a drop in the ocean.

A natural place to search for the culprit for the 1763 crisis, according to the current literature on financial crises, would be the agency problems generated in the credit relationship

and the moral hazard on the part of the ultimate borrowers. However, a striking feature of the crisis of 1763 was the sequence in which the main protagonists encountered difficulties. The first to fail were the Amsterdam houses, followed by the Hamburg bankers some two weeks later, while the ultimate borrowers in Berlin were initially spared from widespread failures.

The crisis was followed by a period of falling industrial production and a stagnation of credit in northern Europe. The Amsterdam financial market was the first to recover from the crisis. Many banking houses that had been declared bankrupt re-opened shortly after the crisis. Those houses that proved to be insolvent, such as de Neufville, were allowed to fail. In the end, a large part of the debts outstanding could be repaid, notwithstanding the high number of initial failures. In spite of the abuse of the system by de Neufville and others, there do not appear to have been any modifications to the laws governing bills of exchange.

In Hamburg, too, many banks that had closed during the crisis reopened for business. However, bankers and merchants became much more cautious in their financial affairs and there were no further serious financial disturbances until 1799.

The biggest impact of the crisis was on Berlin. The bank failures in Amsterdam and Hamburg, and probably also the Prussian departure from *Wechselstrenge*, precipitated a

severe credit crunch, provoking numerous bankruptcies in the corporate sector. The situation was exacerbated by the coin reform enacted at the end of the war, which produced a drastic tightening of the monetary base. Prussia plunged into a deep and long-lasting recession, which culminated in a second wave of bankruptcies in 1766. Many of the bankers who had just averted bankruptcy in 1763 finally collapsed at that point.

The observation that many banks in Amsterdam and Hamburg re-opened after the crisis indicates that the underlying problem of the crisis of the banks was one of illiquidity and not of fundamental insolvency. This is an important ingredient in our stylised model of the crisis. The main insight from our model is that, in a liquidity crisis, goods whose prices are uncorrelated in normal times become highly correlated due to forced distress sales of market participants. Contagion works through the combination of direct interlinkages between agents and generalised price declines induced by fire sales, which can cause the failure of agents that would be solvent in the absence of liquidity risk. The detailed description of this model can be read in our paper "Foreshadowing LTCM: The Crisis of 1763" (see <http://www.nuff.ox.ac.uk/users/Shin/working.htm>).

In the paper, we confront this "distressed sales hypothesis" with the empirical evidence. It confirms that there was a dramatic collapse in the prices of commodities that were prime speculative instruments for the largest players in the market at the time. Such dramatic declines are hard to attribute simply to the underlying macroeconomic fundamentals of the economy, albeit one that was entering a period of peace. It seems reasonable to attribute part of this price collapse to the unwinding of speculative positions, much of it under distressed circumstances. In addition, correlations of commodity prices increased across goods in Amsterdam, Hamburg, and Berlin. We conclude that the evidence from prices is consistent with the "distressed sales hypothesis" developed in our model.

It remains to show the impact of the evolution of prices on

individual balance sheets. We are fortunate in that Jong-Keesing provides a snapshot of de Neufville's balance sheet at the time of bankruptcy. We also have bank money holdings figures for June 30 1763. This was a full month before the failure of de Neufville, but by this time, the full force of the price collapse in Berlin grain prices will have taken its toll.

Table 1 gives some summary statistics for three banks in Amsterdam. We can compare de Neufville's balance sheet with two other banks – Grill & Zonen and Hope & Co. These two banks are representative of two classes: those that failed, but re-opened their doors some months later, and those that did not fail. Additionally, we report the averages for the failed banks in Jong-Keesing's sample, distinguishing between those that re-opened and those that did not. In reading the table, it should be borne in mind that the denomination for a bill was typically around 2,000 guilders and its maturity no more than 3 months.

The most striking feature of de Neufville's balance sheet was the low level of liquidity, as measured by the ratio of bank money at the Bank of Amsterdam to the total liabilities. As compared with Grill & Zonen, de Neufville's liquidity was only 1/40 as large. As compared with the overall average of failing banks in Amsterdam, de Neufville's liquidity was 1/18.

