Editorial

What can governments and other key decision-makers do to improve human wellbeing? This fundamental question has long been at the heart of research conducted by the Centre for Economic Performance (CEP). Our latest initiative is the World Wellbeing Panel, a monthly survey of the views of economists, philosophers, psychologists and sociologists working in the field. Led by CEP’s newly appointed professorial fellow Paul Frijters, the panel has to date reported on how wellbeing is affected by public holidays, by the structure of workplace organisations and by the donation of gametes (eggs and sperm) for assisted reproduction.

The cover story of this issue of CentrePiece introduces The Origins of Happiness, a forthcoming CEP book bringing together a wide range of evidence from surveys in Australia, Germany, the UK and the United States. The authors, which include CEP’s founder director Richard Layard, reveal that the best predictor of an adult’s life satisfaction is their emotional health as a child. They conclude that public policy needs a new focus: not ‘wealth creation’ but ‘wellbeing creation’.

Two further broad themes run through the magazine. One is the impact of technology: Georg Graetz and Guy Michaels explore the extent to which modern technology is to blame for so-called ‘jobless recoveries’ from periods of weak growth and recession; while Marco Manacorda and Andrea Tesei examine the role of mobile phones in coordinating mass political protests and democratic change in Africa.

The other theme is education: significant influences on young people’s achievement at school and the consequences for their behaviour. Shqiponja Telhaj and colleagues show that higher turnover of schoolteachers has a moderately negative impact on students’ results in England. Eric Maurin and colleagues demonstrate the effectiveness of low-cost interventions that clarify educational options for low-achievers in France. And CEP’s director Stephen Machin and colleagues find that keeping young Australians in school for longer reduces their likelihood of committing crime.

All of these pieces are an indication of CEP’s continuing commitment to top-quality research on topics central to public policy. This extends to many of our senior researchers being directly involved in public policy roles. The latest examples are Alan Manning, who was recently appointed as the new chair of the UK’s Migration Advisory Committee, and David Metcalf, from whom Alan takes over and who in turn has been appointed as the UK’s first Director of Labour Market Enforcement. We congratulate them both.

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If young people spend longer in school, are they less likely to commit crimes? **Stephen Machin** and international collaborators examine the impact on youth crime of an educational reform in Australia that raised the minimum school leaving age.

**Larrikin youth: can education cut crime?**
Across the world, education levels of incarcerated criminals are well below those of the general population. So can we conclude that increasing education levels will reduce crime? Unfortunately the answer to this question is not as straightforward as it may appear. The issue is that the level of education is in general an individual’s choice rather than being determined by outside forces.

The most obvious method of establishing whether more education causes a fall in crime would be to determine randomly the education level of each individual and then compare average crime levels for the high versus low education groups.

This would mimic the protocols of a traditional medical drug trial, randomly assigning one group to drug X (a cholesterol-lowering drug, for example) and the other group to a placebo. Comparison of the average change in cholesterol levels for each group pre- and post-treatment would identify the efficacy of the drug – whether the reduction in cholesterol is significantly larger for drug X vis-à-vis the placebo.

But if the allocation across the two groups is not random – for example, if doctors allocate highly motivated individuals willing to change their diet and exercise regimes to drug X and those less motivated to the placebo – this would skew the results and over-estimate the drug’s efficacy.

Similarly, individuals who voluntarily choose to invest in higher levels of education are likely to have a lower discount rate – that is, they are less ‘present-oriented’ or more willing to forgo now for future rewards. By contrast, criminals are likely to have a higher discount rate, valuing rewards now with less concern for possible future implications.

In this case, individuals with higher levels of education are also likely to be less prone to crime. But analogous to the non-random drug trial, education in itself does not cause a reduction in crime since individuals self-select into extending or shortening their education.

Unfortunately, neither government education departments nor voters are likely to agree to the random allocation of education across individuals. So to uncover the causal impact of an increase in education on the level of crime, we need to use alternative methods. Our study uses a ‘natural experiment’ – the introduction of the Earning or Learning education reform in Australia – coupled with extremely rich administrative data on the criminal offending and education of individuals over time.

The Education or Learning education reform was enacted in Queensland in 2006. The reform led to a mandatory increase in the minimum school leaving age. Pre-reform, young people could leave school after completion of grade 10 or when they reached the age of 15, whichever occurred first. Post-reform, young people had to complete an additional two years either in school, vocational education, apprenticeship or full-time work up to the age of 17.
The first birth cohort to be affected by the reform comprised young people who turned 16 in 2006. The reform thus increased the education level of those who would otherwise have left school at age 15. Thus, comparing crime levels pre- and post-reform provides an opportunity to identify the causal impact of education on crime.

We are in the fortunate position of having obtained Queensland administrative data matched at the individual level across state agencies, the Department of Education and Training and the Queensland Police Service. Thus, we have individual records for the entire population of attendees at all Queensland government-funded schools, together with matched individual criminal offence data for the period 2002 to 2013. The focus of our study is on young men aged 15 to 21 – those boisterous and sometimes badly behaved youth whom Australians informally call ‘larrikins’.

The first empirical issue is to check that the reform actually achieved its intended goal: to raise the average levels of education. As Figure 1 clearly demonstrates, the average education level of 17 year olds increased significantly post-reform. The second issue is to check the pattern of youth crime pre- and post-reform: Figure 2 clearly illustrates a significant reduction in the incidence of youth crime post-reform.

Taken together, these two pictures provide a compelling story of the link between education reform: a rise in average education and a seemingly causal decline in youth crime. More detailed analysis, controlling for additional factors, indicates that the reform increased the years of schooling by 0.26 years and decreased youth crime for young men aged 15 to 21 by 0.008.

An estimate of the causal impact of education on crime can be calculated by the ratio of these two figures, producing a highly significant reduction in crime of 0.03. Placing this result in context, the average pre-reform offending rate was 0.08, which means that increased education levels reduced crime by about a third.

Figure 3 provides a graphical interpretation of our results, showing crime-age profiles before and after the reform for all offences, and broken down into violent, property and drug offences.

Two important points are clear. First, the reform not only reduced crime overall but a reduction is also evident for the three broad aggregates of property crime, violent crime and drug crime. The pattern also suggests that the largest reduction in youth crime is for property crime.

