DARK WEB:
THE ECONOMICS OF ONLINE DRUGS MARKETS
The UK’s financial services industry is not nearly as London-centric as the creative industries. Rather than the South East of England being the country’s productivity engine, it is a band stretching west from the capital along the M4 corridor towards Bristol. And in addition to longstanding concerns about the North-South divide, there are emerging disparities between coastal and inland areas.

These are some of the ten key facts about the UK’s business geography in a new ‘atlas’ compiled by the Centre for Economic Performance (CEP) research team at the heart of the LSE Growth Commission. With the government’s professed interest in addressing the country’s regionally uneven economic performance, the findings, summarised in this issue of CentrePiece magazine, shed light on the scale of the task.

The proposed ‘Industrial Strategy’ will also be informed by a related report on the local economic effects of Brexit – the latest in our series of policy briefings on the likely impact of leaving the European Union on living standards, trade, immigration, foreign investment, inequality, regulation and the labour market. Here we present the first full data on what has happened to inflation in the wake of last year’s referendum vote: these reveal a significant rise in consumer prices, particularly food prices. Coupled with limited increases in nominal wages, this has led to the return of falling real wages.

Elsewhere in this issue, we explore some other prominent topics in current public debate. One article explains how stamp duty contributes to the UK’s housing crisis by preventing households from moving to more suitable homes. Another considers evidence from a range of countries showing that refugees have modest or no harmful effects on the wages and employment of native workers. And a third describes an emerging pattern of increasing inequality of wages and productivity between firms in the manufacturing and services sectors of many OECD countries – the ‘Great Divergences’.

Finally, our cover story analyses data from online platforms for buying and selling drugs collected from the so-called ‘dark web’ – the latest work on the economics of crime by CEP’s director Stephen Machin and colleagues. He will also be delivering the high-profile annual public lecture of the Royal Economic Society towards the end of the year, focusing on the importance of economic incentives as a determinant of crime and what can be done to discourage, detect and apprehend criminals.

Romesh Vaitilingam, Editor
lse@vaitilingam.com
Contents

Page 2
The growing inequality between firms
Giuseppe Berlingieri and colleagues analyse data on the dispersion of wages and productivity in OECD countries

Page 8
Industry in Britain: an atlas
Sandra Bernick and colleagues map the geography of UK firms, employment, productivity and innovation

Page 12
Dark web: the economics of online drugs markets
Stephen Machin and colleagues explore online platforms for buying and selling drugs

Page 17
Stamp duty, mobility and the UK housing crisis
Christian Hilber and Teemu Lyytikäinen explain the value of replacing stamp duty with better-designed local taxes

Page 21
Happiness at work
Jan-Emmanuel De Neve and George Ward summarise evidence on which elements of our working lives drive our wellbeing

Page 26
The labour market impact of refugee waves
Michael Clemens and Jennifer Hunt confirm that immigration has few harmful effects on the wages and employment of native workers

Page 6
How the rise of the service economy narrowed the gender gap
Structural transformation gives women a comparative advantage, according to Rachel Ngai and Barbara Petrongolo

Page 15
Where top science gets done
Christian Helmers and Henry Overman examine the impact of the Diamond Light Source synchrotron on scientific output

Page 24
Brexit: the impact on prices
Josh De Lyon and colleagues look at UK price inflation before and after the referendum
Some firms pay well while others don’t; and some are highly productive while many aren’t. Giuseppe Berlingieri, Patrick Blanchenay and Chiara Criscuolo analyse new firm-level data on the increasing dispersion of wages and productivity in both the manufacturing and services sectors in 16 OECD countries – the ‘Great Divergences’.

The growing inequality between firms
Over the last three decades, many economies have experienced increasing inequality in earnings. A number of studies show that most of this dispersion comes from increasing differences in wages between the best- and worst-paying firms, rather than from a growing gap between top and bottom earners within the same firm.

At the same time, recent evidence suggests that there has been a significant increase in the gap between the globally most productive firms and the rest. This suggests that there might be a positive relationship between the two divergences in wages and productivity. In recent research, we provide evidence of these ‘Great Divergences’ using novel micro-aggregated firm-level data.

Our study analyses firm-level data on the increasing dispersion of wages and productivity in both the manufacturing and services sectors in 16 OECD countries: Australia, Austria, Belgium, Canada, Chile, Denmark, Finland, France, Hungary, Italy, Japan, Luxembourg, the Netherlands, Norway, New Zealand and Sweden.

We find that wage inequalities are growing between firms, even those operating in the same sector – and these inequalities are linked to growing differences between high and low productivity firms. Both globalisation and technological progress (notably information and communications technologies, ICT) influence these outcomes – as do policies and institutions such as minimum wages, employment protection legislation, unions and processes of wage-setting.

In Figure 1, the top panel represents how the 90-10 wage ratio, which compares wages in firms at the top 10% of the wage distribution with wages in firms at the bottom 10%, has changed.
Wage inequalities are growing between firms, even those operating in the same sector since 2001. A higher ratio indicates more differences between high-paying and low-paying firms. Over that period, wage differences between firms in the same country and same sector increased by 12%.

Over the same period, productivity experienced a similar divergence. Differences between the most productive and least productive firms of the same country and same sector increased by 12.8% for labour productivity (bottom panel, blue line) and 14% for multi-factor productivity (bottom panel, red line).

Much discussion of inequality has focused on increasing differences between the top 1% of earners and the rest of the income distribution. Our study shows that wage inequalities also come from divergence between firms, in particular from the bottom of the distribution.

The top panel of Figure 2 shows how the ratio of wages between the top decile and the median (upper tail wage inequality, red line), and between the median and bottom decile (lower tail wage inequality, blue line) have evolved between 2001 and 2012. The gap in average wage between the bottom decile and the median grew faster between 2001 and 2012 than the gap between the median and the top decile – that is, lower tail inequality grew faster than upper tail inequality. The same dispersion from the bottom occurred in the distribution of productivity (bottom panel). In other words, the dispersion of both wages and productivity has been faster at the bottom than at the top.

These parallel trends in dispersion suggest that the distributions of wages and productivity are linked. Our research investigates the role of structural factors as well as policies and institutional features of the economy that might have strengthened or weakened the correlation between wage and productivity dispersion.

First, we find that globalisation and digitalisation are not only associated with an increase in between-firm wage inequality, but also that they strengthen the link between wages and productivity dispersion. In sectors where firms increase the use of ICT over time, wage dispersion grows faster, which suggests that ICT affects firms heterogeneously.

We also look at sectors that become more open to trade through either imports or exports. In those sectors, not only has wage dispersion increased but its link with productivity dispersion has also been strengthened.

Country-specific policies and institutions also play a role in shaping the evolution of wage and productivity dispersions, and the link between them. Our research focuses on the role of wage-setting institutions and labour market features:

- Minimum wages (in terms of both the hourly real minimum wage and the minimum relative to average wages of full-time workers).
- Employment protection legislation (strictness of employment protection for both individual and collective dismissals).
Trade union density.

And coordination in wage-setting.

Our results suggest that all of these policies have the intended consequence of reducing wage dispersion and, hence, overall inequality. At the same time, they affect the link between wage and productivity dispersion.