As another measure of liquidity we can examine the size of bank money holding as a proportion of the number of bill transactions. De Neufville's holding of bank money at the Bank of Amsterdam at the end of June 1763 had dwindled to about the same amount as it had in 1751. Meanwhile, the number of bill transactions had increased by a factor of 14. Hence, the ratio of bank money holdings to the number of bill transactions was below 6 at de Neufville, while at Hope & Co., this ratio was well above 300.

The snapshot of de Neufville's balance sheet at the end of June betrays all the symptoms of a leveraged trader in distress. The wafer thin level of liquidity would have compelled the distressed sales of assets, especially the

Table 1. Balance Sheet Snapshot

	Individual banks			Full sample of failures (average)	
	De Neufville	Grill & Zonen	Hope & Co.	(21 failures) (re-opened)	(16 failures) (not re-opened)
Failure date	30th July	4th August, re-opened	Did not fail	Various dates, re-opened	various dates, not re-opened
Bank Money as at June 30th (Thousand guilders)	8	120	793	15	3
Total liabilities at failure date (thousand guilders)	9,643	3,000	n.a.	669	802
Liquidity (= bank money/total liabilities)	0.1%	4.0%	n.a.	2.1%	1.5%
# of bill transactions (first half of 1763)	1,395	777	2,151	241	255
Recovery rate (= accord at court of bankruptcy)	11%	70%	–	43%	10%

liquid assets such as grain and, thereby, contributed to the sharp fall in the Berlin grain price. This fits well with the evidence from Jong-Keesing that many merchants were forced to sell their goods in public auctions at very low prices in order to stay liquid and supports our view that distressed selling by merchants exacerbated the downward movement of prices. Unfortunately, the available data does not allow us to directly establish the link between falling prices and the banks' balance sheets.

The crisis of 1763 foreshadowed many of the events surrounding the turbulence in financial markets in the summer and autumn of 1998. Contrary to some popular accounts of the LTCM crisis, which emphasised the mystique surrounding modern financial theory, we claim that the main themes are rather timeless and that the essentials of the LTCM crisis are well illustrated by its 1763 predecessor.

There is now a large literature on the origins, personalities and the trading strategies employed by LTCM. Its vulnerability arose from its extremely high leveraging. Jorion (2000) estimated LTCM's leverage to be around 25 at the beginning of 1998, rising rapidly to over 50 at the height of the crisis as it suffered dramatic losses on its portfolio. In the end, the New York Fed managed to organise a collective rescue by fourteen of LTCM's major creditors and counter parties, which prevented a disorderly unwinding of the fund's positions and further failures.

Neither the 1763 nor the 1998 crises fit the traditional models used to explain financial crises. In both cases the institutions involved were not deposit banks, financed through demand deposits with sequential service constraints. The borrowing of de Neufville and LTCM was at maturities of several months; in addition, at LTCM investors' capital was locked in for a minimum of three years.

Neither crisis was precipitated by nervous investors who suddenly withdrew their money. The institutions' creditors do not conform to the picture of many small, uninformed individuals that usually appear in such stories. Rather, the creditors and counter parties were a small number of wealthy and sophisticated market participants who were able, and who had an incentive, to monitor the debtor due to the large sums involved.

In addition, the managers had a lot to lose. First, they stood to lose their capital. In 1763, there typically was no separation between the manager and the owner, and the owner was liable with his entire wealth. In 1998, it was common that fund managers received large incentive fees and that they put a substantial amount of their own wealth in the fund.



There are limits to how much risk can be effectively hedged

Worse, the bank or fund ran the risk of losing future rents (the "charter value"), which presumably were quite high due to the reputation built up in previous years. This is even clearer in the 1763 case, where barriers to entry in the financial market were high. In addition, the non-payment of bills was drastically penalised, often by sending the debtor to prison. Finally, there was no reason to believe that a bank or a hedge fund would be bailed out in case of a crisis. Amsterdam was very much a free-market environment in the 18th century and official interventions were unthinkable. We have to turn to alternative explanations of the two crises.

Liquidity risk appears to be at the core of both of them. We see a drying up of liquidity in the market, forcing distressed agents to sell their assets at prices below their fundamental values. In 1998, it seems clear that the high spreads observed in financial markets cannot be explained by credit risk alone, but have to be attributed at least partly to liquidity risk.