The second important implication of Figure 3 is that of a distinct pattern of crime reduction that varies by age and by broad crime type. Specifically, crime reduction is greater for those aged 17 and younger compared with those aged 18 to 21. This sheds light on the reasons underlying the relationship between education and crime.
Previous research suggests two competing but complementary explanations. One is that education boosts young people's human capital and consequently raises the rewards to labour market participation relative to a life of crime. The alternative explanation is that a mandatory increase in years of education leads to an ‘incapacitation effect’ – that is, a lack of opportunity to commit crime when kept in the classroom to a later age.

The fact that younger age groups – those still in school – experience a greater reduction in crime confirms the importance of the incapacitation effect. But – and this is important – the fact that crime levels remain lower post-school suggests that the incapacitation effect is not the sole impact of education: increasing education levels also has a longer-run crime-reducing impact.

Finally, we examine the impact of the education reform on the typical age at which criminal activity begins. One possibility might be that the reform simply delays the inevitability of some young men’s slide into a life of crime.

In fact, the empirical results suggest quite the contrary. The reform significantly reduced the probability of ever offending. The proportion ever offending for the group of young men not affected by the reform was 0.28: it fell by 0.05 (corresponding to an 18% reduction) for those directly affected.


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Figure 3: Youth crime age profiles before and after Queensland’s Earning or Learning education reform
Digital technologies have been widely used for political activism in recent years. In the first systematic test of their role as catalysts for political participation, Marco Manacorda and Andrea Tesei find that the growing use of mobile phones in Africa leads to more protests during recessions and periods of national crisis.

Liberation technology: mobile phones and political mobilisation in Africa
An often-heard argument is that digital technologies have become instrumental in mass political mobilisation and even democratic change, especially in autocratic regimes. This view is often reported in the media and it squares well with observations that two-way and multi-way mobile phone communication, Twitter and other social media were used extensively during the Arab Spring, the Occupy Wall Street movement in the United States and the Indignados movement in Spain – to name just a few – so much that a new term of ‘mobile activism’ has been coined.

This ‘liberation technology’ argument is made forcefully by some political sociologists and media scholars, such as Castells (2011) and Diamond (2010): thanks to the low cost of mobile phones and the internet, and their decentralised and open-access nature, they allow citizens to access and spread information. These technologies can also help to promote coordination among citizens, especially under authoritarian regimes and when reasons for grievance abound.

Despite the popularity of this argument, credible empirical evidence on the effect of information and communication technologies (ICT), particularly mobile phones, on political mobilisation is scant and the channels of impact not well understood. With the exception of a few recent studies that focus on the role of the internet and social media in protest participation (Acemoglu et al, 2014, for Egypt; Enikolopov et al, 2015, for Russia), a large body of research has focused on the effect of traditional media and the internet on civic forms of participation such as voting (Gentzkow, 2006; Falck et al, 2014).

Our research investigates the role played by mobile phones in political mobilisation across the whole of Africa and analyses the underlying mechanisms of impact. Africa is one of the continents with the fastest rate of adoption of mobile phone technology and it has been the theatre for some of the most spectacular episodes of mobilisation in recent years. Importantly, mobile phone technology adoption in many countries in the continent happened against the backdrop of a practically non-existent fixed line infrastructure. Because of this, the technology is claimed to have had unprecedented consequences for citizens’ lives (Aker and Mbitt, 2010).

We match this information with geo-located data derived from newswires on the occurrence of protests (from GDELT and ACLED) and with survey micro data on protest participation (from Afrobarometer). * Figure 2 provides an example of the level of detail of the protest data in GDELT, showing the exact location of episodes of protest during the Cairo uprising of 2011.

We exploit the very detailed level of geographical details warranted by our data to investigate trends in protest activity across areas within the same country that experienced different rates of mobile phone adoption.

As might be expected, we find that protests are strongly counter-cyclical, with negative economic conditions acting as a trigger for protest participation (see Figure 3). This is possibly because recessions with more out of work reduce the opportunity cost of taking part in a protest or because reasons for grievance increase at these times.

We focus in particular on the differential responsiveness of areas with different mobile phone coverage to a country’s aggregate macroeconomic shocks. Consistently across sources, we find that mobile phones act to amplify the effect of economic downturns on the incidence of protests: a four percentage point fall in GDP growth is associated with a 16% higher protest activity in areas fully covered compared with areas without phone coverage.

Figure 4 presents separate estimates and the associated confidence intervals for the effect of coverage on protests at five intervals of the GDP growth distribution, showing that it is precisely and only during recessions that the protest differential between high- and low-coverage areas arises.

One challenge in our empirical analysis

Mobile phones do not cause political protests, but they amplify their effects
Mobiles foster mass mobilisation through their ability to promote coordination.

is that even within countries, mobile phones might not be randomly allocated across areas, as areas that witness earlier or greater penetration might be the ones with different underlying trends in protest activity.

We circumvent this problem by exploiting the circumstance that areas with greater lightning strikes activity (which we take from NASA) tend to experience slower adoption of mobile phone technology. This is due to mobile phone services being both in lower supply (as power surge protection is costly and poor connectivity makes the investment in technology less profitable) and lower demand (as the risk of intermittent communications discourages adoption).

The results from this analysis deliver even larger estimates of the impact of mobile phones on political protests. We also show that the effect is more pronounced under autocratic regimes and when traditional media such as television are under state control. This suggests that the technology may play a key role in fostering political freedom.

In the final part of our study, we use insights from economic theory to shed some light on the mechanisms through which digital ICT acts to foster citizens’ responsiveness to economic downturns. We argue that two mechanisms are at play. First, mobile phones provide access to unadulterated information on reasons for grievance, hence leading to a greater increase in protests in areas with greater coverage. But this is only a first-round effect. When the returns to political activism increase or the costs of participation decrease as the number of participants grows, mobile phone technology can also foster mass mobilisation through its ability to promote coordination. Knowledge, albeit imperfect, of others’ likelihood of participating can foster individuals’ willingness to participate, and lead to the emergence of protests, an outcome that would not result in a world where individuals act atomistically. Empirically, we show that both effects are at play.

Conclusion

Our analysis suggests that ICT does indeed help to promote mass mobilisation, especially when reasons for grievance arise and citizens blame the government for the poor state of the economy. But while citizens become empowered by the technology, governments also become cognisant of its potential to subvert the status quo.

The looming question is whether ultimately technology will increase government accountability or whether it will result in greater repression. The advent of 3G and 4G technologies, which further facilitate coordination among citizens but also expand the potential for government control, suggests that the technological battle for hearts and minds will further intensify in the future.

Further reading


In brief...

