The Skills Gap: Is it a myth?

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SUMMARY

- Almost 60% of employers believe there is a skills gap. Policy is focused in particular on raising the supply of STEM skills.
- The skills gap is hugely significant in economic and individual terms. It may account for about a third of the increase in the unemployment rate in the US in the Great Recession.
- There are three possible reasons why the gap persists: workers do not adjust to changes in skills demand by acquiring the skills they need to find a job; firms do not adjust to changes in skills supply by creating jobs that utilise the skills that are available in the labour market; or wages do not reflect skills shortages by creating incentives for workers to acquire scarce skills or abandon occupations where wages are falling due to an abundance of skills.
- The analysis presented in this paper – based on US data - suggests that the most important of these reasons is that wages do not reflect skills shortages. Wages fail to go up for skills that are scarce; and fail to fall for skills that are abundant.
- The implication is that an increased emphasis on scarce skills in schools, colleges and universities will not help to reduce the skills gap. Students have a choice about what skills they acquire, and whether they use these skills on the labour market. As long as wages do not reward certain skills, they will either chose not to acquire these skills, or even if they do, they will find employment in other occupations.
- The analysis described here has not (yet) been able to identify the underlying frictions that prevent wages from reflecting skills shortages and thus closing the skills gap. But it does suggest that the next time that an employer tells you about the skills gap, you should ask why they do not raise wages for the type of workers that are hard to find.

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THE SKILLS GAP: IS IT A MYTH?

INTRODUCTION

Concern is growing in advanced economies, and in particular in the UK, about the 'skills gap': the 'growing gulf between the skills workers possess today and the skills businesses say they need' (Economist Intelligence Unit 2014). The concerns are often focused on shortages of workers with skills in the science, technology, engineering and maths (STEM) subjects (OECD 2015), but increasingly also on 'soft skills' like problem solving, team working and communication (EUI 2015). Almost 60% of employers believe there is a skills gap in Britain (YouGov 2013).

In the public debate, it is often taken for granted that the skills gap is a supply problem. The Education Secretary, Nicky Morgan, has for instance made a commitment 'to raise the status of STEM subjects, and increase the number of students studying maths and physics at A level by 50% within 3 years.'

I argue that this view is incorrect. My research shows that the choices that individuals are making regarding their field of study and occupation, are optimal given considerations of employability and remuneration. This analysis, which is based on US data, shows that the source of labour market mismatch is that market wages do not reflect the relative demand for different types of skills. Businesses complain about the lack of workers with STEM skills, but at the same time they are unwilling to raise wages for these workers (or to reduce wages for workers with skills that are in less demand).

WHAT IS THE SKILLS GAP?

The term 'skills gap' is a somewhat loosely defined term, used mostly in the media for a situation in which the skills that available workers have are different from the skills that firms look for in workers. In other words: firms do not find the type of workers that they are trying to hire. The academic literature tends to refer to this situation as skills mismatch rather than a skills gap. The two terms basically mean the same thing, but the term skills mismatch emphasises that the skills gap is (probably) not due to an absolute shortage of skills, but to differences in the skills that are supplied and demanded. In other words, the problem is not that workers do not have skills. The problem is that the skills they have are not the skills employers want. In this note, I will use the terms 'skills gap' and 'skills mismatch', as well as 'labour market mismatch', interchangeably.

Skills mismatch has two related but distinct macroeconomic effects: lower productivity; and unemployment. Lower productivity comes about because workers accept jobs that they are not really qualified for. This again has two sides: over- or underqualification (or vertical mismatch), and horizontal mismatch (also called field-of-study mismatch). Over- and underqualification refers to a situation, in which workers have the right type of skills, but not in the right amounts. An example of an overqualified worker is a doctor

who works as a nurse, or a linguist who teaches basic Spanish to tourists. An example of underqualification is a computer programmer, who does not know the programming language she is meant to be coding in. Horizontal mismatch refers to a situation, in which workers have the right level of skills, but not the right type (or not in the right field). Here, think of a physicist who works in an investment bank, or a linguist (with a bachelor's degree) who works as a project manager in a manufacturing firm (a job that requires a bachelor's degree, but a business degree would be more appropriate for). As the examples illustrate, the distinction between vertical and horizontal skills mismatch is not always clear.

It is difficult to assess the effect of labour market mismatch on aggregate productivity. Some recent studies show that the effect of skills mismatch on wages is high and persistent (Montt 2015, Guvenen et al. 2015). A related literature on physical capital shows very large effects from the misallocation of capital across firms, which may be responsible for a productivity differential of up to 60% between India and the US and up to 50% between China and the US, according to estimates by Hsieh and Klenow (2009). Skills mismatch is a misallocation of human capital across firms, and we might thus expect its effects on productivity to be equally large.

In this note, I focus on skills mismatch as a cause of unemployment. Mismatch leads to unemployment if the skills demanded by firms and the skills that workers have are sufficiently far apart that a match cannot be formed and the worker is not hired. There will be unemployed workers looking for jobs and firms with vacant positions looking for workers at the same time, because the worker and vacancies are 'not right' for each other. Clearly, unemployment carries with it huge economics and personal costs. Understanding the effect of skills mismatch on unemployment is therefore relevant for policy. Moreover, since unemployment and productivity are closely linked as two effects of the same mismatch problem, it is likely that what we learn about skills mismatch from unemployment will carry over to productivity and vice versa.

IS THERE ANY SKILLS MISMATCH?