Assets that used to be uncorrelated in normal times, suddenly showed a high degree of correlation as traders were forced into liquidating their portfolios. The fact that many traders had accumulated similar positions meant that such liquidations had a detrimental feedback effect on other traders' portfolios. The feedback effect also lowered the value of collateral assets, which magnified the financial distress further. When the New York Fed organised LTCM's rescue by its creditors, it was for fears of systemic repercussions. First, LTCM's counter parties would incur direct losses, as their contracts remained unfulfilled. Second, a disorderly unwinding of LTCM's positions would lead to an even stronger downward movement of asset prices, which would affect even those banks with no direct relationships with LTCM. This danger was amplified by the fact that many other firms had followed very similar strategies as LTCM and were thus subject to the same risks. It seems that these were not so much other hedge funds, but were the proprietary trading desks of large banks.

With the 1998 crisis, we do not know whether there really was the danger of a systemic meltdown. Some recent literature has suggested that the fear might have been exaggerated. But, in the case of the 1763 crisis, we can see what happened in the absence of such a rescue. There was a complete breakdown of the financial system, spreading as far as Sweden and England. The crisis was followed by a period of falling industrial production, a stagnation of credit activities in the whole of northern Europe and further bank failures, especially in Prussia.

This indicates that a systemic meltdown is a real possibility in a situation where banks are connected through interlocking obligations and, in addition, have very similar trading positions. "Hedging" and collateral lose much of their reliability when market and credit risks are correlated and this has to be taken into account in risk management.

We draw two policy conclusions from the events of 1763 that have wider significance:

■ There are limits to how much risk can be effectively hedged. Aggregate risk inheres in the financial system even though each individual trader may believe that his own risks have been hedged. At the critical moment, the tensions finally manifest themselves in the form of increased co-movement of prices and the increased correlation between credit risk and counter party risk. The overconfidence in financial engineering was as dangerous in 1763 as it is today.

■ Liquidity risk can have a devastating effect on a financial system populated with traders with highly leveraged and similar balance sheets. As one trader attempts to repair his balance sheet by disposing of assets, the negative price effect of this action impacts on the balance sheets of all other traders in the financial system. This negative feedback has the potential to trigger a self-fulfilling flight to liquidity and the consequent damage to potentially healthy balance sheets. In distressed market conditions, traders that are intrinsically solvent may nevertheless be pushed into failure.

Isabel Schnabel is Assistant Professor at the University of Mannheim

Hyun Song Shin is Professor of Finance at the LSE and a member of both the CEP and the Financial Markets Group.

This article is an edited version of their paper "Foreshadowing LTCM: the crisis of 1763", to be found at <http://www.nuff.ox.ac.uk/users/Shin/working.htm>

References & further reading

Baasch, Ernst (1927): *Holländische Wirtschaftsgeschichte*. Jena: Fischer.

Bank for International Settlements (1999): "A Review of Financial Market Events in Autumn 1998", CGFS Publication Number 12, Bank for International Settlements, <http://www.bis.org/publ/cgfs12.htm>.

Buist, Marten G. (1974): *At spes non fracta: Hope & Co. 1770-1815, merchant bankers and diplomats at work*. Den Haag: Martinus Nijhoff.

Büsch, Johann Georg (1797): *Versuch einer Geschichte der Hamburgischen Handlung nebst 2 kleineren Schriften verwandten Inhalts*. Hamburg.

Diamond, Douglas W. and Raghuram G. Rajan (2001): "Liquidity Shortages and Banking Crises", Working Paper, University of Chicago.

Gorton, Gary and George Pennacchi (1990): "Financial Intermediaries and Liquidity Creation", *Journal of Finance*, 45(1), 49-71.

International Monetary Fund (1998): *World Economic Outlook and International Capital Markets: Interim Assessment*. December 1998, <http://www.imf.org/external/pubs/ft/weo/weo1298/index.htm>.

Jong-Keesing, Elisabeth Emmy de (1939): *De Economische Crisis van 1763 te Amsterdam*. Amsterdam: N.V. Intern. Uitgevers en h. Mij.

Jorion, Philippe (2000): "Risk Management Lessons from Long-Term Capital Management", *European Financial Management*, 6, 277-300.