For example, more centralised bargaining is associated with a weaker link between productivity and wage dispersion, while this is not the case for changes in employment protection legislation and union density. More centralised bargaining can therefore help to limit wage dispersion, but at the same time it weakens the link between wages and productivity dispersion, which might be detrimental to long-run growth.

Conversely, minimum wage policies, while also reducing wage dispersion, are associated with a stronger link between wage and productivity dispersion over time, which could benefit long-run growth.

But one ought to be careful. By changing how easy it is for firms to hire workers or dismiss them, these policies affect how labour flows to the best firms. This dampens the transmission channel between productivity dispersion and wage dispersion.

Thus, policies that might be beneficial to workers in the short run by shielding them from productivity fluctuations may have a detrimental impact in the long run. By hindering the reallocation of resources away from poorly performing to highly productive firms, they might inadvertently trap workers in low-paying firms, rather than giving them the opportunity to earn higher wages in more productive firms.

Some firms pay well while others don’t; and some are highly productive while many aren’t
in brief...

How the rise of the service economy narrowed the gender gap

The historical growth in the service sector has created jobs for which women have a comparative advantage, according to analysis by Rachel Ngai and Barbara Petrongolo.

One of the most remarkable changes in the labour markets of rich countries since the Second World War has been the rise of female participation in the workforce. In the United States, for example, the employment rate of women has more than doubled: from about 35% in 1945 to 77% at the end of the twentieth century. Several European countries, including the UK, have experienced very similar trends.

There has been a huge amount of research on the causes and consequences of the rise in women’s involvement in the labour market. Proposed explanations include medical advances, growing investment in human capital, technological progress in the household and wider availability of childcare.

Our research puts forward a new and complementary explanation based on the secular expansion of the service economy and its role in raising the relative demand for female work. Our emphasis on the evolution of the industry structure is motivated by a few observations.

First, the sustained rise in female work since the late 1960s in the United States has been accompanied by a fall in male work and a rise in women’s relative wages. In 1968, women’s hours were about 37% of men’s hours and their wages were about 62% of male wages. By 2008, these ratios had risen to 73% and 81%, respectively.

The historical growth in the service sector has created jobs for which women have a comparative advantage, according to analysis by Rachel Ngai and Barbara Petrongolo.

Second, the entire (net) rise in female hours has taken place in the broad service sector, while the entire (net) fall in male hours has taken place in goods-producing sectors, including the primary sector, manufacturing, construction and utilities. This pattern is closely linked to the process of ‘structural transformation’, and specifically the reallocation of labour from goods to service industries, with an expansion of the service share from 56% in 1968 to 75% in 2008.

Finally, the rise in women’s hours in the service sector has been accompanied by a strong decline in their working hours in the household – from about 41 to 31 hours weekly – consistent with substantial ‘marketisation’ of home production.
Women’s market hours were boosted by structural transformation and marketisation

One reason for the significance of services is that their production is relatively less intensive in the use of ‘brawn’ skills than the production of goods – and relatively more intensive in the use of ‘brain’ skills. As men are better endowed with brawn skills than women, the historical growth in the service sector has created jobs for which women have a comparative advantage.

While the brawn versus brain distinction has become less relevant with the introduction of what might be called ‘brawn-saving technologies’, women may still retain a comparative advantage in services, related to the more intensive use of communication and interpersonal skills that cannot be easily automated. The simultaneous presence of producers and consumers in the provision of services makes these skills relatively more valuable in services, and a few studies have highlighted gender differences in the use of such traits.

Women’s comparative advantage in services is clearly reflected in the allocation of their market hours. In 1968, the average working woman in the United States was supplying three quarters of her market time to the service sector, while the average man was supplying only one half. As structural transformation expands the sector in which women are over-represented, it has potentially important consequences for the evolution of women’s hours of market work.

A second reason for the significance of services relates to women’s involvement in household work. In 1965, women spent on average 41 hours a week in home production, nearly four times as much as men. Household work typically includes childcare, cleaning, food preparation and other activities that have close substitutes in the market service sector. If the expansion of the service sector makes it cheaper to outsource these activities, there is going to be a reallocation of women’s work from the household to the market.

The work allocation of men and women in the late 1960s is thus key to understanding later developments. While women were mostly working in home production and the service sector, men were predominantly working in the goods sector.

From that point, while men’s working hours mostly bore the burden of deindustrialisation, women’s market hours were boosted by both structural transformation and marketisation.

We use US data to assess quantitatively the importance of these mechanisms. The forces of marketisation and structural transformation predict the entire rise in the service share between 1970 and 2006, 20% of the gender convergence in wages, one third of the rise in female market hours and 9% of the fall in male market hours.

By predicting changes in the overall allocation of time across market goods, market services, home services and leisure, the evolution in the industry structure explains about 60% of the evolution in the overall structure of time allocation across manufacturing, services, leisure and home production for men and women.
Measures to promote a more even spread of industry across Britain are on the policy agenda. The maps and charts in a new report by Sandra Bernick, Richard Davies and Anna Valero provide a starting point, setting out the latest data on firm location, together with geographical measures of employment, productivity and innovation.
Britain is a place where people worry about the geographical spread of industry. While employment is at record levels, British workers are far less productive than their counterparts in countries such as France, Germany and the United States. Growth in real wages has been poor since the financial crisis; insecure working arrangements are on the rise; and there are significant disparities in economic activity and opportunity across the country.

Concerns that some regions are falling behind others – and that the location of firms helps to explain this – are longstanding, yet determination to adopt policies that address regional disparities has ebbed and flowed. There are signs that the 2017 Parliament could see an intensification of efforts to ‘drive growth across the country’. This is likely to be a key theme in the government’s new ‘Industrial Strategy’, set to be launched over the coming months.

Despite the rising interest in addressing Britain’s uneven economic performance, to date no one has published a comprehensive analysis setting out the latest facts on business geography. New CEP analysis begins to fill that gap, using data on firms to create a mapping of industry in Britain. Ten stylised facts stand out, many of which challenge the prevailing wisdom.

**FACT 1: Three patterns of industry**

The location of business activity in Britain (measured using data on employment patterns) varies considerably by industry, and follows three broad patterns:

- **Uniform**: Some industries are fairly evenly spread around the country, with a similar concentration of activity in most locations. These industries often provide products or services that must be sold locally: retail services, for example, include firms such as hairdressers and gyms. Outside large cities, agriculture is spread relatively evenly. More surprisingly, manufacturing is relatively evenly spread outside London.

- **Scattered**: In these industries, activity is concentrated in a number of locations, creating a scatter of strong dots across the country. This group includes firms operating in science and technology sectors and mining and quarrying (see Figure 1). The fact that finance is scattered across multiple hubs is a challenge to the belief that banking only occurs in the South East.

- **Single hub**: In these industries, there is one location where activity seems to be concentrated. The creative sectors (see Figure 2) and information and communications technology are examples: in both cases, activity is focused in London and the South East, although there are also pockets in cities such as Manchester and Edinburgh. Given the expectation that creative industries and ‘tech’ are potential growth industries, this finding will concern those seeking a more even spread of opportunity.

**FACT 2: Firm size distribution**

Firm size matters for industrial performance: larger firms tend to invest more and have higher productivity. But industry is dominated by small firms with around 99% of firms being classed as ‘small’ (0-49 employees). So-called ‘non-employing’ businesses (firms where the owner-manager is the only worker) are the largest category, making up around three quarters of firms in all regions.