It is very difficult, if not impossible, to directly measure the skills possessed by the workforce. Skills is a multi-dimensional concept, which includes the amount and quality of education, field of study, experience in this and previous jobs, soft skills like problem solving, team working and communication, and perhaps even personality traits. Some skills are general, or transferrable between jobs, others are specific or transfer only partially. Skills in some tasks can easily be substituted with machines or computers, others cannot or may even be complementary with technology. With the exception of educational attainment, very little data is available for any of these components of skill.[1]

One way to quantify the amount of skills mismatch is to measure dispersion in labour market conditions across occupations, industries or geographic areas. This is the approach taken by most of the macroeconomics literature, because it allows researchers to quantify the effect of mismatch on macroeconomic outcomes like unemployment.[2] The idea is that, if there are jobs in some occupations, and unemployed workers in others, then we should see big differences in the ratio of vacancies over unemployment across occupations. With some (uncontroversial) assumptions of the technology of matching vacancies to workers, we can then ask the question how much

lower the unemployment rate would be if – hypothetically, of course – we were to reallocate unemployed workers to those occupations where they are most likely to find jobs.

Using this approach, Şahin et al. (2014) find that mismatch across industries and occupations explains about 1.5 percentage points or one third of the increase in unemployment in the US in the Great Recession from 4.6% in 2006 to 10% in 2009.[3] These findings, which were confirmed in subsequent work by Barnichon and Figura (2013) and myself (Herz and van Rens 2015), make clear that skills mismatch is hugely relevant for policy: if we were able to completely eliminate the skills gap, we might expect the unemployment rate to drop by as much as one third.

IS THIS A NEW PROBLEM?

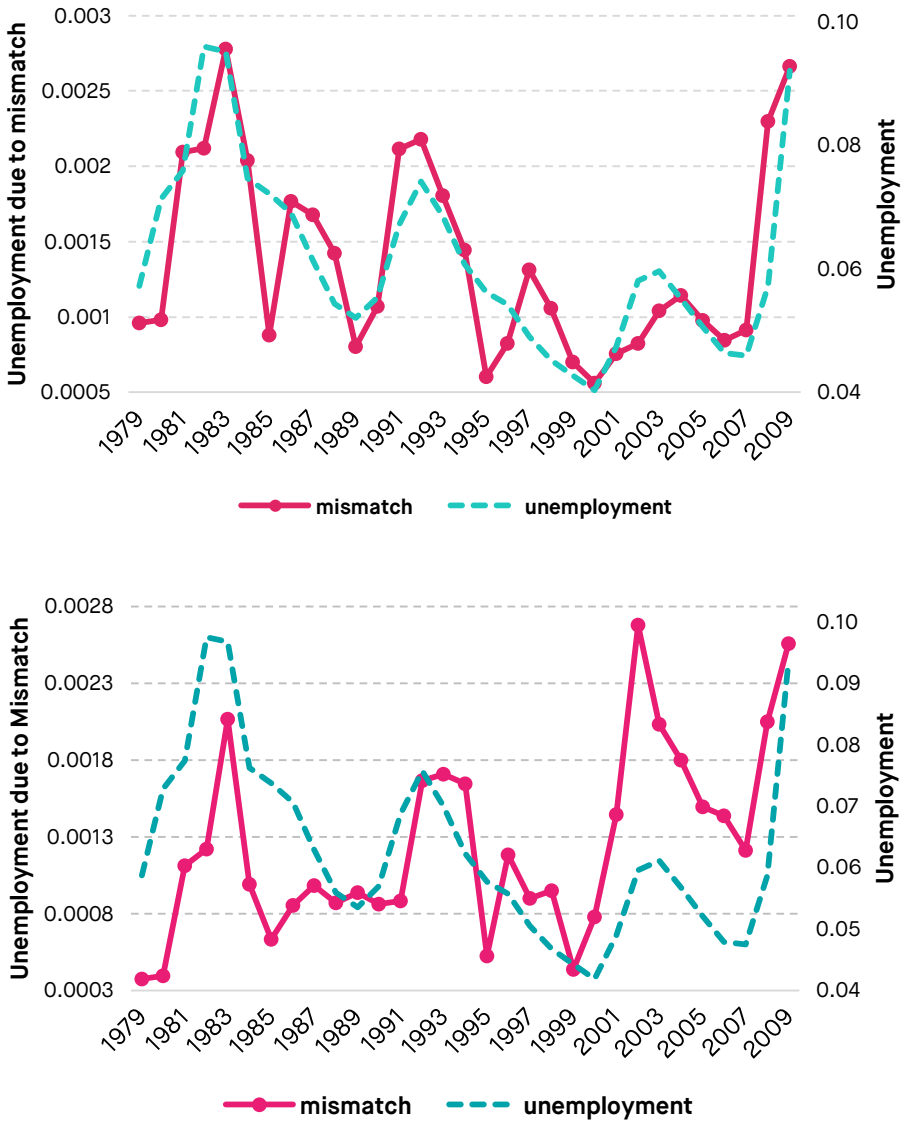
The US debate on labour market mismatch initially centred on the premise that the increase in skills mismatch was a structural change in the labour market. In the wake of the Great Recession, this view was advocated most prominently by Narayana Kocherlakota (2010), the president of the Federal Reserve Bank of Minneapolis, who argued that 'it is hard to see how the Fed can do much to cure this problem. Monetary stimulus has provided conditions so that manufacturing plants want to hire new workers. But the Fed does not have a means to transform construction workers into manufacturing workers.' Early critics included Krugman (2010), DeLong (2010), Lazear and Spletzer (2012), and Peter Diamond (2011), who notes in his Nobel lecture that 'there is a long history of claims that the latest technological or structural developments make for a new long-term high level of unemployment, but these have repeatedly been proven wrong.' (p.1065). Kocherlakota later publicly changed his view in light of the evidence (New York Times of 27 January 2014).