Kahn, Charles and William Roberds (2002): "Transferability, Finality, and Debt Settlement", Working Paper, Research Department, Federal Reserve Bank of Atlanta.

Kohn, Meir (1999): "Bills of Exchange and the Money Market to 1600", Working Paper 99-04, Department of Economics, Dartmouth College.

Mansvelt, W. M. F. (1922): "Het Amsterdamsche acceptbedrijf en creditwezen in de 18e eeuw", *Tijdschrift voor Geschiedenes*, 37, 400-404.

Rachel, Hugo, Johannes Papritz, and Paul Wallich (1938): *Berliner Großkauffleute und Kapitalisten, Band 2: Die Zeit des Merkantilismus 1648-1806*. Berlin: De Gruyter.

Rule, David (2001): "The Credit Derivatives Market: its Development and Possible Implications for Financial Stability", *Financial Stability Review*, Bank of England, June 2001, 117-140, <http://www.bankofengland.co.uk/fsr/fsr10art3.pdf>.

Sedatis, Lutz (1967): *Über den Ursprung der Wechselstrenge: Eine historisch-dogmatische Untersuchung der Lehre vom rigor cambialis*. Berlin: Duncker & Humblot.

Skalweit, Stephan (1937): *Die Berliner Wirtschaftskrise von 1763 und ihre Hintergründe*. Stuttgart-Berlin: W. Kohlhammer.

Usher, Abbott Payson (1914): "The Origin of the Bill of Exchange", *Journal of Political Economy*, 22, 566-576.

Winn, Jane (1998): "Couriers without Luggage: Negotiable Instruments and Digital Signatures", 49 *South Carolina Law Review* 739, <http://www.law.washington.edu/Faculty/Winn/Publications/Couriers%20without%20Luggage.htm>.

Wirth, Max (1890): *Geschichte der Handelskrisen*. Frankfurt am Main: Sauerländer.

Image credit:

The Lottery Office, Isaak Ouwater, 1779, © Rijksmuseum, Amsterdam

Science fiction or the wave of the future?

Nanotechnology is seen by some as a dehumanising threat and by others as promising almost limitless benefits.

Stephen Wood, Richard Jones and Alison Geldart argue that we need urgently to get to grips with its real implications.



Nanotechnology is provoking extreme visions of the future of humankind. As one commentator (Dinkelacker) has put it, it offers the "possibilities of either wondrous prosperity and freedom or a wretched, hard-scrabble existence under cruel oppression".

For the optimists, new forms of manufacturing could bring about material abundance the world over, undermining power based on the control of scarce resources. Institutions would need to restructure to accommodate these changes. The

contexts that determine our identities, such as the work place and the family, may have to be redefined and the nature of work itself would be transformed. The most radical change to society, however, could be our increasing longevity. Nanotechnology's supporters envisage the end to disease and suffering.

These utopian scenarios are mirrored by equally strong predictions. Those opposed to nanotechnology fear a dystopian future, in which it not only fails to bring about a perfect world, but positively hastens humanity's demise. The "grey goo" scenario envisages nanosized, self-replicating robots getting out of control and reproducing themselves with such speed and in such quantities that they obliterate the biosphere.

This may all be an interesting and fertile debate for social science, but there are more imminent and important issues surrounding nanotechnology that are currently in danger of being ignored.

First, it is necessary to define what nanotechnology is. It is a generic term to describe a range of emerging

technologies. Its domain is defined in terms of a length scale – from about 1 to 100 nanometers. Its importance derives from the appearance of different physical properties at these length-scales.

The underlying science – nanoscience – is a convergence of physics, chemistry, materials science and biology, which investigates and controls matter at the molecular level. Nanoscience is here and flourishing, with the capacity to observe and manipulate matter at the nano level well developed.

In contrast, nanotechnology is an emerging engineering discipline, which applies methods from nanoscience to create usable, marketable and economically viable products. It is still very much in its infancy. In fact, the most developed domain of nanotechnology is the making of the tools that enable the science. The basic tool of nanoscience is the scanning probe microscope that allows individual atoms to be observed and manipulated. Its development has been, perhaps, the single most important step in the crystallisation of nano-scale science and technology as a discipline.