Our maps show that mid-sized firms (those with 50-249 employees) are relatively evenly spread. Large firms are very sparsely spread: currently, only 55% of local authorities have ten or more large firms. More encouragingly, maps showing the increase in mid-sized firms indicate that this growth is relatively evenly spread.

**FACT 3: Business demography**

The rate at which firms start up and go bankrupt is relatively evenly spread, with maps showing that these ‘births’ and ‘deaths’ are equally likely across regions. This suggests that the ease with which a firm can be established and wound up are unlikely to explain regional productivity differences.
FACT 4: The spread of productivity
The output per hour of a British worker varies considerably by location. At the bottom of the productivity scale is mid-Wales: the countryside around Brecon is an area with little industry and where agriculture is the main employer.

At the other end of the scale, there are three high-productivity hubs: the oil industry around Aberdeen; the area around Greater Manchester; and a band of productivity in the South. Contrary to popular belief, the high productivity of London does not spread into the South East but rather spreads west along the M4 towards commuter towns like Reading and Slough, which have their own high-productivity firms.

FACT 5: Leader and laggard sectors
The highest productivity sectors – real estate, mining and utilities – are small employers and so play little role in aggregate performance. Of the high employment sectors that drive national productivity, the leading sectors are finance, information and communications technology, construction and manufacturing. Professional, scientific and technical services vary within and across regions: this sector includes some very high-productivity firms together with much weaker ones.

But it is important to consider high employment sectors with weak productivity, such as retail and wholesale trade, administrative services, and accommodation and food services. Raising average productivity in these sectors could have a large aggregate effect due to their high employment shares.

FACT 6: Innovation in the regions
Data on research and development (R&D) expenditure and patents allow a comparison of innovation across regions. In absolute terms, London and the South East dominate, accounting for nearly a third of business spending on R&D. But in terms of R&D as a percentage of GDP, the East of England stands out (see Figure 3).

At a more disaggregated level, Britain’s most innovative NUTS2 regions (equivalent to grouped counties, unitary authorities or districts) are East Anglia, Cheshire and Hertfordshire. Respectively, these reflect the impact of Cambridge University, chemicals firms along the River Mersey and pharmaceuticals and life sciences firms located in and around Hertfordshire.

FACT 7: Unbalanced exporting
Britain has a sizeable current account shortfall at 3.4% of GDP (in the first quarter of 2017). Only 11% of firms export and those that do export are most likely to be based in London, the South East or the East of England. The North East has the lowest share of exporters at fewer than 6%.

A poor and unbalanced export performance has long been of concern, but Britain’s exit from the European Union will create new challenges in this area. It is estimated that all local authorities are likely to become worse off following Brexit, but that the largest impacts are expected to be in cities that specialise in finance and business services.

Understanding the local impacts of Brexit through changes to trade – together with immigration, foreign direct investment and innovation – will be crucial for policy-makers developing an industrial strategy with region-specific elements.

FACT 8: Britain’s coastal malaise
A number of maps outline concerns about the economic performance of Britain’s coastal towns. Maps of survival rates show that firms located near the coast are more likely to go out of business than those further inland.

These areas also specialise in accommodation and food services, which tend to be low productivity industries with a high churn of businesses. Other research shows that skills are particularly weak in these areas, perhaps reflecting the demands of the local labour market.

Britain’s productivity engine is a band stretching west from the capital along the M4 corridor towards Bristol.
**FACT 9:**
*The power of a single firm*

Some of the patterns in the regional data indicate local dominance by single firms. For example, the high productivity in north Lancashire, Derby and Brentwood is influenced by the major plants of BAE Systems, Rolls Royce and Ford, respectively. Further examples are Tata Steel in Port Talbot and Airbus in Broughton (Flintshire), both in Wales. The same can also be true for service sector firms, for example, Sky in parts of Scotland. The local impact of losing or gaining a large firm can be large.

**FACT 10:**
*The German benchmark*

It is well known that Britain’s aggregate productivity is far behind that of its key comparator countries. We compare the economic performance of British regions with those in Germany. The resulting maps are concerning, showing that Britain’s best performing regions (with the exception of Central London) are far behind the German average (see Figure 4).

Germany stands out as a multi-hub country, with around ten identifiable high-productivity areas: by contrast, in Britain, the South East dominates. While Germany also faces regional challenges, with longstanding poor performance in East Germany, these poor performing regions are catching up. In Britain, however, similarly laggard regions appear to be falling further behind.

**Next steps**

Britain has good quality firm-level data, and it is crucial that this is put to best use in guiding policy. The LSE Growth Commission made a series of recommendations to strengthen the institutions governing industrial strategy.

A key component here would be the publication of an annual *Industrial Strategy Report* on the state of British business akin to other regular publications (for example, the Bank of England’s *Inflation Report*). Our work provides some of the types of analysis that could be usefully included and built on in such a report.

While our analysis provides a snapshot of the current state of play, it remains unclear what is the optimal distribution of industry, and therefore what the ultimate goal of regional policy should be. Industrial policy has to proceed cautiously, in full knowledge of facts on the ground and ensuring that government resources are used effectively.

Broadly, the evidence suggests that area-based initiatives can lead to displacement rather than aggregate gains, though it is possible to design policies that deal with these issues. Moreover, there are tensions between ‘jam-spreading’ (spreading resources across locations) and the ability to build up successful hubs that exploit network effects.

It is increasingly recognised that greater local control is important: more space for local authorities to experiment with different types of policy. This, together with improved data collection and evaluation, should increase the chances that policies can deliver both improved aggregate performance and a more balanced economy.

This article summarises ‘Industry in Britain – An Atlas’ by Sandra Bernick, Richard Davies and, Anna Valero CEP Special Paper No. 34 (http://cep.lse.ac.uk/pubs/download/special/ceps34.pdf).

Sandra Bernick is a research assistant in CEP’s growth programme. Richard Davies is chief of staff of the LSE Growth Commission. Anna Valero is a research officer in CEP’s growth programme.

Figure 4:
*Productivity per hour in Britain versus the German average (=100)*

---

Notes: GVA per hour at NUTS3 level in 2014, with Germany’s overall productivity set to 100 (index).

Source: Data for Britain from the Office for National Statistics Regional and Subregional Productivity release (January 2017), German data from the federal states’ national accounts.
Like many other consumer transactions, the buying and selling of drugs are increasingly moving online. This is one very visible dimension of cybercrime – and it has been receiving growing attention from researchers as the online drugs markets have expanded rapidly. A key feature of online drugs platforms is that they are located on the so-called ‘dark web’, which is accessible via the sophisticated technology of anonymisation software and encryption programs, and buying and selling transactions are conducted using the anonymous cryptocurrency, Bitcoin.

Our research so far has empirically studied these online drugs platforms by scraping large amounts of data from their websites and by focusing specifically on three economic questions:

First, we have conducted an appraisal and empirical analysis of the buyer ratings of online drugs purchases that the platforms collect.

Second, we are looking at whether these ratings act to generate a reputation mechanism for sellers in the illegal online market setting as happens in legal online markets.

Third, we are analysing the dynamics of the market, as both seller turnover and platform turnover are high in online drugs markets.