Is technology to blame for jobless recoveries?

Since the early 1990s, the United States has been plagued by weak employment growth when emerging from recessions – so-called ‘jobless recoveries’. Georg Graetz and Guy Michaels look at multiple recoveries elsewhere in the world over a 40-year period to see if the same applies – and whether modern technology is responsible.

Recoveries from recessions in the United States used to involve rapid job generation. During the 1970s and 1980s, the first two years of recoveries saw an average increase of over five percentage points in employment. But since the 1990s, the recovery engine of jobs has slowed down, and the first two years of recoveries have generated, on average, less than a one percentage point increase in employment.

This recent joblessness of recoveries exceeds what we would expect based only on the recovery of GDP, and it has caused concern among policy-makers. In our latest research, we investigate whether the jobless recovery is a wider problem that plagues developed countries outside the United States – and whether modern technologies may be an underlying cause.

The possibility that technology may be causing jobless US recoveries has been proposed in a widely cited study (Jaimovich and Siu, 2012). The authors argue that middle-skilled jobs – often involving routine tasks that are particularly susceptible to replacement by new technologies – might be permanently destroyed during recessions. The displaced workers are then forced into time-consuming transitions to different occupations and sectors, resulting in slow job growth during the recovery.

Other explanations have been proposed, emphasising not the role of technology, but that of extended unemployment benefits or the decline of unions’ ability to influence restructuring during recessions. But the possibility that technology may be responsible for jobless recoveries is perhaps of more concern, since it is not dependent on specific institutions or policy choices, and could therefore be affecting other developed economies.

To appreciate concerns about technology’s possible effect on jobs, consider its long-run effects on employment. Following the seminal work of Autor et al (2003), recent CEP research (Goos et al, 2014; Michaels et al, 2014) demonstrates that across the developed world, new computer-based technologies are replacing routine-based tasks, including routine white collar work. So if the technology-based mechanism that Jaimovich and Siu propose is responsible for jobless recoveries, we might expect its effects to be evident throughout the developed world.

To investigate this possibility, we put together data on recession dates, employment and value added for 28 industries in 17 countries between the years 1970 and 2011. This period spans 71 recoveries, giving us ample opportunities to test whether recent ones differed from earlier ones, and whether technology is bringing about any changes.

We first examine whether recoveries that took place after 1985 differed from earlier ones – and if so, how. Across the 17 countries, we find that recent recoveries involved a slower growth of GDP, but not a significantly slower recovery of employment. In this respect, the jobless US recoveries seem to be the exception.
Second, we examine recoveries in industries that use routine tasks more intensively, including parts of the financial intermediation, retail and manufacturing sectors. These industries were more prone to technological change, including automation. Across the developed economies that we study, routine-intensive industries experienced sharper recessions and slower recoveries (compared with the periods of expansion) even before 1985, but they were not worse affected in their employment growth in more recent recoveries.

But in the United States, where recent employment recoveries have been slower, the routine-intensive industries stand out, having faced slower employment recoveries of late. We further show that our findings are not specific to routine-intensive industries but to all those that are exposed to technological change.

To do that, we focus on another indicator of new technology adoption: the use of industrial robots. Building on our previous work (Graetz and Michaels, 2015), we examine the tasks that robots are nowadays capable of performing, match these tasks to occupations and then measure the share of each industry’s employment that was made up by replaceable occupations in 1980, before industrial robots became important. This gives us an indicator of industries’ differential exposure to robots.

Although industries with high shares of jobs that are replaceable by robots (especially car manufacturers and the chemical and electronics industries) differ from routine-intensive industries, the patterns we find over time are quite similar in the two cases. Industries in which employment is prone to replacement by robots did not experience more jobless recoveries in recent years across the developed countries that we study.

Third, we examine whether workers from different skill groups are differentially affected by joblessness in recent recoveries. We focus mainly on middle-skilled workers: typically those with high school degrees or some post-high school education but less than a full college degree. Middle-skilled workers’ jobs often involve more routine tasks, which are more prone to replacement by computer-based technologies.

We find that across the developed countries, middle-skilled workers have not suffered more employment losses in recent recoveries. In other words, there is no evidence that recoveries across the developed world are hurting middle-skilled workers who are particularly vulnerable to technological change.

Finally, we examine whether middle-skilled workers are worse affected in recoveries in routine-intensive industries, where technological replacement might be particularly pronounced. Once again, we find that across our 17 developed economies, middle-skilled employment in routine-intensive industries has not performed particularly badly in more recent recoveries.

Taken together, our results suggest that in developed countries outside the United States, modern technologies are unlikely to be causing jobless recoveries. Our results do, however, pose a puzzle as to the nature of recent jobless US recoveries.

It is possible that US technology adoption is somehow different to that in other developed countries and that this is contributing to jobless recoveries. For example, Bloom et al. (2012) show that US multinationals achieved more productivity gains from using information technology than their European counterparts, so it is possible that job creation patterns in the United States also differed.

At the same time, the extension of US unemployment benefits in recent years may have played a role in explaining slow employment recoveries. Meanwhile, European labour markets have become more flexible, which may have contributed to their robust employment growth during recent recoveries. Exploring these possibilities is an important task for future research.


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Further reading


Understanding the key determinants of people’s life satisfaction makes it possible to suggest policies for how best to reduce misery and promote wellbeing. A forthcoming book by Richard Layard and colleagues discusses evidence on the origins of happiness in survey data from Australia, Germany, the UK and the United States.

Origins of happiness

In 1961, the OECD organised a conference on human capital that propelled education into the centre of policy-making worldwide (OECD, 1962; Schultz, 1961). In December 2016, the OECD and CEP held a conference on subjective wellbeing that they hope will usher in another revolution, one in which policy-making at last aims at what really matters: people’s happiness.

As Thomas Jefferson once said, ‘The care of human life and happiness… is the only legitimate object of good government’. But to make policy requires numbers. Human capital took off once people realised its high rate of return. Wellbeing will only take off when policymakers have numbers that tell them how any change of policy will affect the measured wellbeing of the people, and at what cost.

The first step is a clear unified account of how wellbeing is currently determined. Our forthcoming book, the first draft of which was presented at the conference, aims to provide this, using large surveys from four major advanced countries.

One key issue is to adopt a single definition of wellbeing. The right definition, in our view, should be life satisfaction: ‘Overall how satisfied are you with your life, these days?’, measured on a scale of 0 to 10 (from ‘extremely dissatisfied’ to ‘extremely satisfied’). That is a profoundly democratic concept because it allows people to evaluate their own wellbeing rather than having policy-makers decide what is more important for them and what is less so.