In order to explore to what extent the rise in skills mismatch in the Great Recession was an unprecedented event, we constructed a long time series for mismatch unemployment. To do this, we needed to slightly modify the approach in Şahin et al. (2014), because the data on vacancies they use start only in 2005. We used dispersion in job finding rates as a measure of labour market mismatch instead of dispersion in vacancy-unemployment ratios. Theoretically, the link between the vacancy-unemployment ratio and the job finding rate in an occupation, industry or geographic area is very tight and uncontroversial. And because data for job finding rates can be constructed from as far back as 1979, this enabled us to get estimates for a much longer period.[4]

Our estimates for the evolution of mismatch unemployment in the US are shown in Figure 1. The first graph shows unemployment due to mismatch across geographic areas (states), the second graph shows unemployment due to skills mismatch, which we operationalise as mismatch across industries.[5] For comparison, the dash-dotted line in both graphs shows the actual unemployment rate. As is quite clear from these graphs, skills mismatch increased not only in the Great Recession, but mismatch tends to be high whenever the unemployment rate is high. There is no evidence for a secular trend or structural increase in mismatch since 1979. The comovement with the unemployment rate is in fact quite striking, suggesting that there is a mechanical link between the two

concepts, perhaps because both fluctuate due to the same aggregate shocks, or because skills mismatch is an important determinant of the unemployment rate.

Figure 1: US Unemployment due to mismatch across states and industries



The graph on the top shows unemployment due to mismatch across states, the graph on the bottom due to mismatch across industries in the US. The dash-dot line in both graphs shows the unemployment rate over the same period for comparison. Mismatch tends to be high whenever unemployment is high, and there is no evidence for a secular trend or structural change in mismatch since 1979. Source: Herz and van Rens (2015).

We conclude that skills mismatch is not a new phenomenon, but a recurrent problem that surfaces in recessions. This result is not inconsistent with observation that there was an outward shift in the Beveridge curve, the negatively sloped relation between vacancies and unemployment, which indicates a decline in aggregate matching efficiency and provides much of the basis for the argument that there was an unprecedented increase in mismatch in the Great Recession (Elsby et al. 2010). While an increase in mismatch indeed reduces matching efficiency, there are many other causes for shifts in the Beveridge curve as well, including changes in the separation rate and

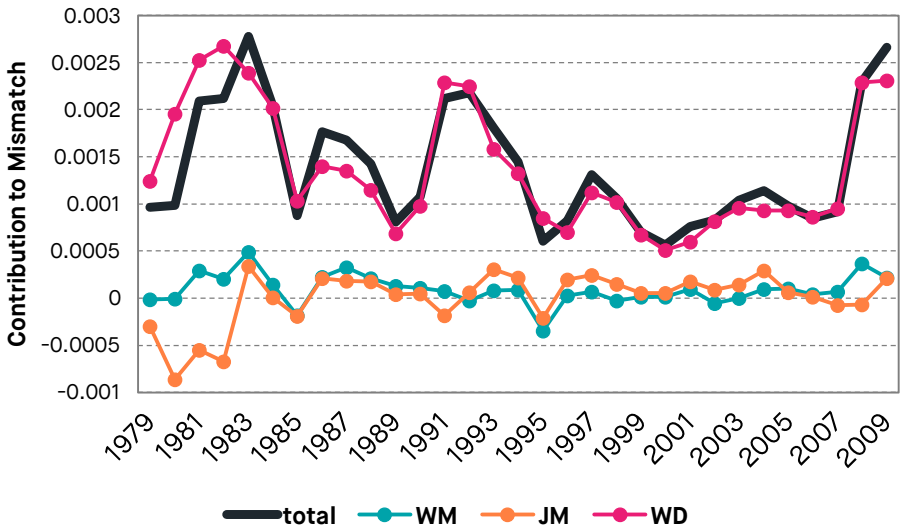
demographics. Controlling for these factors, the remaining role for mismatch is very small, as shown by Barnichon and Figura (2010).

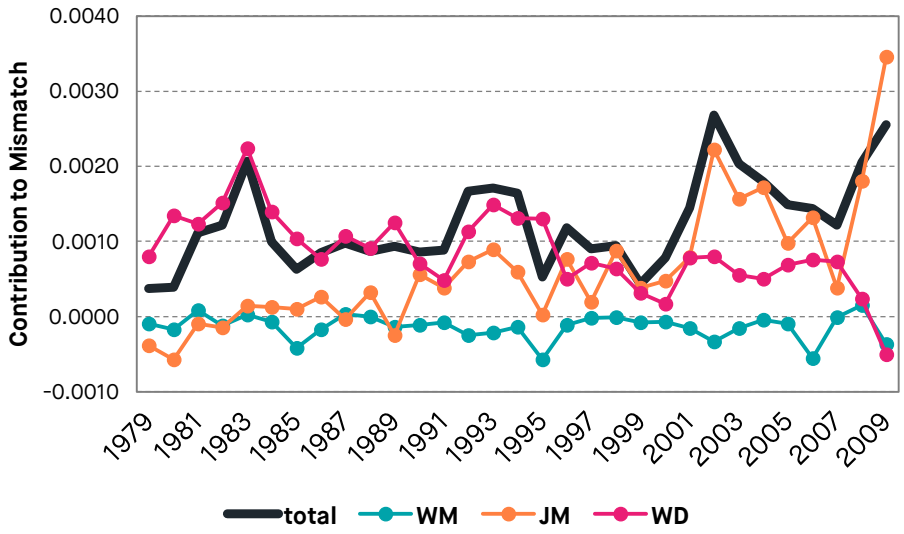
WHY DOES SKILLS MISMATCH ARISE?