While there is a small scale prior history of drugs being bought and sold online, the origins of today’s online drugs markets date back to the establishment of ‘Silk Road’, the best known platform, in January 2011. Silk Road distinguished itself from the black markets that had been operating before by its highly professional website and its ability to ensure anonymity. Figure 1 shows a sample screenshot of the site.

Silk Road operated for just under three years before being shut down following the arrest of its founder, Ross Ulbricht, the libertarian who set up and ran the site (under the administrator name, ‘Dread Pirate Roberts’) and who is currently serving a life sentence for doing so. Trade on the site grew massively over its time of operation: in May 2011, it had around 340 listings; by the time of its closure in
October 2013, there were around 13,000 drugs listings on the platform.

Since the demise of Silk Road, a large number of online drugs platforms have come and gone, some lasting only a few days, but others running longer – and making a lot of money. Figure 2 shows the lifetimes of 83 dark web drugs platforms and names some of the larger sites.

For our research, data were scraped from four of the largest online drugs platforms – Agora, Evolution, Nucleus and Silk Road 2.0 – between 2013 and 2016 and then analysed to present evidence on the economic functioning of online drugs markets.

A key research question is how well – or badly – these markets operate given the high probability of problems of ‘moral hazard’ arising because of their illegal nature and because they are populated by individuals engaged in criminal actions. Some of the findings come from analysing these data in ways similar to other research on legal online markets, such as eBay or Amazon, where there is a focus on whether online activity alters the way in which trust between market participants operates and whether it affects the efficiency of outcomes.

A particular emphasis has been placed on whether online activity enhances or diminishes seller reputations so that problems of moral hazard either improve or deteriorate in the context of online commerce (see Cabral and Hortaçsu, 2010). Buyers might be concerned about the quality of the products they are looking to buy and therefore forgo purchasing opportunities. At the same time, sellers might worry whether they will be paid.

Some striking findings emerge. Analysis of around 1.5 million drugs transactions scraped from the four platforms (plus data on Silk Road from Christin, 2012) shows that, for the most part, online drugs markets function without the significant problems of moral hazard that a priori one might think would constrain their operation.

In fact, only a small minority of online drugs deals receive bad ratings from buyers, as Table 1 shows. This is lower than the incidence of drugs rip-offs that researchers have reported in analyses of the quality of drugs available from street transactions (Galenianos et al, 2012).

Moreover, as with legal online markets, if sellers do receive bad ratings, this typically leads to them experiencing significant sales reductions and market exit. Thus, perhaps contrary to what many people’s first intuition might be, reputation mechanisms appear to work relatively well even in these illegal online marketplaces.

Our research also finds that drugs platforms exit and get closed down for different reasons. As the online drugs markets have emerged and grown rapidly, they have attracted attention from both the media and law enforcement agencies.

Table 1: Negative ratings of drugs transactions

<table>
<thead>
<tr>
<th>All five platforms</th>
<th>Silk Road</th>
<th>Silk Road 2.0</th>
<th>Agora</th>
<th>Evolution</th>
<th>Nucleus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>% Neg</td>
<td>Number</td>
<td>% Neg</td>
<td>Number</td>
<td>% Neg</td>
</tr>
<tr>
<td>All drugs</td>
<td>1,454,103</td>
<td>145,485</td>
<td>1.2%</td>
<td>189,628</td>
<td>1.9%</td>
</tr>
<tr>
<td>Cannabis</td>
<td>441,166</td>
<td>42,373</td>
<td>1.0%</td>
<td>48,882</td>
<td>2.0%</td>
</tr>
<tr>
<td>Dissociatives</td>
<td>39,381</td>
<td>4,082</td>
<td>0.8%</td>
<td>5,548</td>
<td>1.6%</td>
</tr>
<tr>
<td>Ecstasy</td>
<td>213,400</td>
<td>26,656</td>
<td>1.3%</td>
<td>30,215</td>
<td>1.7%</td>
</tr>
<tr>
<td>Opioids</td>
<td>120,008</td>
<td>8,472</td>
<td>1.2%</td>
<td>7,071</td>
<td>3.0%</td>
</tr>
<tr>
<td>Prescription</td>
<td>111,531</td>
<td>11,828</td>
<td>1.0%</td>
<td>29,366</td>
<td>1.8%</td>
</tr>
<tr>
<td>Psychedelics</td>
<td>171,884</td>
<td>23,937</td>
<td>0.8%</td>
<td>28,435</td>
<td>1.5%</td>
</tr>
<tr>
<td>Stimulants</td>
<td>338,414</td>
<td>19,772</td>
<td>2.0%</td>
<td>35,939</td>
<td>2.3%</td>
</tr>
</tbody>
</table>

As a result, some have been seized and shut down. Others have undertaken exit scams and run off with the money they were holding (in Bitcoins often running into millions of pounds). Thus, the market has become characterised by platform (and seller) entry and exit. It is interesting to consider whether this has had a deterrent effect on potential buyers and sellers.

An examination of what happens to the online drugs market when large platforms exit suggests no evidence of deterrence. In fact, the markets seem to bounce back rapidly and get bigger as sellers migrate quickly to different sites and continue to ply their trade online.

Our research has looked at three specific cases: the well-known seizure of the original Silk Road, the shutdown of its successor Silk Road 2.0 by law enforcement agencies, and the exit scam by the then market leader, Evolution. There is no evidence that these large scale exits deterred buyers or sellers from continuing to engage in online drugs sales and purchases, with new platforms rapidly arising to replace those taken down.

Very recently – in July 2017 – the then market leader AlphaBay was taken down, along with another relatively large platform, Hansa. But again, despite widespread media coverage, this also seems not to have reduced sellers’ appetite for selling drugs online as new sites rapidly expanded in terms of drugs listings following the shutdown. Table 2 reproduces data showing this for four out of five platforms in the week at the end of July 2017 after AlphaBay and Hansa were seized.

So despite high turnover of the platforms that host the buyers and sellers of drugs, the online drugs market seems resilient. As with legal online markets, illegal online markets are substituting for offline economic activity (street transactions in the case of drugs) as buyers and sellers increasingly operate online: a trend that seems unlikely to end any time soon. Thus, it seems that the role of law enforcement in the ‘war on drugs’ may need to be one of devoting more resources and finding better means to tackle drug buying and selling in the cyber domain.

**Sellers that do receive bad ratings typically experience significant sales reductions**

<table>
<thead>
<tr>
<th>Platform</th>
<th>24 July 2017</th>
<th>31 July 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dream Market</td>
<td>95,026</td>
<td>98,844</td>
</tr>
<tr>
<td>TradeRoute</td>
<td>14,914</td>
<td>17,816</td>
</tr>
<tr>
<td>Tochka</td>
<td>1,719</td>
<td>2,390</td>
</tr>
<tr>
<td>Wall Street Market</td>
<td>1,653</td>
<td>2,216</td>
</tr>
<tr>
<td>Rs Club Market</td>
<td>2,327</td>
<td>1,689</td>
</tr>
</tbody>
</table>

**Notes:** Numbers from Cyberint research, as reported on BBC website, 1 August 2017: [http://www.bbc.co.uk/news/technology-40788266](http://www.bbc.co.uk/news/technology-40788266).

In the ‘war on drugs’, law enforcement needs more resources and better means to tackle drug buying and selling in the cyber domain.
Where top science gets done

The Diamond Light Source synchrotron in Oxfordshire is the largest single investment in basic research infrastructure in modern UK history. Christian Helmers and Henry Overman examine its impact on the geographical distribution of related scientific output.