Moreover, policymakers like the concept – and so they should. Work in our group at CEP shows that in European elections since 1970, the life satisfaction of the people is the best predictor of whether the government gets re-elected – much more important than economic growth, unemployment or inflation (Ward, 2015).

So the task is to explain how different factors affect our life satisfaction, analysing them all simultaneously. There are of course immediate influences – our current situation, including income, employment, health and family life – but also more distant ones going back to our childhood, schooling and family background.

We can start with the immediate influences. Here, the big factors are all non-economic: especially how healthy an individual is, but also whether they have a partner. Less than 2% of the variance of life satisfaction is explained by income inequality.

An obvious question is: do economic factors play a bigger role if we focus only on those who are least happy – the bottom 10% of the population in terms of life satisfaction. The results are almost the same as before. When we ask what distinguishes this group from the rest, the biggest distinguishing feature (other things equal) is neither poverty nor unemployment but mental illness. And it explains more of the misery in the community than physical illness does.

In fact, it is interesting to ask: if we wanted to reduce the numbers in misery, what change would have the biggest effect – raising incomes, ending unemployment, improving physical health or abolishing depression and anxiety? It turns out that if we could abolish depression and anxiety, it would reduce misery by as much as if we could abolish all of poverty, unemployment and the worst physical illness.

Most human misery is due not to economic factors but to failed relationships and physical and mental illness.
Except for poverty, we cannot of course completely abolish any of these things, but we can reduce them all at the margin – and at a cost. The cheapest of the four policies is treating depression and anxiety disorders, which is why CEP has been involved in two major mental health initiatives.

Since 2008, the UK’s National Health Service has developed a nationwide service with different local names but known generically as Improving Access to Psychological Therapies. This programme now treats over half a million people with depression or anxiety disorders annually, of whom 50% recover during treatment. Because of financial flowbacks, we believe that in fact it costs the government nothing (Layard and Clark, 2014).

In addition, we should try to prevent mental illness before it occurs, so a second initiative is preventive – a four-year curriculum for children in schools called Healthy Minds, one lesson a week. This too has very low costs since children are already spending an hour a week on life skills lessons of unknown but probably low effectiveness.

The importance of prevention becomes even more evident when we try to predict adult life satisfaction from earlier in a person’s life, from their child development – their academic qualifications, their behaviour at 16 and their emotional health at 16. The evidence shows that the best predictor of an adult’s life satisfaction is their emotional health as a child. How on earth did so many policy-makers come to believe that all that promotes ‘the interests of the child’ is a concentration on qualifications?

The final step in our forthcoming book is the explanation of these child outcomes, using data from the Avon Longitudinal Study of Parents and Children, which has surveyed children born in and around the city of Bristol in 1991/92.

Academic performance is the outcome on which most existing research has focused, and it is profoundly affected by family income. But emotional health is the best measure of the wellbeing of the child, and it is also the biggest determinant of the wellbeing of the future adult. It is affected to some extent also by family income but above all by the mother’s mental health. The same is true of the child’s behaviour – which also affects the wellbeing of so many other people.

What about the effect of schools? In the 1960s, the Coleman Report in the United States told us that parents mattered more than schools. Since then the tide of opinion has turned and the data available have become more plentiful and sophisticated. Our data strongly confirm the importance of the individual school and the individual teacher. These are equally important for the academic performance of the children and for their happiness (Flèche, 2016).

Let us end with the thorny question of income. As we have seen, income inequality explains a very small fraction (under 2% in any country) of the variance of life satisfaction. But the effect of log income is well determined, and similar in all countries. One would therefore have expected economic growth to bring considerable increases in life satisfaction. But in many countries, it has not – the so-called ‘Easterlin paradox’ (Easterlin, 1974).

Our analysis provides an explanation of this. People adapt to higher levels of income over time, but, much more importantly, they also compare their own income to that of their peers. Analysing data from the British Household Panel Survey, we find that life satisfaction (0-10) is predicted mainly by an individual’s income relative to that of others in their peer group as defined by age, gender and region. The same is true in Australia and Germany.

At last the map of happiness is becoming clearer and usable for policy analysis. We now need thousands of well-controlled trials of specific policies from which we can obtain estimates of the effects on life satisfaction in the near and longer term (where our book can contribute valuable coefficients). We can then compare those gains to the net cost of the policies. The optimal mix will surely be very different from the one we have now.

This article introduces The Origins of Happiness by Andrew Clark, Sarah Flèche, Richard Layard, Nick Powdthavee and George Ward, which will be published by Princeton University Press.

Andrew Clark of the Paris School of Economics is a professorial research fellow of CEP. Sarah Flèche is a research officer in CEP’s wellbeing programme. Richard Layard is founder director of CEP and its wellbeing programme. Nick Powdthavee and George Ward are research associates in CEP’s wellbeing programme.

Further reading


The size of the average suburban home in the United States increased steadily in the decades after the Second World War – but the size of the biggest houses built grew even faster. Research by Clement Bellet shows how this visible wealth inequality fuelled the US mortgage boom that culminated in the 2008 financial crisis.

Superstar houses and the American mortgage frenzy

Built in 1927 on the eve of the Great Depression, the Palm Beach residence of President Donald Trump – Mar-a-Lago – ranks among the 20 biggest houses in the United States. At 62,500 square feet, it is about 35 times the size of the median suburban house in the country.

Analysing a large dataset of houses built between 1920 and 2009, my research asks whether this kind of ‘upscale’ of housing size at the top of the distribution incited US households to ‘keep up with the Joneses’, with ultimately disastrous consequences in the 2008 financial crisis.

Classical economists from Adam Smith to Karl Marx were certainly aware of the potential impact of ‘upward-looking’ comparison effects on economic behaviour. Smith noted that ‘It is from our disposition to admire, and consequently to imitate, the rich and the great, that they are enabled to set, or to lead what is called the fashion’; while according to Marx, ‘a house may be large or small, as long as the neighbouring houses are likewise small, it satisfies all social requirement for a residence. But let...
there arise next to the little house a palace, and the little house shrinks to a hut.’