It should not be surprising that a certain amount of labour market mismatch arises now and then. All kinds of unexpected events affect different occupations differently: the development of computers increased the demand for programming skills and reduced the demand for bank tellers; a recession reduces the demand for luxury car engineers more than the demand for bakers; new nutritional insights could reduce the demand for butchers and increase the demand for vegetarian cooks; a fad may have resulted in an excessive number of graduates in communication studies; etc. The more pertinent question is how mismatch can persist. Why does the labour market not adjust, reallocating workers so that changing demands for skills across occupations are met? Answering this question is the main contribution of my work with Dr Benedikt Herz, currently at the European Commission.

The labour market can adjust to skills mismatch in two ways. The workforce may respond to changes in the demand for skills, or firms may respond to changes in the supply of skills. For one or both of these adjustment channels to operate effectively, wages must reflect supply and demand conditions for skills across occupations. Thus, there are three possible reasons why mismatch persists: workers do not adjust to changes in skills demand, firms do not adjust to changes in skills supply, or wages do not reflect skills shortages. Figure 2 shows the decomposition of US unemployment due to mismatch into these three sources. It is clear from these graphs that the most important source of skills mismatch is wage setting. Before discussing these results in more detail, I will first explain how we obtained these estimates.

Figure 2: US Unemployment due to mismatch across states and industries





The graph on the top shows the decomposition of mismatch across states, the bottom graph of mismatch across industries in the US. The thick black line is overall mismatch across states and industries, respectively. The blue line with diamonds shows the contribution of worker mobility frictions (WM), the red line with squares the contribution of job mobility frictions (JM), and the green line with circles the contribution of wages setting frictions (WD). Source: Herz and van Rens (2015).

To explain our methodology, I describe in more details the three sources of labour market mismatch, and in each case discuss how we may learn from the data whether it is an important source of mismatch. Then, I explain how we put everything together to decompose mismatch unemployment into the three sources. The idea behind the decomposition is summarised in Figure 3.

Figure 3: Why does labour market mismatch arise?

Potential source of mismatch #3:

Wage setting frictions prevent wages going up (and therefore profits going down) for skills that are scarce, or going down (profits up) for skills that are abundant

Potential source of mismatch #1:

Worker mobility frictions prevent workers from looking for the jobs where their skills command the highest wage

Wages earned by workers after they are hired

Profits made by firms after they hire a worker

Potential source of mismatch #2:

Job mobility frictions prevent firms from recruiting for skills that will generate the highest profits

Potential sources of mismatch

Job finding rate faced by unemployed workers

Job filling rate faced by firms with vacant positions

Determined by the ratio of vacancies over unemployed: high v/u means high job finding, low job filling rate, and vice versa

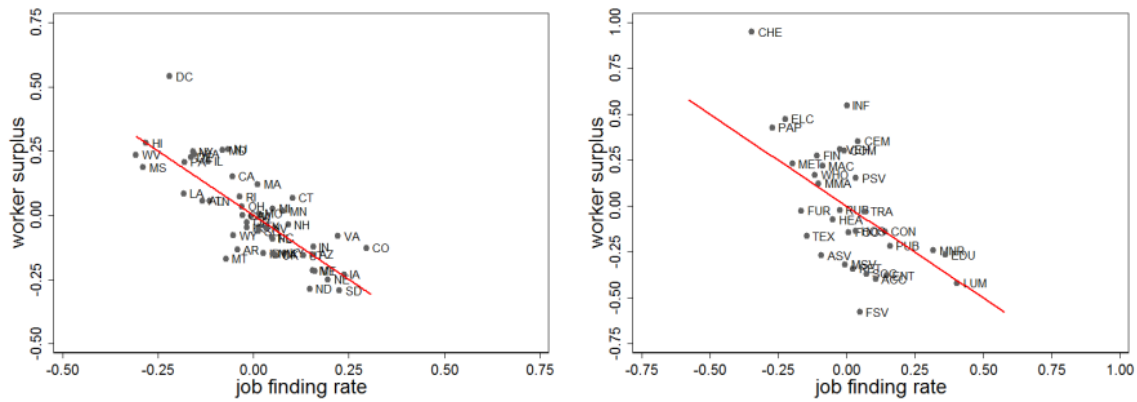
DO WORKERS ADJUST TO CHANGES IN SKILL DEMAND?

Imagine you are a typist looking for work in the 1980s. Computers are becoming more commonplace and word processing applications are replacing the typewriter. Thus, some of your skills are rapidly becoming obsolete. However, this does not mean you will not find a job. First, you may take a computer course and find a job working with a word processor. Second, even if you do not, others might, leaving their jobs as typists and moving on to (perhaps better paying) jobs in word processing, leaving the remaining typist jobs open to you. Third, as long as typist jobs are not disappearing too rapidly, you may be able to find a job replacing another typist who retired, until at some point you retire yourself. This last scenario assumes no (or at least fewer) new typists are entering the labour market, presumably because younger workers are already familiar with word processing. In all three scenarios, the workforce adjusts to a change in skill demand, without generating unemployment due to mismatch. If these adjustment channels operate insufficiently fast, then some increased unemployment is the result. We refer to this source of mismatch unemployment as worker mobility frictions.