Big scientific research facilities like the UK’s Diamond Light Source benefit scientists located nearby significantly more than scientists located further away. According to our research, the highly localised effects of scientific infrastructure on research productivity extend even to scientists that do not rely on the facilities directly for their work.

Since scientific facilities often cannot be distributed across multiple locations, our findings suggest that the decision on where to locate a facility has important consequences. Large-scale facilities have the power to create new and highly concentrated geographical clusters of scientific research as well as to reinforce existing clusters.

We examine the impact of the Diamond Light Source, a third generation synchrotron (a circular particle accelerator), which represents the largest single investment in basic research infrastructure in the modern history of the UK.
Quantifying the impact of large-scale scientific infrastructure is generally difficult because the location for the investment is not chosen at random. Instead, policymakers, just like private companies, strategically place investments in a way that maximises locational benefits – in the case of Diamond, building the facility in an existing scientific hub: the Harwell Science and Innovation Campus at the Rutherford Appleton Laboratory near Oxford.

This then poses the research challenge of how to separate effects from the existing cluster from any additional effects created by the new facility. We overcome this difficulty by capitalising on the controversy that existed in 1998 about where the Diamond Light Source should be sited – and, in particular, the existence of a ‘runner-up’ location at the Daresbury Science and Innovation Campus in Cheshire.

The government initially planned to build the new facility at Daresbury, which was also home to Diamond’s predecessor, the Synchrotron Radiation Source. Effective lobbying led to a change of heart – and a final decision in 2000 to locate the new facility at Harwell. This sparked fierce controversy because of the longstanding debate on the North-South divide in investment in scientific research in the UK.

We analyse how scientific research in the form of journal publications was affected by Diamond’s opening in January 2007. Comparison of papers produced by researchers near Diamond to those near Daresbury shows that output from researchers in direct proximity to the synchrotron increased more than it would have done if the facility had been located elsewhere.

We find that scientists located within a 25 kilometre radius of Diamond produced around 11% more scientific articles over the 2000-2010 period as a result of their geographical proximity to the facility. This is the combined result of two effects, one direct and one indirect.

The direct effect results simply from ease of access for nearby researchers who use the synchrotron. The indirect effect is perhaps more surprising: there is also an increase in scientific papers even when that research made no direct use of Diamond. The explanation is that these indirect effects arise as a result of the localised knowledge spillovers that occur when researchers learn from each other, for example, through personal contact.

Both the direct and indirect effects are mainly driven by an increase in the number of scientists working in geographical proximity to the facility. The results indicate that the increase comes from new scientists rather than the relocation of existing scientists.

In the case of the Diamond, locating the particle accelerator close to Oxford reinforced the scientific strength of the so-called ‘Golden Triangle’ of London, Oxford and Cambridge.

Because clusters tend to create self-reinforcing feedback loops that attract more private and public investment, the results of our study are likely to underestimate the long-run impact of the synchrotron on the geographical location of scientific research in the UK.


Christian Helmers is at Santa Clara University

Henry Overman is professor of economic geography at LSE and director of the What Works Centre for Local Economic Growth.
The UK’s stamp duty land tax raises substantial revenues for the government, but as research by Christian Hilber and Teemu Lyytikäinen shows, it exerts powerful constraints on household mobility. They explain how replacing stamp duty with better-designed local taxes could help to alleviate the country’s crisis of housing affordability.

Stamp duty, mobility and the UK housing crisis

Stamp duty – a tax to be paid on the transfer of certain legal documents – has a long history in England. It was first introduced in 1694 to help finance a war against France. Although initially conceived as a temporary solution, the tax was so successful in raising revenue that it eventually evolved into a permanent form of UK taxation.

While in recent decades global competition has reduced the scope of stamp duty on trading of financial assets, stamp duty on transactions of land and property is today more significant than ever. UK revenue from the stamp duty land tax (SDLT) has almost tripled over the last eight years: from £2.9 billion in 2008/09 to £8.6 billion in 2016/17.

The SDLT (commonly referred to as ‘stamp duty’) has long been criticised by economists as being inefficient. The central case against its use is that it hampers household mobility. The 2011 Mirrlees Review neatly summarises the key argument:

‘By discouraging mutually beneficial transactions, stamp duty ensures that properties are not held by the people who value them most. It creates a disincentive for people to move house, thereby leading to potential inflexibilities in the labour market and encouraging people to live […] in properties of a size and in a location that they may well not otherwise have chosen.’

There are some prior studies documenting a negative effect of stamp duty on housing transactions and mobility, but to date we know little about the nature of affected moves. Specifically, there is no evidence of the relative importance of the SDLT for the functioning of housing and labour markets. In our research, we provide some answers by exploring the impact of the SDLT on different types of mobility.

Before 2014, stamp duty bore the
The reform removed the discontinuities in the tax liability and the bunching of transactions just below the old thresholds. But it did not substantially alter the overall tax burdens, somewhat lowering them at the bottom end and increasing them at the top end of the price distribution. Thus, the tax-induced disincentive to move remained.

Figure 1 illustrates our research design and key results. We use data from the British Household Panel Survey (BHPS) to analyse how the two percentage points increase in the SDLT affects the mobility of homeowners. The BHPS includes homeowners’ own estimates of the value of their home. When we plot mobility rates in house value bins around £250,000 in Panel A of Figure 1, we find a clearly visible reduction in the rate of mobility when the self-assessed house value exceeds £250,000 and the tax rate rises from 1% to 3%.

The BHPS also contains information on the distance of moves and the main reasons for moving. When we split moves by distance of move (shorter versus longer than 10 kilometres – Panels B and C of Figure 1), we find a large effect on short moves but no effect on long moves. The SDLT appears to prevent moves to a more suitable dwelling locally but has little impact on long-distance relocation.

A similar picture emerges when we divide moves into three groups based on survey responses regarding the main reasons for moving (Panels D, E and F of Figure 1). The SDLT affects housing and area-related moves but has little effect on job-related or major life event–related mobility.

We should note that job-motivated mobility is overall very rare among owner-occupiers. Nevertheless, all in all, our findings strongly suggest that stamp duty jams the housing market by preventing households from moving to more suitable dwellings locally but has little impact on long-distance relocation.
Figure 1: What happens to mobility when stamp duty increases from 1% to 3%?
homes, but its effect on relocation of the labour force appears to be quite limited.

A potential explanation for the differential effects is that when moving to a more suitable house locally – say, one bedroom more or less – the benefits of moving often exceed the costs only by a narrow margin. Therefore even a small increase in the tax wedge can prevent a large fraction of moves. Longer, often job-related, moves – say, a great job opportunity in another city – imply that there are large benefits from moving and in turn that the SDLT burden may not be pivotal in most cases.

Our analysis suggests that abolishing the SDLT (or replacing it with an annual tax on the value of land or property) may do little to improve the spatial mismatch of job opportunities and workers. But it could greatly reduce the allocative mismatch in the housing market via increasing the likelihood of a match between elderly households willing to downsize and young families seeking to expand their housing consumption.

We do not claim that abolishing the SDLT could solve the housing affordability crisis. The latter is caused largely by a flawed planning system: see, for example, Cheshire (2014) for the central argument, and Hilber and Vermeulen (2016) for estimates of the effects of regulatory constraints on house prices. But abolishing the SDLT could help to alleviate the crisis by putting existing housing stock into more efficient use.