From 1940 onwards, suburbs accounted for more US population growth than central cities and, by 2000, half of the entire population lived in the suburbs of metropolitan areas. This period simultaneously saw an impressive upscaling in the size of suburban single-family houses: the median newly built suburban house doubled in size after 1945, while the top 10% of houses built – ‘superstar houses’ – experienced an upscaling of nearly 120%, reaching an average size of 7,000 square feet on the eve of the financial crisis.

Meanwhile, the ratio of mortgage debt to income went from 20% of total household income in 1945 to 90% in 2008, following a trend that closely matched the historical variation in housing size (see Figure 1).

Despite this major upscaling in housing size, there was no increase in households’ expressed satisfaction with their homes after the 1980s. The flatness of the house satisfaction curve evidenced in Figure 2 is particularly puzzling considering that within any given year since 1984, the correlation

Suburban homeowners who experienced a relative downscaling faced lower satisfaction and house values

Figure 1:
Changes in US housing size and the ratio of mortgage debt to income since the 1920s

Figure 2:
Changes in average US house size and average house satisfaction since the 1980s
between housing size and house satisfaction is positive and significant. This result echoes the Easterlin paradox, according to which increasing the income of all does not increase the happiness of all. The paradox has been explained in part by the income comparisons between individuals: if people care about their income relative to others, a relative gain for some leads, by definition, to a relative loss for others.

My research reveals that the distribution of housing size followed the U-shaped pattern of top income inequality over a century. As Figure 3 shows, the income share of the top 10% of the US population fell dramatically from around 1940, but then started rising again in the mid-1970s and returned to its pre-war peak in the 2000s. Similarly, the ratio between the size of the top 10% of housing size and the 50% below the median fell from the late 1930s and went back up again from around 1980.

I examine if there is evidence that homeowners experiencing a relative downscaling of their house following the construction of bigger units around them value their house less in comparison with similar households who experienced no such change. The data I analyse combine 18 waves of the American Housing Survey from 1984 to 2009 with an original sample of more than three million suburban houses built between 1920 and 2009. My empirical strategy exploits differences in house construction histories across different cohorts of movers, over time and across suburbs.

Suppose two similar households who lived in the same suburb are both surveyed in 1995. The suburb’s variation in top housing size saw a sharp increase between 1980 and 1990 but no rise after that. The only difference between household A and household B is that A moved in 1980 while B moved in 1990. According to my hypothesis based on Easterlin, unless they perfectly internalised future variations in housing size when buying a house, household A, which experienced a rise in top housing size, should be less satisfied than household B, which experienced no change at all.

Figure 4 illustrates the intuition of the research. It compares cross-sectional experienced variation in housing size inequality between old and recent movers, using the same inequality measure as in Figure 3. I find that suburban owners who...
experienced a relative downscaling of their home record lower satisfaction and house values.

The richness of my dataset allows me to exploit changes along various segments of the size distribution within suburbs and over time to test which part of the distribution matters. I find that comparison effects are upward-looking, with people in smaller houses looking enviously at neighbours with bigger ones. Being surrounded by houses smaller than the household’s own house does not significantly affect house satisfaction. The utility gains from an increase in own housing size are offset by a similar increase in size of superstar houses, in line with trickle-down theories of consumption.

I further show that when bigger houses get built closer to smaller houses, house satisfaction is lower among the smaller households. The effect is concentrated in suburbs where size inequality is high but segregation is minimal due to geographical constraints on developable land. Thus the relative size effect depends on economic segregation within counties, defined by the distance separating superstar houses from houses below median size.

Lastly, I turn to the relationship between relative house size and mortgage debt. My research provides evidence of a link between top income inequality and household debt. I show that relatively deprived households want to keep up with the Joneses. They react to relative deprivation by increasing the size of their house and subscribing to new mortgage loans. A 1% rise in top housing size during the length of tenure is associated with a 0.1% rise in size through home improvements and a 0.5% rise in the level of outstanding mortgage debt.

Had such households not tried to keep up with the Joneses, I estimate that the ratio of mortgage debt to income would have been 25 percentage points lower on the eve of the financial crisis. This finding is particularly relevant considering the continuous rise in income inequality in the United States, but also given the extensive use of minimum lot size requirements in suburban communities. Zoning regulations, by locally increasing the size of new houses built compared with the size of those before they came into place, may very well have amplified upward-looking comparison effects and increased financial distress, with no long-term improvement in overall house satisfaction.
in brief...

What can be done to help low-achieving teenagers?

Young people who drop out of school are far more likely to experience unemployment and poverty than their peers. Experimental research by Eric Maurin and colleagues in deprived neighbourhoods of Paris shows the effectiveness of low-cost interventions that clarify educational options for low-achievers and dramatically reduce the number of dropouts.

A simple programme of meetings facilitated by school principals and targeted at low-achieving 15 year olds can help them to identify educational opportunities that fit both their tastes and their academic ability. That is the central finding of a large-scale randomised experiment that we conducted in Paris.

Our study reveals that the outcome of an intervention in deprived neighbourhoods of Paris has been a very significant reduction in the number of students repeating educational years (‘grade repetition’) and in the number of students dropping out of school altogether. Compared with most existing interventions, this is a very low cost way to help young people who struggle at school to find the educational track most suited to their needs and, as a result, drop out early.

In many developed countries, a uniform schooling system terminates at adolescence. It then gives way to a highly stratified system of schools and ‘tracks’ that typically involves a prestigious academic track and a complex structure of vocational programmes.

Given that only the best students can get access to the most sought-after tracks, such a system may be a source

Young people who struggle at school need help finding the educational track most suited to their needs
of disappointment and disengagement for many young people, especially the academically weaker ones and those who lack information on available options and assignment mechanisms. Many find themselves obliged to choose among tracks that they never planned to study – and this may eventually lead them to drop out of education.

Our experimental research took place in 37 middle schools in the suburbs of Paris, mostly in deprived neighbourhoods. At the end of middle school (ninth grade), students in France can apply either to enter a three-year academic programme or to pursue a vocational programme. Students are also entitled to repeat ninth grade at least once.

We asked school principals to pre-select the quarter of ninth graders that they considered the most exposed to the risk of early dropout. Once the lists of pre-selected students were available, we randomly chose about half of the classes, in which the parents of the pre-selected students (and only these) were invited by school principals to attend two group meetings during the second term.

During these meetings, the principals discussed the specific aspirations of each family taking into account the academic performance of their children and, whenever necessary, provided them with specific feedback and targeted information on alternative options.

Our research finds that a year on, these parents had become more involved and had formed educational expectations better adapted to the very low academic record of their children.