How can we see whether there are mobility frictions in the data? If workers are not able or willing to adjust to changes in skill demand, then there must be some jobs which require skills that insufficient workers possess (say, word processing jobs), that are easy to find and at the same time offer high wages; and other jobs which require skills that are abundant (typists) and that are hard to come by even though wages are not particularly high.

If instead the workforce adjusts, i.e. in the absence of worker mobility frictions, there may still be differences in job finding rates, but it must be that jobs that are hard to find compensate for that by offering high wages, and vice versa jobs that are easy to find offer lower wages, so that workers have no incentives to change the jobs they look for. Since both job finding rates and wages are observable, we can estimate the degree to which worker mobility frictions prevent the workforce from adjusting. The data for both job finding rates and wages come from the Current Population Survey, the US labour force survey.

Figure 4: Do workers adjust to changes in skill demand?



The graph on the left shows the dispersion in job finding rates and wages across states, the graph on the right across industries in the US. Worker surplus (on the vertical axis) is the net present value of wages a worker can expect to earn on average when starting a job in a particular state or industry. The red line represents the

relation between job finding rates and worker surplus we would expect to see in the absence of worker mobility frictions. Source: Herz and van Rens (2015).

Figure 4 shows the correlation between how hard it is to find a job and how well jobs pay, for an arbitrarily chosen year (2005). There is substantial variation across states and industries in how easy it is to find a job, and in this particular year, the probability to find a job in West Virginia (WV) and Mississippi (MS) was more than 25% below the US average, whereas in Colorado (CO) that probability was more than 25% above average.

Similarly, workers looking for jobs in paper products manufacturing (PAP) were 25% less likely to be successful than the average, whereas workers looking for jobs in educational services (EDU) and lumber and wood production (LUM) were almost 40% more likely to find one. However, there were also very good reasons why workers did not move from West Virginia to Colorado, and why paper workers did not retrain to work in lumber production: wages in West Virginia and paper production were above average high, by 25 and 50% respectively, whereas wages in Colorado and lumber production were substantially below the national average.

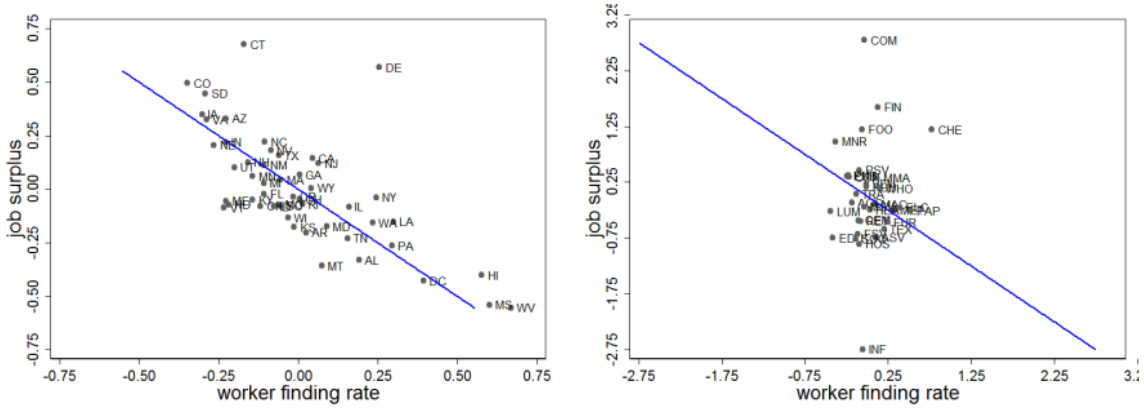
Comparing the observed correlation between job finding rates and wages across states and industries with the perfect negative correlation we would expect to see in the absence of worker mobility frictions (represented by the red line in the graphs), it is clear that the observed correlation is close to, and certainly not systematically different from, the benchmark of perfect worker mobility.[6] This explains why the estimated contribution of worker mobility frictions to mismatch unemployment in Figure 2 is so small.

DO FIRMS ADJUST TO CHANGES IN SKILL SUPPLY?

Returning to the example of the disappearing typist jobs, even if the workforce were unable to adjust, there may be no mismatch and no resulting unemployment if firms make the adjustment instead. Firms could adjust in (at least) two ways. First, they could keep some typist positions open, even although typists are less productive than word processors, taking advantage of the fact that typing skills are more abundant and therefore cheaper than word processing skills. Second, recognising that word processing skills are not (yet) very common among available workers they could hire typists, and train them in word processing. If this adjustment does not take place or takes place insufficiently, we refer to this as job mobility frictions.

The contribution of job mobility frictions to skills mismatch is observable using a very similar approach to the estimate of worker mobility frictions. In the absence of job mobility frictions, we would expect jobs that are hard to fill to be very attractive to firms, whereas less attractive positions should be easier to fill. The measure for how attractive it is to the firm to fill a position is the profits that a worker doing that job will generate. Profits depend both on the productivity of the worker and (negatively) on her wage. We use data on profits from the National Income and Product Accounts.

Figure 5. Do firms adjust to changes in skill supply?