The potential caveat of our research design is that people with a higher underlying propensity to move could select into the lower tax group. This could bias our results. It is comforting that we do not find discontinuities in household characteristics linked to the propensity to move. Our results are also robust to dropping data very close to the £250,000 threshold where sorting could be likely to occur. These checks suggest that our research design is valid.

The main scholarly contribution of our study is the analysis of the differential impacts of the SDLT on different types of mobility. Yet from a policy perspective, the sheer magnitude of the impact of the SDLT on mobility is also of great importance. Our estimates come with substantial uncertainty. But taken at face value they imply that the overall effect is very substantial: our central estimate suggests that a two percentage points increase in stamp duty from 1% to 3% reduces household mobility by almost 40%.

Considering the entire distribution of self-assessed house values in our sample in 2007, our central estimate implies that abolishing (or replacing) stamp duty could have increased mobility of homeowners by around 27% (from 5.1 to 6.5 percentage points per annum). Since 2007, house prices have risen substantially in the UK and the system was reformed in 2014. While the former increased the stamp duty burden, the latter reduced it for the majority of homeowners. Overall, the adverse impact of the SDLT on mobility may be of a similar magnitude.

Our empirical findings suggest that stamp duty induces substantial misallocation of dwellings. This imposes a hefty welfare loss on society as a whole. We can quantify the welfare loss relative to the additional tax revenue generated by stamp duty with the help of some simple calculations. These are based on the observation that for a transaction to take place, the valuation of the buyer has to exceed the valuation of the seller at least by the amount of the tax liability.

Therefore, we can assume that each transaction prevented by the tax rate hike from 1% to 3% destroys the welfare of the trading partners by somewhere between a similar 1% and 3% of the price at the time. At the same time, each prevented transaction depresses tax revenue. Our calculations suggest that the welfare loss associated with the tax rate hike from 1% to 3% is massive, possibly above 80% of the revenue increase.

The same amount of revenue could be collected with little or no welfare losses through an annual tax on the value of property, or even better, an annual tax on the value of land. In contrast to the SDLT, these taxes do not discourage mutually beneficial transactions.

In fact, if designed as local taxes, they would have the additional benefit of providing genuine fiscal incentives to local authorities (and their residents) to release more land for residential development. This would help gradually to solve the housing affordability crisis that cripples the prospects of the younger generations, particularly in the most productive parts of the country.
What roles do work, employment and joblessness play in shaping our happiness? **Jan-Emmanuel De Neve** and **George Ward** summarise global evidence from the *World Happiness Report* on which elements of people’s working lives drive their reported job satisfaction, engagement at work and overall wellbeing.

### Happiness at work

Since most of us spend much of our lives working, it is inevitable that work plays a key role in shaping our levels of happiness. In a chapter of the *World Happiness Report 2017* – which is published annually to coincide with the United Nations’ International Day of Happiness – we look more closely at the relationship between work and happiness.

We draw largely on the Gallup World Poll, which has been surveying people in over 150 countries around the world since 2006. These efforts allow us to analyse data from hundreds of thousands of individuals across the globe and investigate the ways in which elements of people’s working lives drive their wellbeing.

Subjective wellbeing – often loosely referred to as happiness – can be measured along multiple dimensions. We look primarily at how people evaluate the quality of their lives overall, something Gallup measures according to the Cantril Ladder, an 11-point scale where the top step is your best possible life and the bottom step is your worst possible life. Gallup then asks respondents to indicate which step they’re currently on.

We look at this rating, and also investigate the extent to which people experience positive and negative affective states, such as enjoyment, stress and worry, in their day-to-day lives, as well as analysing responses to more workplace-specific measures, such as job satisfaction and employee engagement.

### Which jobs are happiest?

Eleven broad job types are recorded in the Gallup World Poll. The categories cover many kinds of jobs, including being a business owner, office worker or manager, and working in farming, construction, mining or transport. Which groups of workers are generally happier?

The first thing we notice is that people working in blue-collar jobs report lower levels of overall happiness in every region around the world. This is the case across a variety of labour-intensive industries, such as construction, mining, manufacturing, transport, farming, fishing and forestry.

People around the world who categorise themselves as a manager, an executive, an official or a professional worker evaluate the quality of their lives at a little over 6 out of 10, whereas people working in farming, fishing or forestry evaluate their lives around 4.5 out of 10 on average.

This picture is true not only for overall life evaluation but also for the specific, day-to-day emotional experiences of workers. White-collar workers generally report experiencing more positive emotional states, such as smiling, laughing and enjoyment, and fewer negative feelings, such as worry, stress, sadness and anger.

These descriptive statistics represent the raw differences in happiness across job types. Of course, there are likely to be many things that differ across people working in these diverse fields that could potentially be driving these happiness differentials. Perhaps surprisingly, much of the picture remains similar even once we adjust our estimates to take account of differences in income and education, as well as a number of other demographic variables, such as age, gender and marital status.

It is more difficult to generalise about happiness associated with self-employment since this appears to have a multi-faceted relationship with wellbeing. When we look at global averages, we see that being self-employed is generally associated with lower levels of happiness compared with being a full-time employee. But follow-up analysis indicates that this very much depends on the region of the world and the measure of subjective wellbeing used.

---

**Work-life balance is a particularly strong predictor of people’s happiness**
In most developed countries, being self-employed is associated both with higher overall life evaluation and with more negative daily emotions, such as stress and worry. For anyone who owns a business, it will be no surprise that being self-employed can be both rewarding and stressful.

**Being unemployed is miserable**

One of the most robust findings in the economics of happiness is that unemployment is highly damaging for people's wellbeing. We find that this is true around the world. The employed evaluate the quality of their lives much more highly on average compared with the unemployed. Individuals who are unemployed also report around 30% more negative emotional experiences in their day-to-day lives.

The importance of having a job entails more than just salary. A large body of research shows that the non-monetary aspects of employment are also key drivers of people's wellbeing. Social status, social relations, daily structure and goals all exert a strong influence on people's happiness.

Not only are the unemployed generally unhappier than those in work, but we also find that people generally do not adapt over time to becoming unemployed unlike their responses to many other negative shocks. What's more, spells of unemployment also seem to have a 'scarring' effect on people's wellbeing, even after regaining employment.

The experience of joblessness can be devastating to the individual in question, but it also affects those around them. Family and friends of the unemployed are typically affected, of course, but the spillover effects go even further. High levels of unemployment typically heighten people's sense of job insecurity, and negatively affect the happiness even of those who are still in employment.

High degrees of job satisfaction can hide low levels of engagement at work
Happiness helps to shape job market outcomes, productivity and firm performance

Job satisfaction around the world
What about wellbeing measures specific to the workplace, such as job satisfaction? The Gallup World Poll asks respondents a yes/no question as to whether they are satisfied with their jobs. The percentage of respondents who report being ‘satisfied’ (as opposed to ‘dissatisfied’) is higher in countries across North and South America, Europe, Australia and New Zealand.

Specifically, Austria takes the top spot with 95% of respondents reporting being satisfied with their jobs. Austria is followed closely by Norway and Iceland. We see a moderate correlation between job satisfaction responses and life evaluation for individuals in the Gallup World Poll.