This is reflected in their children’s applications at the end of the year in which the meetings with principals took place: the proportion that included at least one low-level vocational programme in their list of possible school assignments increased by about 30%. At the same time, the proportion who asked to repeat the year (with the aim of being accepted for the more selective three-year programmes) decreased by about the same proportion.

This adjustment in applications was followed by very significant shifts in actual assignments. One year after the intervention, the grade repetition rate of these students had fallen by about 30% and their dropout rate by about 45%.

Two years after the intervention, the students had not been induced to make unsuitable choices, nor had they simply postponed dropping out: the same proportion were in the second year of vocational education as one year before, and there were even fewer dropouts.

By encouraging many students to opt for a vocational programme rather than repeating ninth grade, the intervention did not harm their education prospects; rather, it helped to reduce their dropout rates further.

By contrast, the intervention had no negative impact on the share of pre-selected students who chose (and ended up in) three-year academic programmes: principals were able to target their intervention so as to avoid reducing the aspirations of the best performing students.

Our study reveals that having aspirations that are ill adapted to young people's academic ability is an important source of school dropouts. By showing that a simple intervention facilitated by the school principal can induce a significant fraction of would-be dropouts to identify and opt for programmes in which they can persevere and pass grades, our study contributes to the body of evidence on effective dropout prevention policies. Compared with most existing interventions, the set of meetings considered here is extremely low cost.

This article summarises ‘Adjusting Your Dreams? High School Plans and Dropout Behaviour’ by Dominique Goux, Marc Gurgand and Eric Maurin, which is forthcoming in the Economic Journal.

Dominique Goux is at CREST, Paris. Marc Gurgand and Eric Maurin are at the Paris School of Economics. Maurin is also an international research associate in CEP’s education and skills programme and an expert adviser to the Centre for Vocational Education Research (CVER) at LSE. He presented these findings as a keynote address at CVER’s annual conference in September 2016.

Encouraging low-achieving teenagers to opt for a vocational programme reduces their dropout rates
Do educational results suffer in schools where there is a high turnover among the teaching staff? Shqiponja Telhaj and colleagues explore this question by analysing data from all state secondary schools in England.

Does teacher turnover affect young people’s academic achievement?

 Hiring and retaining good teachers has been a persistent policy concern in the UK. There is a general belief among researchers and policy-makers that teacher turnover harms school students’ achievement. That is why a 2012 report by the House of Commons Education Committee concluded that recruitment and retention of outstanding teachers should be at the top of the educational reform agenda. But there is little known about the impact of teacher turnover on academic attainment.

Teachers gain experience and promotion through job search and changing schools, but this turnover might have a direct impact on young people. Teacher turnover may matter for their achievement because of the variable quality of teachers to whom they are exposed: they might lose a good teacher and gain a bad one, or vice-versa.

Teacher turnover may also matter because it disrupts learning in a number of ways: it can result in a loss of expertise within the school; teaching quality may be affected by the time required for the new teachers to acclimatise and assimilate into a school; and turnover may break continuity in learning as different teachers adopt different approaches and teach in different ways. Relationships between teachers and students may also be weaker.

If teacher turnover does harm learning, then there is a potential case for providing incentives to encourage the retention of teachers or to compensate schools with additional resources when turnover is high. The lack of appropriate data linking the performance of individual students and schools to teacher turnover has made it difficult to investigate whether high teacher mobility has an impact. Until recently, research on this issue has mainly examined factors associated with higher turnover,
finding that schools serving disadvantaged young people have higher turnover than other schools. It is also worth noting that most of these studies have based their findings on small-scale surveys or cross-sectional data.

The key question we answer in our research is whether (and to what extent) teacher turnover affects academic progress in state secondary schools in England. We use unique administrative data for the period 1995 to 2013 covering all state secondary schools in England. Data on teachers are matched with achievement data for individuals and schools at the end of compulsory schooling at age 16.

To examine the effects of different types of movers, we use alternative measures of teacher turnover: entry from other schools; entry into the teaching workforce; exit from schools; and exit from the profession. We also examine turnover rates by teacher characteristics, age, experience, gender and salary.

We estimate the net impact on academic attainment of school entry and exit rates over two years prior to students taking their final year 11 exams, the General Certificate of Secondary Education (GCSE).

Descriptive statistics suggest that teacher turnover is indeed an issue for state secondary schools in England. Figure 1 reports annual rates of entry and exit between 1995 and 2015. As Panel A shows, entry rates have been consistently high throughout this period. Overall, exit rates (Panel B) show similar patterns, with the number of teachers leaving the profession steadily rising over time too.

Turnover also varies by teacher characteristics: part-time teachers, young teachers and teachers with fewer than five years of experience are the ones who move more. For example, exit rates for teachers with fewer than five years of experience are about 60% higher than exit rates of more experienced teachers (21% compared with 14%).

Similarly, exit rates for teachers aged between 20 and 29 are almost twice the exit rates of teachers aged between 40 and 49 (19.5% compared with 11.5%). Teachers with the lowest salaries (first and second quartile) move twice as
This article summarises ‘Does Teacher Turnover Affect Student Academic Achievement?’, a forthcoming paper by Shqiponja Telhaj, Steve Gibbons and Vincenzo Scrutinio.

Shqiponja Telhaj of the University of Sussex is a research associate in CEP’s education and skills programme. Steve Gibbons is professor of economic geography at LSE and director of CEP’s urban and spatial programme. Vincenzo Scrutinio is an occasional research assistant in CEP’s community programme.

often as teachers in the two top quartiles of the wage distribution (22% compared with 11%).

As descriptive statistics show, turnover in secondary schools is high, and this makes it more important to establish the effects on academic progress. We employ two measures of attainment: the proportion of students achieving five or more grade A*-C examination results in their GCSEs; and the proportion getting no GCSE passes.

We find a negative association between the proportion achieving five A*-C grades and entry rates in the raw school data: a percentage point increase in entry from outside the profession leads to a decline of 0.5 percentage points in the share of students achieving five or more A*-C in their GCSEs, while a similar increase in entry from other schools is related to a 0.1 percentage point lower share of good GCSE results.

Given that, on average, 58% of students achieved five or more A*-C GCSEs in the period we analyse, these effects are small. This association is further weakened once we control for observed teacher characteristics and other factors affecting school performance. But it remains statistically significant: a percentage point increase in entry from outside the profession and entry from other schools leads, respectively, to a 0.14 and 0.062 percentage point decline. Entry rates are detrimental but the effect remains small when the share of no passes is used as a measure of school performance.