Advances in the broad field that is labelled nanotechnology are incremental and the development of new techniques has been a progression from such disciplines as materials and colloid science. The research here is not a radical or conceptual break from investigations over the last 20 years. Even those products that are heavily publicised as relying on nanotechnology, such as stronger materials and sunscreens, are the results of an evolutionary progress. In the short term, the majority of nanotechnology products will be fairly prosaic.

Nanotechnology's diversity – and its core theme of molecular manipulation – makes it applicable in many areas. Its promoters predict that it will have an impact on the vast majority of industries, from cosmetics and food, to new materials, electronics and defence. However, there are three major areas where nanotechnology is expected to make the greatest

There is the risk of over-hype

difference: sustainable energy, medicine and information.

Environmentalists are often suspicious of new technology and its potential impact on the world; yet, developed responsibly, nanotechnology could signal the end of our reliance on fossil fuels. It promises advances in several alternative sources of power, such as solar and hydrogen fuel cells. Research being undertaken into new materials for photovoltaics, such as carbon nanotubes and semiconducting polymers, could soon lead to cheaper and more efficient solar cells. If significant improvements can be made in this area, nanotechnology could potentially lower the cost of energy generated by solar cells towards that from non-renewable energy sources, such as gas and oil.

In medicine, nanotechnology could transform drug delivery, diagnostics and monitoring systems, and artificial implants. Drug particles would be encased in nanoparticles, either to protect the active element from the body's defences until it reached its desired target, or to protect the body from their unwanted side effects. In diagnostics, "laboratory-on-a-chip" technology could eliminate the need to take large fluid samples and could even respond to biochemical changes within the body. Diabetics, for instance, could benefit from the development of a chip that monitors insulin levels and secretes the required hormone into the bloodstream as needed. Artificial implants continue to be developed and artificial skin is now

Its basic tool is the scanning probe microscope

used commonly in treatment. Nanotechnology could contribute to this field through advances in scaffolds that encourage cells to grow in a pre-designed shape. Biocompatible coatings are also in development, which will make artificial implants, such as bone replacements, less likely to be rejected by the host's immune system.

Nanotechnology is also likely to contribute to vast increases in the availability of computing power and information. The development of ever faster, better, smaller and cheaper computers will allow them to be incorporated into even the cheapest and smallest artefacts. Electronic tags for product packaging are very close to being marketed and will improve supply chain management. Similarly, surveillance will become cheaper and easier and, therefore, more prevalent.

These advances raise important social and economic issues, which have little to do with either the utopian or the dystopian scenarios for the future of nanotechnology. The ease and cheapness of storing information will cause a growing lack of privacy. Fast and cheap DNA sequencing could lead to requirements for screening by insurance companies and affect how life insurance policies are calculated. More efficient surveillance may lead to less crime, but will also inhibit the privacy of individuals.

Medical uses of nanotechnology will further increase the intimate association between the human body and artificial implants. Other uses, such as the development of display screens that are projected directly onto the retina, promise to further reduce the differences between humans and machines. We have been taking structures from living things to use in artificial contexts throughout history, but further developments in bionanotechnology could see the radical modification of bacteria to make new functional devices. This raises questions of whether such a radical remodelling of a living organism is ethically acceptable.

Economic issues also need to be considered. As investors latch onto nanotechnology as a buzzword and

Surveillance will become cheaper and more prevalent

national governments race to become the world leaders in research and development, there is the risk of over-hype, leading to a stock market bubble and the collapse of the emergent industry. Technological development is driven by market opportunities, generating questions about inequity and economic divides. Will nanotechnology lead to the eradication of poverty through material abundance and beneficial applications, as the utopians predict; or will most products be those that are highly profitable and aimed at a richer market, such as cosmetics and life extension?

These are some of the real issues which social science needs to investigate as nanotechnology develops. The danger is that they will be lost in either futuristic enthusiasm or indiscriminate pessimism. The opportunity is here now to prepare society for the technological changes that are coming.