To find out why some societies seem to generate greater job satisfaction than others, we turn to more fine-grained data from the European Social Survey. This provides more information on job quality by revealing particular workplace characteristics related to employee happiness. As might be expected, people in well-paying jobs are happier and more satisfied with their lives and their jobs, but a number of other aspects of people’s jobs are also strongly predictive of varied measures of happiness.

Work-life balance emerges as a particularly strong predictor. Other factors include job variety and the need to learn new things, as well as the level of individual autonomy that employees enjoy.

Moreover, job security and social capital (as measured through the support received from fellow workers) are also positively correlated with happiness, while jobs that involve risks to health and safety are generally associated with lower levels of wellbeing. We suspect that countries that rank high in terms of job satisfaction provide better quality jobs by catering to these non-pecuniary job characteristics.

Engagement at work
The Gallup World Poll also asks whether individuals feel ‘actively engaged’, ‘not engaged’ or ‘actively disengaged’ in their jobs. In contrast to the relatively high job satisfaction numbers, these data paint a much bleaker picture. The number of people saying they are actively engaged is typically under 20%, and around 10% in Western Europe and much lower again in East Asia.

The difference in the global results between job satisfaction and employee engagement may partially be attributable to measurement issues. But it also has to do with the fact that both concepts measure different aspects of happiness at work. Job satisfaction can perhaps be reduced to feeling content with one’s job, but the notion of active employee engagement requires individuals to be positively absorbed by their work and committed to advancing their employer’s interests. Increased employee engagement thus represents a more difficult hurdle to clear.

Although we focus here on the role of work and employment in shaping people’s happiness, it is worth noting that the relationship between happiness and employment is a complex and dynamic interaction that runs in both directions. Indeed, a growing body of research shows that work and employment are not only drivers of people’s happiness, but that happiness can itself help to shape job market outcomes, productivity and even firm performance.


Jan-Emmanuel De Neve, associate professor of economics and strategy at the Said Business School, University of Oxford, is an associate editor of the World Happiness Report.

George Ward is a PhD student at the Institute for Work and Employment Research, MIT Sloan School of Management.

Both are research associates in CEP’s wellbeing programme.

People in blue-collar jobs report lower happiness everywhere in the world
in brief...

Brexit: the impact on prices

In the wake of last year’s referendum, what has been happening to consumer prices and real wages in the UK? Josh De Lyon, Swati Dhingra and Stephen Machin have collated and analysed data on price inflation before and after the vote to study whether there is any empirical connection between Brexit and consumer prices.

Both before and after the UK’s referendum on membership of the European Union (EU) in June 2016, a number of research reports have estimated the likely economic impact of Brexit (see, for example, Dhingra et al, 2017a, 2017b). Typically, these studies have either been based on theoretical modelling or, if they drew on data, they have only used information from before the vote.

Now, however, some post-referendum data are available. Here, we report early results from our research on the evolution of consumer prices in the UK in the wake of the vote. We also show how the observed price changes are affecting trends in real wages.

We find that price inflation in the UK has risen relative to Eurozone economies in the period following the referendum.

In turn, this has caused annual real wage growth once again to become negative.

The pattern of significantly higher price inflation is shown in Figure 1. This plots the annual consumer price index (CPI) before and after the Brexit vote, comparing the UK with what has happened in the 19 Eurozone countries. To a large extent, the CPI growth rates of both the UK and Eurozone move together, with both being driven by worldwide commodity prices.

The index is a cumulated annual index and so only shows the full effect of the referendum from May 2017, when it is no longer diluted by pre-referendum data. Taking this into account, the spike observed shortly after the referendum is significant. It is likely to have been driven by the devaluation of sterling, which occurred immediately after the referendum result.

The full effect is indicated by the divergence of CPI annual growth rates between the UK and the Eurozone a year after the referendum. This divergence in consumer price inflation partly reverses the convergence in price changes that occurred in the single market, when price dispersion of tradable goods started to converge to levels seen across US cities by the mid-1990s (Rogers, 2001).

Following the referendum, there has been a significant rise in consumer prices, particularly food prices

Figure 1: Consumer price inflation trends pre- and post-Brexit vote

Figure 2: Food consumer price inflation trends pre- and post-Brexit vote
For certain commodity groups, the increase in the CPI growth rate has been more pronounced. Figure 2 presents the annual growth rate of CPI where the sample of goods and services is restricted to food. There is a distinct and substantial rise in the rate of CPI food inflation for the UK relative to the Eurozone.

The divergence that immediately followed the referendum is quite a bit larger than that observed for all goods in Figure 1, and becomes larger when amplified over time. This has important implications for how the vote has affected the purchasing power of different income groups. Low-income households spend a higher proportion of their income on food than rich households.

The UK experienced several years of real wage falls following the financial crisis of 2007/08, but in the period before the referendum, real wage growth in the UK had become positive (see Blanchflower and Machin, 2016; Blanchflower et al, 2017). This arose because of very low inflation, not because of any strength in nominal wage growth (which seems to have become stuck at a norm of 2% per year since the start of the decade).

But the increase in prices following the Brexit vote coupled with no significant rise in nominal wages has again caused real wage growth to become negative. This is shown in Figure 3, which indicates that the real wages squeeze is back because of the post-referendum price increases.

By the end of our data period, the price increases following the referendum have now fully appeared in the annual index. It seems that the Brexit vote has caused a one-off rise in prices, and that the annual growth rate of prices will begin to fall out of the index once it no longer includes the months that immediately followed the referendum.

Overall, this research points to a significant rise in prices occurring after the EU referendum. Future work that builds on these initial findings will quantify the role of the devaluation of sterling by focusing closely on price changes for imported goods and services.

Josh De Lyon is a research assistant in CEP’s trade programme. Swati Dhingra is assistant professor of economics at LSE and a research associate in CEP’s trade programme. Stephen Machin is director of CEP.

Further reading


Recent research has challenged the consensus that sudden inflows of refugees have little or no impact on natives’ wages and employment, claiming instead that there are uniformly large detrimental effects on natives without school qualifications. Michael Clemens and Jennifer Hunt demonstrate the flaws in this analysis: the labour market impact of immigration is small even on natives with low skill levels.

The labour market impact of refugee waves
The recent surge in migration to Europe has brought renewed attention to research on the labour market effects of sudden major inflows of refugees and a reassessment of the findings of four particularly influential studies:

- Card (1990), who finds that a large inflow of Cubans to Miami in 1980 did not affect natives’ wages or unemployment.
- Hunt (1992), who finds that a large flow of refugees from post-independence Algeria to France caused a small increase in native unemployment.
- Friedberg (2001), who finds that a large inflow of post-Soviet Jews to Israel 1990-94 did not reduce natives’ wages.
- And Angrist and Kugler (2003), who find that a surge of Balkan refugees during the 1990s was associated with higher native unemployment across 18 European countries, but who do not interpret the association as causal because it is unstable and statistically insignificant.

Two recent studies have challenged these results by re-analysing all four of the refugee waves. The researchers claim that earlier work obscured uniformly large detrimental effects from all four waves, either by aggregating the affected workers with unaffected workers (Borjas, 2017), through inadequate identification of causality (Borjas and Monras, 2017) or both.

Our latest study reconsiders the published research on refugee inflows to reconcile the new results with the old ones. We show that for all four refugee waves, the methods used in the recent re-analyses are subject to substantial bias.