The effect of exit rates on school performance is similar to those of entry rates. But it is worth noting that entry into the profession appears to be more detrimental to the attainment of more vulnerable students. As Figure 2 shows, the effect of entry from other schools and the proportion of entry from outside the teaching profession on GCSE scores is substantially larger in schools in the top quartile of the distribution of students eligible for free school meals.

Effects are, in any case, negative in all quartiles. The effect of entry from outside the profession on achievement of good GCSEs is less clear-cut.

Overall, our findings suggest that teacher turnover does reduce student attainment at GCSE level, even after controlling for teacher characteristics. But the effects are moderate: a percentage point increase in entry from other schools reduces the share of five or more A*-C GCSEs by 0.06 percentage points on average; and entry from outside the profession by 0.14 percentage points. The effects are small relative to overall variation in student attainment, given that 58% of students achieved five or more A*-C GCSEs during this period.

This suggests that targeting teacher turnover per se might not be the most effective policy to improve student performance. But since students from more disadvantaged social backgrounds are the ones affected the most, resources should be directed at retaining teachers in their schools.

The effects of teacher entry from other schools and outside the teaching profession on schools’ share of students achieving five or more A*-C GCSEs

This article summarises ‘Does Teacher Turnover Affect Student Academic Achievement?’, a forthcoming paper by Shqiponja Telhaj, Steve Gibbons and Vincenzo Scrutinio.

Shqiponja Telhaj of the University of Sussex is a research associate in CEP’s education and skills programme. Steve Gibbons is professor of economic geography at LSE and director of CEP’s urban and spatial programme. Vincenzo Scrutinio is an occasional research assistant in CEP’s community programme.

Resources should be directed at retaining teachers at schools in disadvantaged neighbourhoods.

Figure 2: The effects of teacher entry from other schools and outside the teaching profession on schools’ share of students achieving five or more A*-C GCSEs.
The population of the world is distributed very unevenly. Research by Vernon Henderson and colleagues explores the fundamental geographical determinants of the location of economic activity, notably differences in localities’ suitability for agriculture and trade – and how the relative importance of these factors has changed over time.

The roles of nature and history in world development
Why do people live where they do, whether in the world as a whole or within a given country? Why are some places so densely populated and some so empty? In daily life, we take this variation in density as a matter of course, but in many ways it can be quite puzzling.

#### Key drivers of the distribution of population

Economists point to three factors to explain how population is distributed. The first is that there are differences in geographical characteristics – often referred to as ‘first nature’ – that make some places more amenable for living or producing output than others. This explains why mountainous regions, deserts, tundra and so on tend to have low population density – and why much of the world’s population is situated in places where it is relatively easy to produce food.

The second factor is agglomeration. Because of economies of scale and gains from trade, we humans often find it efficient to gather in small areas. Of course, many industries, notably food production, don’t benefit from such concentration, and are instead spread out in accord with the availability of first-nature resources.

What’s more, there are limits to the benefits of agglomeration: because of congestion and transport costs, the urban population is spread among many cities, which are in turn spatially dispersed.

The final factor affecting the distribution of population is history. Once established, cities have a very strong tendency to stay put. This persistence results from many factors, often collectively described as ‘second nature’ (Cronon, 1992).

Among these factors are long-lived capital, political power and the fact that once agglomeration has started in a particular place, it will be a natural focus for future development. This persistence can be important even when the reasons that a city has been established in a particular location are no longer important (Bleakley and Lin, 2012; Michaels and Rauch, 2013).

#### Regions’ suitability for agriculture and trade

The complete story of how nature, agglomeration and history have interacted to give the world the distribution of population that we see today is far too complex to be captured in a single study. The goals of our recent research are less ambitious.

We ask how economic and technological development has changed the ways in which first-nature characteristics affect population distribution. While these characteristics themselves haven’t changed too much over history (so far), the way in which they affect settlement has. Illustrative examples of such changes are the impacts of air conditioning, irrigation and the discovery of new uses for particular mineral resources.

We focus on the two natural characteristics where we think that changes associated with economic and technological change have been most important: first, the suitability of a region for growing food; and second, the suitability of a region for engaging in domestic and international trade.

Over the last few centuries, the importance of fertile land as a determinant of population density has declined. This is partly because agricultural productivity has increased, so that a smaller fraction of the labour force works on farms. It is also because transport costs have fallen, so that people don’t need to live near where their food is produced.

Similarly, lower transport costs, along with increased opportunities for gains from trade, have raised the value of locations (such as those on coasts, navigable rivers, or natural harbours) that are accessible to trade, either within or between countries.

Our goal is to show how these changes are reflected in the distribution of population today. In pursuing this goal, the effect of persistence turns out to be very important. We are interested in how technology in historical times affected agglomeration at those times, but the data on population density that we use are only available for the world today.

But if we know when (in a rough sense) agglomeration began in a country, then we can use the similarity of today’s distribution to the historical distribution to learn about how the technology available at that time affected agglomeration.

#### First-nature data and the distribution of population today

Before looking at the role of history, we start by simply examining the explanatory power of first-nature characteristics for today’s world population distribution.

Our starting point in measuring the dispersion of population is lights observed at night by weather satellites. Specifically, we use the 2010 Global Radiance Calibrated Nighttime Lights dataset (Ziskin et al, 2010). In previous work (Henderson et al, 2012), we show that change over time in night-lights data is a useful proxy for the growth of GDP in countries with poor national income accounts data.

The lights data are distributed as a grid of pixels of dimension 0.5 arc-minute resolution (1/120 of a degree of longitude/latitude). We aggregate into a grid of 1/4-degree squares, with each...
square covering approximately 770 square kilometres at the equator. At this resolution our sample is roughly 240,000 grid squares (excluding squares made up solely of water). Figure 1 shows this grid cell data for the world as a whole.

The first-nature variables we use in predicting lights are in three groups. The first – ‘agriculture’ – comprises factors that seem clearly related to producing food. These include six continuous variables (temperature, precipitation, length of growing period, land suitability for agriculture, elevation and latitude) as well as a set of 14 indicators for biomes (mutually exclusive regions encoding the dominant natural vegetation expected in an area, based on research by biologists.)

The second group of variables – ‘trade’ – focuses on access to water transport. These measure whether the centre of a grid cell is within 25 kilometres of a coast, navigable river, major lake or natural harbour, as well as including a continuous measure of distance to the coast.