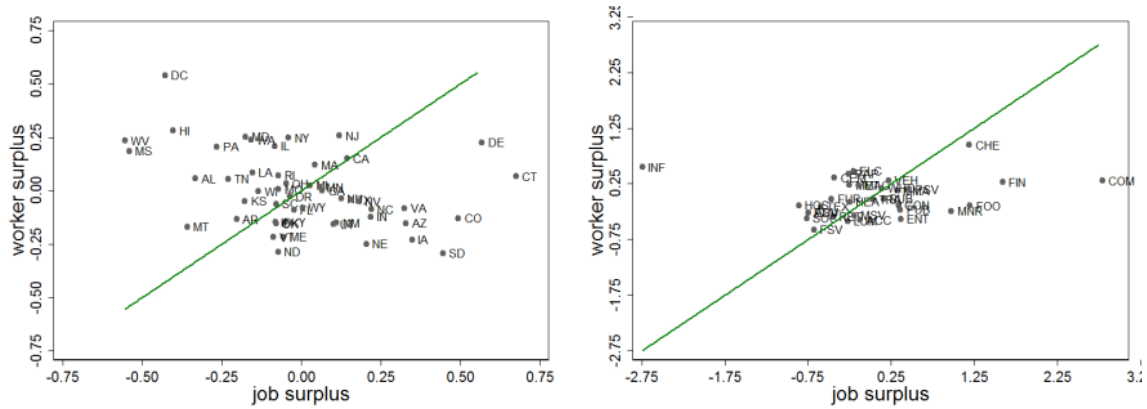
The graph on the left shows the dispersion in worker finding rates (job filling rates) and profits across states, the graph on the right across industries in the US. Job surplus (on the vertical axis) is the net present value of profits a firm can expect to earn on average when filling a job in a particular state or industry. The blue line represents the relation between worker finding rates and job surplus we would expect to see in the absence of job mobility frictions. Source: Herz and van Rens (2015).

Across states, more profitable jobs tend to be harder to fill, with the correlation being very close to the benchmark of perfect job mobility, as Figure 5 shows. Across industries, the picture is less clear. The very large differences in worker profitability between e.g. financial services (FIN, 200% above the average in 2005) and hospitals (HOS, 75% below average) are not compensated by differences in job filling rates. From Figure 2, we see that job mobility frictions in fact explain a large part of mismatch unemployment in 2005.

DO WAGES ADJUST TO EQUATE DEMAND AND SUPPLY?

Worker and job mobility only helps to eliminate skills mismatch if wages accurately reflect shortages or abundance of skills, as illustrated in Figure 3. The reason is that workers will choose to move into occupations that pay high wages, whereas firms will open positions that are profitable to them. If a particular set of skills is particularly productive, let's call it STEM skills, but the wage does not go up to reflect this higher productivity, then it is not surprising that workers do not acquire more STEM skills. Since they do not reap any of the benefits of the resulting increase in their productivity, there is no reason for them to do so. On the other hand, for firms the low wage makes it extra attractive to hire workers with STEM skills: not only are they very productive, they are cheap too. Thus, firms will open lots of vacancies for STEM positions, but will then find that it is very difficult to fill these. This is the third potential source of mismatch, and the one that we find to be the most important one.

Figure 6. Do wages reflect skills shortages?



The graph on the left shows the dispersion in job surplus and worker surplus across states, the graph on the right across industries in the US. Job surplus is the net present value of profits a firm can expect to earn on average when filling a job in a particular state or industry. Worker surplus is the net present value of wages a worker can expect to earn on average when starting a job in that state or industry. The green line represents the relation between job and worker surplus we would expect to see in the absence of wage setting frictions. Source: Herz and van Rens (2015).

Wages accurately reflect the demand for and supply of skills, if the contribution of a worker with a particular skill set to the firm is shared between firm and worker, in proportions that are the same across skills. This guarantees that those skills that firms are interested in hiring are the same skills that workers are interested in acquiring. If there are deviations from this 'surplus sharing' condition, represented by the green line in Figure 6, we refer to these as wage setting frictions. As is clear from the figure, wage setting frictions are important, both across states and across industries. In fact, if anything the correlation between wages and profits seems to be negative, indicating that the skills that firms are interested in hiring are exactly those skills that workers are not remunerated for.

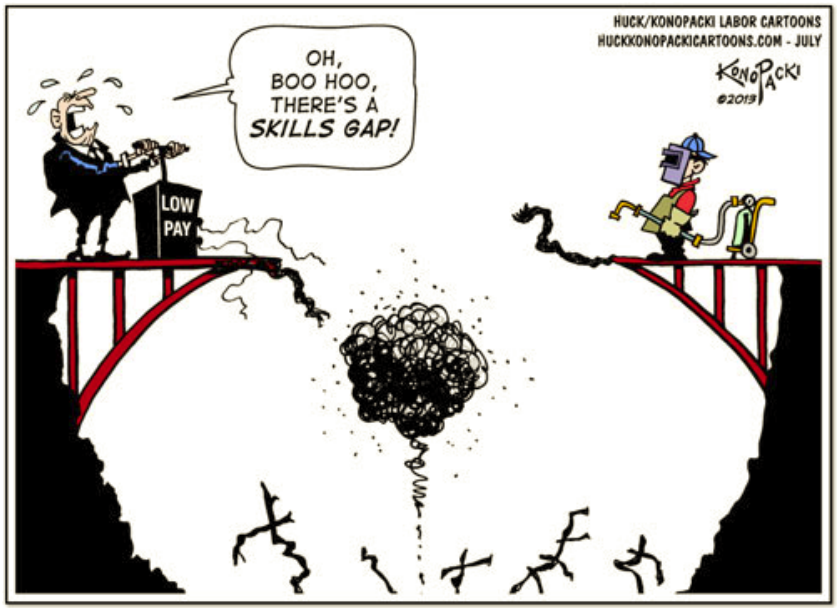
Putting the findings in Figures 4, 5 and 6 together gives the decomposition shown in figure 2. In the absence of worker mobility frictions, job mobility frictions and wage setting frictions, there is no dispersion in job finding rates, and therefore no unemployment due to mismatch. Our estimate for overall mismatch unemployment is simply the difference between the actual unemployment rate and the counterfactual unemployment rate that would prevail if there were no dispersion in job finding rates. The decomposition is obtained by calculating the counterfactual job finding rates in all industries or states, replacing the observed relations in Figures 4, 5 or 6 with the benchmark relation in those figures. The difference between the overall mismatch unemployment rate and the counterfactual mismatch unemployment is the contribution of deviations from that benchmark relation, i.e. the contribution of one source of mismatch, to unemployment.