Correcting these biases largely eliminates disagreement between the new and old findings. Corrected methods offer strong evidence of small detrimental effects in France in 1962 and no clear evidence of detrimental effects in 1980s Miami, 1990s Israel or 1990s Europe.

**Blunt instruments**

The new research on these refugee waves uses ‘instrumental variables’ to separate correlation from causation – and this is its biggest problem. The simple association between natives’ labour market outcomes and migrant inflows across regions or occupations could arise not from migrants’ effects but from their choice of where to go. Migrants are likely to choose high-wage areas or occupations, which could mask any negative causal effect they have on native wages. The new research tries to account for this by using prior migration flows as an instrumental variable. This tests the effects of migration that was determined by prior immigration patterns – the instrumental variable – rather than recent economic changes.

But there is a problem when the instrumental variable (in this case, past migration per population) and the variable affected by migrants’ choice of location or occupation (current migration per population) have the same denominator (Bazzi and Clemens, 2013). The instrumental variable strategy only works when the two variables are strongly correlated, but any two variables will be strongly correlated if they share the same divisor.

Indeed, even random noise will be correlated with a variable of economic interest if both are divided by the same quantity. If such a random ‘placebo’ instrument gives similar results in any instrumental variables study, it implies that the original instrument was doing little work to separate correlation from causation.

We show that repeating the Borjas and Monras (2017) re-analysis of refugee waves with a placebo instrument – random noise divided by population – gives similar results to the original studies. In most cases, the results are actually stronger using this meaningless placebo: the estimates of detrimental effects on natives are a bit larger and more statistically significant.

Kronmal (1993) suggests a simple correction to address this problem: rather
than divide past migrant flows and current migration flows by population, use past migrant flows by itself as an instrument for current migrant flows by itself, while controlling for population. When we make this correction, none of the results in Borjas and Monras differs substantially from the original studies of Miami, France, Israel and Europe.

The impact of the Mariel boatlift

In re-analysis of one of the four episodes, the 1980 wave of Cubans into Miami known as the ‘Mariel boatlift’, a special problem arises. Although Borjas and Monras (2017) agree with Card (1990) that the boatlift did not affect native workers’ unemployment, Borjas (2017) argues that Card’s analysis missed large detrimental effects on wages.

Card’s analysis aggregated all workers with high school education or less, finding no wage effects. Borjas separates out male non-Hispanic workers with less than high school education, and finds a very large and robust fall in average wages for that group in Miami relative to the same group in comparison cities after 1980.

Our study points out a previously unreported problem with the method used by Borjas (2017). His result is highly sensitive to selecting different subsets of workers to study (Peri and Yasenov, 2017), but the mechanism for this has been unclear.

Among the sub-samples of non-Hispanic men with less than high school education that Borjas studies, the fraction that were black is sharply higher after the boatlift than before it in Miami, but not in the comparison cities. This could not have been caused by the arrival in Miami of the Cubans themselves, since the sample excludes Hispanics. It is likely to reflect the large and simultaneous arrival of low-income Haitians with less than high school education (who cannot be separated from US workers in the data), and contemporaneous efforts by the Census Bureau to improve its coverage of low-income black men.

Because Haitian blacks earned much less than US blacks, and US black men earned much less than non-black men at this education level, this compositional change would mechanically cause a large, spurious fall in the average wage in the sample. It is enough to explain the entire post-boatlift fall in wages observed by Borjas (2017).

When estimates of the impact of the boatlift are adjusted to account for the change in the racial composition of the sample, and when the effect of race on wages is allowed to differ by city, the effect that Borjas finds is attenuated by more than 50%, and its statistical significance becomes fragile to the choice of dataset and choice of control cities.

A further adjustment recognising that the effect of race on wages differs by education level reduces the effect further to statistical insignificance. The corrected analysis cannot rule out a wage effect of minus 2% to minus 8% relative to the Borjas control cities – much smaller than the minus 45% effect measured by Borjas in the corresponding regressions – but they cannot rule out a zero effect either.

Conclusion

The evidence from refugee waves shows detrimental short-term effects on native workers’ labour market outcomes in some times and places but no effect in others. It supports the existing consensus that the impact of immigration on average native-born workers is small and does not support claims of large detrimental impacts on workers with less than high school education.


Michael Clemens is at the Center for Global Development. Jennifer Hunt of Rutgers University has been a visiting academic at CEP in 2017.

Further reading


CEP PUBLICATIONS

CEP publications are available as electronic copies free to download from the Centre’s website: http://cep.lse.ac.uk/_new/publications/default.asp

CEP DISCUSSION PAPER

HEALTHY BUSINESS? MANAGERIAL EDUCATION AND MANAGEMENT IN HEALTHCARE
Nicholas Bloom, Renata Lemos, Raffaella Sadun and John Van Reenen
CEP Discussion Paper No. 1500
September 2017

ROBOT ARITHMETIC: CAN NEW TECHNOLOGY HARM ALL WORKERS OR THE AVERAGE WORKER?
Francesco Caselli and Alan Manning
CEP Discussion Paper No. 1497
September 2017

ARE IDEAS GETTING HARDER TO FIND?
Nicholas Bloom, Charles Jones, John Van Reenen and Michael Webb
CEP Discussion Paper No. 1496
September 2017

CAN RAISING INSTRUCTIONAL TIME CROWD OUT STUDENT PRO-SOCIAL BEHAVIOUR? UNINTENDED CONSEQUENCES OF A GERMAN HIGH SCHOOL REFORM
Christian Krekel
CEP Discussion Paper No. 1495
August 2017

GOODS AND FACTOR MARKET INTEGRATION: A QUANTITATIVE ASSESSMENT OF THE EU ENLARGEMENT
Lorenzo Caliendo, Luca David Opreomolla, Fernando Parro and Alessandro Sforza
CEP Discussion Paper No. 1494
August 2017

ARE IDEAS GETTING HARDER TO FIND?
Nicholas Bloom, Charles Jones, John Van Reenen and Michael Webb
CEP Discussion Paper No. 1496
September 2017

THE LONG-LASTING EFFECTS OF FAMILY AND CHILDHOOD ON ADULT WELLBEING: EVIDENCE FROM BRITISH COHORT DATA
Andrew Clark, Sarah Flèche and Warn Lekfuangfu
CEP Discussion Paper No. 1493
July 2017

CEP BREXIT ANALYSIS SERIES

THE LOCAL ECONOMIC EFFECTS OF BREXIT
Swati Dhingra, Stephen Machin and Henry Overman
CEP Brexit Analysis Paper No. 10
July 2017

CEP SPECIAL REPORTS

BREXIT AND THE FUTURE OF GLOBALIZATION?
John Van Reenen
CEP Special Paper No. 35
September 2017

INDUSTRY IN BRITAIN – AN ATLAS
Sandra Bernick, Richard Davies and Anna Valero
CEP Special Paper No. 34
September 2017

CEP BLOGS

CEP REAL WAGES UPDATES blog posts:
http://cep.lse.ac.uk/_new/publications/series.asp?prog=CEPRWU

CEP BREXIT blog posts:
http://cep.lse.ac.uk/BREXIT/blogs.asp

THE STATE OF WORKING BRITAIN
http://stateofworkingbritain.blogspot.co.uk