Finally, we define a ‘base’ group of two variables – ruggedness and malaria ecology – which seem to be roughly equally relevant for agriculture and trade.

Figure 2a shows how lights in a grid square are explained by our three sets of first-nature variables. Together, these variables explain 47% of the variation in lights.

But there are two potential problems with jumping from this result to the conclusion that nature really does explain such a large fraction of variability in population density. The first is that variation in visible light is not solely determined by population density. The other big determinant is income per capita. It is for this reason that in Figure 1, Japan is so much brighter than Bangladesh, even though the latter is more densely populated.

The second problem is that a statistical correlation between geographical characteristics and either income or population density might not indicate a true effect of geography, but rather be acting as a proxy for the effect of something correlated with geography. For example, if European colonisers implanted good institutions in places where the climate was amenable to their settlement and bad institutions in places that were not (Acemoglu et al, 2001), then a European-type climate will predict higher income, even though it may not directly affect income at all.

Both of these problems are addressed by looking at variation in lights and natural characteristics within countries. Figure 2b is an example of this: we estimate the effect of first-nature characteristics using only within-country variation in lights, and then from values for the world as a whole.

As the figure shows, knowing only how geography affects population within countries, one would still do a pretty good job of predicting the variation in population density the world over. The agriculture and trade variables account for slightly more than a third of within-country variation.

The changing importance of first-nature characteristics

We now turn to the question of how the importance of natural characteristics as a determinant of the distribution of population has changed over time. Key to our approach is comparing countries where agglomeration took place early, thus reflecting the weights put on natural
characteristics further back in time, with those that agglomerated later.

Unfortunately, we don’t have a consistent measure of exactly when agglomeration took place, so instead we use data from 1950 on urbanisation and two proxies: education and GDP per capita. Our assumption is that countries with higher values of these measures at that point in time also started their urbanisation process earlier.

We use several statistical approaches to parse the data. One is to estimate coefficients on our ‘agriculture’ and ‘trade’ variables separately for early and late agglomerators, while simultaneously letting the data determine where the threshold is between these two groups of countries. Applying this method using urbanisation in 1950, for example, we find that the cut-off between early and late agglomerators is an urbanisation rate of 36.2%, which puts 70 out of 189 countries (57.2% of our grid squares) in the ‘early’ category.

We then analyse the impact on visible lights of the set of base variables, the base plus agriculture variables and the base plus trade variables. The improvement in explanatory power that comes from adding agricultural variables is much larger in the early agglomerators than in the late ones; correspondingly, the improvement that comes from adding trade variables is much larger in the late agglomerators than in the early ones.

We find a similar pattern when we use education or GDP per capita in 1950 to split the data, and we find it also when we look solely within the New World or the Old World.

These results tell what at first seems to be a puzzling story: late agglomerators are generally poorer countries and, on average, are more dependent on agriculture than early agglomerators. Yet it is in the latter group of countries in which agricultural variables do a better job of predicting the location of population and economic activity.

Our explanation of this apparent puzzle looks to the timing of when agricultural productivity rose and trade costs fell. In countries where agglomeration got going early, the rise in agricultural productivity preceded the decline in transport costs. In other words, people began moving from farms to cities at a time when it was still relatively expensive to move food from place to place. As a result, cities were located close to areas conducive to food production.

By contrast, in late agglomerators, the rise in agricultural productivity that allowed urbanisation came later relative to declining transport costs, and so the latter was relatively more influential as a determinant of location.

Figure 3 shows some of the data that support this argument: it plots the urban share of the population in groups of early and late agglomerators, as well as a global index of transport costs. The figure makes clear that transport costs were far lower when late agglomerators reached any particular level of urbanisation than when the same level was reached by early agglomerators.

One implication of this analysis is that countries that are only urbanising now have population distributions that are more appropriate to modern technology than those that urbanised earlier. For example, even though in Europe coastal areas already have particularly high population densities, our estimates imply that if Europe had developed later, coastal density would be even greater. Similarly, if Africa had developed earlier, interior areas such as the Ethiopian highlands and the Congo basin would have higher relative population densities than they actually do.

Countries urbanising now have population distributions more appropriate to modern technology

Locational decisions made today will have effects in centuries to come

Figure 3: Urban share of the population in groups of early and late agglomerating countries; and a global index of transport costs

<table>
<thead>
<tr>
<th>Year</th>
<th>Urban share (%)</th>
<th>Global real freight index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1800</td>
<td>10</td>
<td>1.4</td>
</tr>
<tr>
<td>1850</td>
<td>20</td>
<td>1.2</td>
</tr>
<tr>
<td>1900</td>
<td>30</td>
<td>1.0</td>
</tr>
<tr>
<td>1950</td>
<td>40</td>
<td>0.8</td>
</tr>
<tr>
<td>2000</td>
<td>50</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Note: Global real freight index excludes periods including world war years.
Sources: Bairoch (1988); Mohammed and Williamson (2004).
Further implications of our analysis involve spatial inequality within countries. We expect early agglomerators, with their activity focused around agriculturally suitable land, and a distribution of population inherited from a period when transport costs were high, should have a higher degree of spatial equality in lights overall than late agglomerators with their heightened coastal focus and low transport costs.

Conclusion
The saying that ‘geography is destiny’ is often attributed to Napoleon. Meanwhile, the American industrialist Henry Ford really did say that ‘history is bunk’. Our research shows that when it comes to thinking about how population is distributed within countries, there is reason to doubt both of these statements.

Geography clearly matters quite a bit for where people live. But the aspects of geography that matter change over time. Further, there is enormous persistence in location, so that the ways in which geography mattered in the past – that is, history – are still reflected in the spatial distribution of population today.

To many readers, sitting in cities founded hundreds of years ago, sipping coffee grown thousands of kilometres away, none of this will come as a great surprise. But understanding the dynamic interplay of geography, technology, economic growth and history – a project in which our study is only a small step – is of great import in thinking about many issues facing the world today.

Not only are the impacts of different geographical characteristics continuing to change with economic and technological development, but also in decades to come, geographical characteristics themselves will be changing at an ever-increasing rate. At the same time, in much of the developing world, urbanisation is taking place at a rapid pace. The locational decisions made today will have effects in centuries to come.


Vernon Henderson is School Professor of Economic Geography at LSE and a research associate in CEP’s urban and spatial programme. Tim Squires is at Amazon.com. Adam Storeygaard is at Tufts University. David Weil is at Brown University.

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