WAGES DO NOT REFLECT SKILLS SHORTAGES

On the basis of this analysis therefore, the main reason that skills mismatch persists in the US labour market, is that wages do not adjust in response to differences between demand and supply of skills, as can be seen from Figure 2. One could argue, therefore, that there is no skills gap, see e.g. Cappelli (2012). This is largely a semantic issue, and there certainly is a mismatch between the skills possessed by workers and those demanded by firms. However, this finding does raise the question why firms do not adjust wages in response to perceived skill shortages.

Businesses complain about the lack of, for instance, workers with STEM skills, but at the same time they are unwilling to raise wages for these workers. The irony in this situation is nicely illustrated by the cartoon in Figure 7. The worker on the right-hand side of the gap is a welder. Welding is a skill that is, or at least was at the time this cartoon was drawn, in short supply. The employer on the left-hand is complaining about a skills gap, whereas it was him that generated the gap by offering low pay to welders. Could it be that employers and their representatives who are pushing for a solution to the 'skills gap' are in fact lobbying to keep their wage costs down?

Figure 7. Wages do not reflect skills shortages



Source: David Groves, www.thestand.org, 18 June 2013. The cartoon accompanied an online article about an editorial in the New York Times of 15 June 2013 on Peter Cappelli's (2012) provocative book about the skills gap.

Is it possible that businesses are willing to raise wages, but unable to do so? One argument along these lines that is often offered is that a firm would not be competitive anymore if it were to raise wages for scarce skills. This argument fails to convince. If all businesses in an industry experience difficulties hiring a particular skill, a firm that would raise wages for that skill above the going rate would not only attract sufficient applicants, but could potentially choose the best workers, luring them away from their competitors. It would seem that such a move would make the firm more, not less,

competitive. However, it is hard to take a more definitive stance on this topic without understanding the reasons for why wages do not adjust.

HOW SHOULD WE REFORM THE EDUCATION SYSTEM?

Returning to the policy question raised for example by the Education Secretary, I argue that reform of the education system is not needed nor desired, at least not in order to close the skills gap. The strongest result in Figure 2 is that worker mobility frictions do not at all contribute to labour market mismatch. This result is very robust and has not been contradicted by any other academic study of which I am aware. In fact, some other researchers have reached similar conclusions, based on very different approaches (Cappelli 2012, Chevalier 2015). Nevertheless, almost all of the proposed solutions to the skills gap, treat it as a problem of the education system.[7] The phrase 'If it ain't broke, don't fix it' comes to mind. These interventions, which are expensive, are unlikely to be effective.

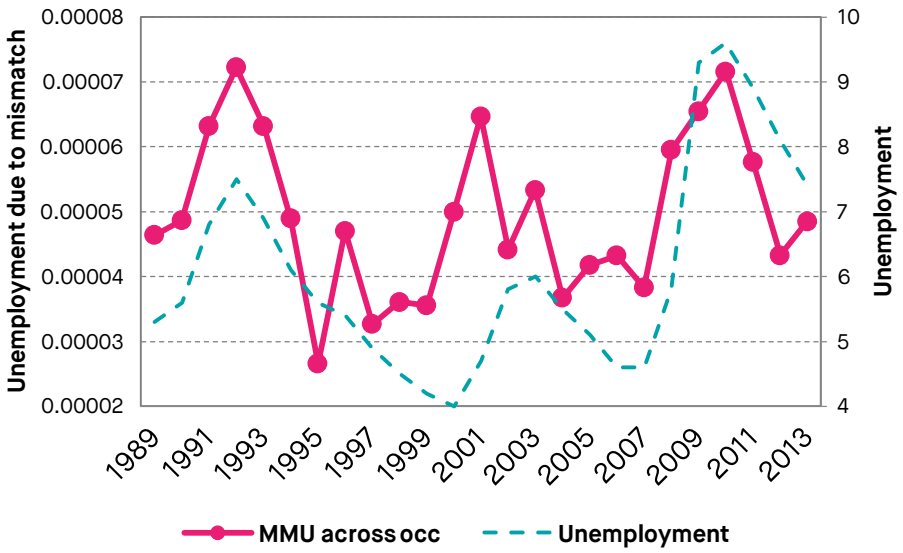
Why will increased emphasis on scarce skills in schools and universities not help to reduce skills mismatch? The reason is simply that students have a choice about what skills they acquire in school or college, and whether they use these skills on the labour market. As long as wages do not reward certain skills, they will either chose not to acquire these skills, or even if they do, they will find employment in other occupations. The most obvious example of this problem is the STEM gap. While firms complain about a shortage of qualified physicists and engineers on the labour market, a very large number of graduates in these fields work in the financial sector, where they use only a subset of their STEM skills. Encouraging universities to educate more physicists and engineer will not make any difference if these graduates look for jobs in investment banks.