Involving social science in the debates about technological development will help to guide it in a more socially useful way. Nanotechnology is a unique opportunity for scientists and social scientists to work together. There are currently three generic questions fertile for research:

- how technological change is governed, including an understanding of the drivers and decision processes at the various key points of choice;
- how social learning occurs, including how conflicts of interest can be identified and clarified in a way that fosters informed debate; and
- how evaluation of risk and opportunities under uncertainty is accomplished, particularly looking at how scientists, technologists and firms can best be regulated and at the limits of the nation state's ability to act as a regulator in an increasingly international world.

Stephen Wood is research chair and deputy director, Institute of Work Psychology, University of Sheffield and co-director of the ESRC Centre for Organisation and Innovation. He is also Chief Editor of the *British Journal of Industrial Relations* and a member of the CEP.

Richard Jones is a professor in the Department of Physics and Astronomy, University of Sheffield, and co-ordinator of inter-disciplinary research in Nanotechnology at Sheffield and co-director of the Sheffield-Leeds MSc in Nanoscale Science.

Alison Geldart is a research assistant in the ESRC Centre for Organisation and Innovation, University of Sheffield.

Stephen Wood, Richard Jones and Alison Geldart are authors of *The Social and Economic Challenges of Nanotechnology*, published by the ESRC and available by request to Rachel.Blackford@esrc.ac.uk.

Reference

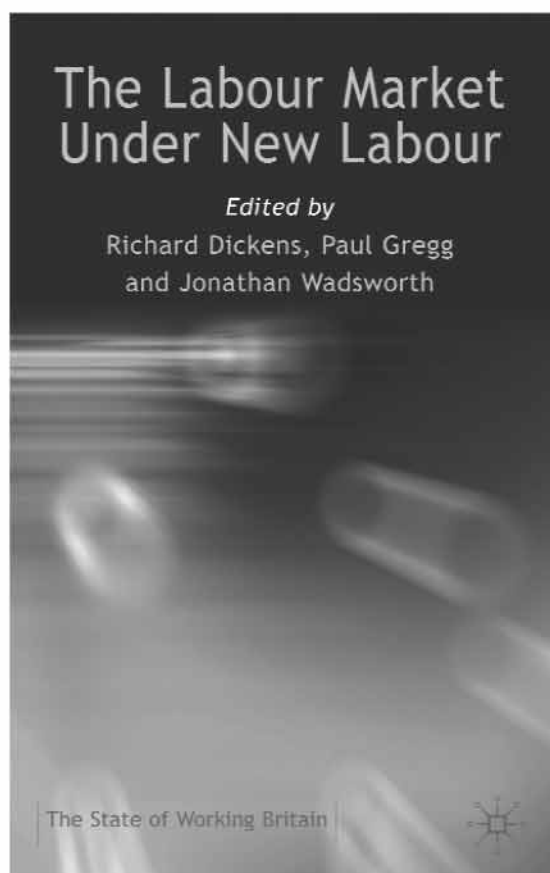
Dinkelacker, J. (2002). *Transition to Tomorrow: Social Institutions at the Threshold of Nanotechnology's Molecular Epoch*

http://www.hpl.hp.com/personal/Jamie_Dinkelacker

The majority of its products will be fairly prosaic



THE LABOUR MARKET UNDER NEW LABOUR
The State of Working Britain



EDITED BY
RICHARD DICKENS
PAUL GREGG
AND JONATHAN
WADSWORTH

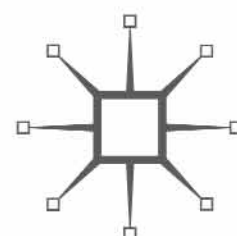
October 2003
Paperback
£18.99
1-4039-1630-6

THE LABOUR MARKET UNDER NEW LABOUR presents an up to date assessment of the UK labour market presented by leading national and international experts in the field.

For students, policy makers, journalists, academics or anyone with an interest in the nature of work, unemployment, education or inequality in British society this is essential reading.

To order call Palgrave Orders on tel: +44 (0)1256 302866,
fax +44 (0)1256 330688 or email orders@palgrave.com.

Visit www.palgrave.com/economics/highlights



The back issues



CENTRE for ECONOMIC
PERFORMANCE

THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

HOUGHTON STREET LONDON, WC2A 2AE

Tel: 020 7955 7798 Fax: 020 7955 7671

Homepage: www.centrepiece-magazine.com Email: centrepiece@lse.ac.uk