MISMATCH ACROSS OCCUPATIONS

The facts about skills mismatch discussed so far are largely based on mismatch across industries. One might argue that industries are a poor proxy for skills, especially because the data we use are fairly aggregate by nature (33 broad industries). Ideally, we would use detailed occupations for the analysis instead but, for a complete analysis of the causes of mismatch, the necessary data are not available at this level. The main problem is that profits are not available by occupations, whereas we need these data to distinguish the role of job mobility frictions from wage setting frictions. However, we can still estimate the contribution of worker mobility frictions.

Figure 8, which is taken from preliminary work with Dr. Eriş Dereli of the University of Marmara, shows unemployment in the US due to mismatch across almost 400 detailed (4-digit) occupational categories. The evolution of occupational mismatch over time looks very similar to the evolution of mismatch across industries (see Figure 1), although the cyclical pattern is a bit less pronounced. Calculating the contribution of worker mobility frictions across occupations confirms our earlier conclusion that these frictions are basically irrelevant as a source of mismatch unemployment.

Figure 8. US Mismatch unemployment due to occupational mobility



The solid line (labelled 'MMU across occ') in the graph shows the evolution over time of unemployment due to mismatch across 4-digit occupations in the US; the dashed line shows the actual unemployment rate for comparison. The evolution of occupational mismatch over time looks very similar to the evolution of mismatch across industries Source: Eriş Dereli and van Rens (2015).

It seems that workers are not moving out of occupations, in which it is hard to find jobs, into other occupations, where that is easier, presumably in pursuit of scarce high-paying jobs. This result has far reaching policy implications. Policies aimed at encouraging workers to retrain, as advocated by Larry Katz (2010) in his testimony to US Congress, are not just ineffective, they may actually be counterproductive, enabling more workers to chase high-paying jobs, thus making them less available for lower-wage, but easier to find jobs.

CONCLUSION

The research described here has not (yet) been able to identify the underlying frictions that prevent wages from reflecting skills shortages and closing the skills gap. The positive policy recommendations of this work are therefore limited.

However, sometimes it is just as important to know what we don't know, as what we do know. The vast majority of proposed solutions to the problem of skills mismatch are reforms of schools or universities that are unlikely to be effective and may even be counterproductive. Many of these measures are costly to the Treasury, and policy makers need to be aware that the information they receive from business leaders may be inspired by self-interest rather than a thorough analysis of the problem. The next time an employer tells you about the skills gap, ask her why she does not raise wages for the type of workers that are hard to find.

The research described in this note is not a call to do nothing. The skills gap is a large problem, and if there is any policy intervention that can reduce it, the resulting reduction in unemployment alone will be very beneficial, not even mentioning the increase in

productivity, which is likely to happen as well. However, before undertaking costly policy interventions, we must at least have reasons to believe they may be effective.

From a researcher's perspective, two main things are currently missing in the literature. First, there is virtually no information on the macroeconomic effects of skills mismatch for countries other than the US. Second, there is insufficient research into the reasons why wages do not reflect relative labour market conditions across occupations or skills. I plan to address both of these issues by undertaking a large-scale empirical analysis aimed at improved policymaking in the UK and other European countries, as well as improving our theoretical understanding of productivity and unemployment. There are good reasons to believe European labour markets are quite different from the US. In particular, worker mobility is much lower, and social welfare systems are more generous, possibly making workers more reluctant to accept jobs that are not a good match for their skills set. I also hope to be able to shed light on the question of whether European labour market integration has led to any changes in skills mismatch both within and across countries.

ENDNOTES

[1] Some specialised datasets have better measures of skill, but cover only a small subset of the workforce, e.g. the US National Survey of College Graduates and the UK Graduate Careers Survey. Other datasets have broader coverage but provide information for a small sample over a short time span, e.g. the OECD Survey of Adult Skills (PIAAC), the World Bank STEP Skills Measurement Program, and the Cedefop European Skills and Jobs survey.

[2] An alternative is, for instance, to take the wage premium in different occupations as a measure of the shortage of the skills that that occupation requires, see e.g. Altonji et al. (2015) and Chevalier (2015). However, since the demand for skills is determined more by relative than absolute wages, it is not clear how one would extract the aggregate effects from these estimates.

[3] Şahin et al. (2014) also find that labour market mismatch across geographic regions is quantitatively almost irrelevant compared to skills mismatch. The finding is confirmed and extended by Marinescu and Rathelot (2014), who argue that the estimates in Şahin et al. may still be too high because workers may look for jobs not only where they live but also in surrounding areas. Marinescu and Rathelot also show that the contribution of geographic mismatch is small not only for changes in unemployment rate, but also for the level of unemployment.

[4] For the period post 2002, our estimates look very similar to those in Şahin et al. (2014).

[5] Mismatch across industries is of course an imperfect measure of skills mismatch, especially because for reasons of sample size, we work at a fairly high level of aggregation (33 industries). However, below I will discuss some additional evidence that the results are very similar if we use detailed occupational categories instead.

[6] To be precise, these graphs show the job finding rate in relative deviations from the average, and the expected net present value of wages, also in relative deviations. In the absence of worker mobility frictions, a no-arbitrage condition states that the product of the job finding rate and the expected net present value of wage must be constant, and therefore the correlation between these two variables in relative deviations must equal minus one.

[7] As an example, Altonji et al. (2015) list initiatives in the US to increase STEM skill production in 2010. These included freezing tuition for STEM majors in Florida, and offering free tuition for good students in STEM in public universities in New York.

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