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Apprentice pay in Britain, Germany and Switzerland: institutions, market forces, market power

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Abstract

Although trainee pay is central to the economics of work-based training, institutionalists have paid it little attention, while economists typically assume that it is set by market clearing. We document large differences in the pay of metalworking apprentices in three countries: relative to the pay of skilled employees, it is high in Britain, middling in Germany, and low in Switzerland. Combining fieldwork evidence with national survey data, we associate apprentice pay with both institutional attributes and market forces: specifically, with trade union presence and goals, employer organisation, the contractual status of apprentices, the supply of eligible and interested young people, and public subsidies. Apprentice pay appears to have fallen in Britain and Germany as bargaining coverage has declined.

Keywords: Apprenticeship training, pay structure, trade unions, employers' associations, collective bargaining, training contracts, young workers, public subsidy

JEL Classifications: J24, J31, J41, J42, J51

Introduction[1]

Trainee pay plays a central role in the economics of training, dividing the costs of work-based training between the employer and the trainee. Economists typically assume that it is set competitively, by clearing the market for training places. Some models allow a role for trade unions, which are seen as raising trainee pay. Institutionalists have paid little attention to trainee pay despite its potential importance in national systems of skill formation.

We consider apprenticeship training for skilled manual occupations in metalworking industry in Britain, Germany and Switzerland – countries in which apprentice pay, standardised by skilled pay, is high, middling, and low, respectively. Apprentice pay is widely set by collective bargaining in Germany, but not in Switzerland or Britain. Employer organisation is much less extensive in Britain than in the other two countries. We analyse the extent to which pay outcomes can be attributed to such institutional attributes, and also to market forces.

Evidence is taken from both national statistics and on-site interviews with managers in 24 matched establishments in metalworking industry, spread evenly across the countries. We first discuss the importance of trainee pay, then present the context and methods of the research, followed by the evidence on pay outcomes, and finally analyse the causes of inter-country differences in apprentice pay.

We find that pay differences are generated by five factors, including both institutional attributes and market forces: union presence and goals, employer organisation and power, the contractual status of apprentices, the age and supply of potential trainees, and the scale and manner of public training subsidy. The evidence suggests: that trade unions, as in Germany, do not invariably seek, let alone attain, high pay for trainees; that low bargaining coverage, as

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in Britain, need not lead to low trainee pay when youth supply is inadequate and public subsidies go direct to employers; but that low bargaining coverage combined with the coordination of pay setting by employers' associations, as in Switzerland, can cause low trainee pay. It seems also that the decline of bargaining coverage in Britain and Germany has reduced the relative pay of apprentices, albeit with differences in timing and extent.

Trainee pay and the economics of training

In canonical human capital theory, the pay of trainees is determined by the volume and type of skill they learn, with market forces as the enforcer. If perfect competition in all markets is assumed, trainee pay adjusts so as to allocate the entire cost of training to the trainee – because any investment the firm made in its trainees' skills would have to be recouped by underpaying skilled workers, thereby creating an incentive to them to quit, which would deny the firm any return on its investment. For a costly skill, trainee pay is therefore low, and the costs of training fall on the trainee as foregone earnings (Becker 1964).

Becker's theory faces an anomaly: firms frequently bear costs for work-based training, by paying trainees more than the value of their net output during training, even when the resulting skills are valued by many other employers. Some economists therefore assume that labour market frictions – notably, the cost to skilled workers of finding and moving to another job – create market (monopsony) power for the training employer, by limiting competition for its ex-trainees. The firm can then pay skilled workers less than the value of their output, allowing it to share the cost of training – i.e., pay its trainees more than under perfect competition – without fearing too large a reduction of the return on its investment (Stevens 1994; Acemoglu and Pischke 1999).

A little noticed feature of these models is that, although employers are assumed to have market power over skilled labour, the market for training places is typically assumed perfectly competitive (Stevens 1999; Leuven 2005). Alternatively, some models assume an exogenous, supra-competitive wage floor for trainees, created by trade unions, which are

assumed to seek higher relative pay for trainees, as part of egalitarian wage policy (Acemoglu and Pischke 1999).[2]

The assumption of monopsonistic competition for skilled workers combined with either perfect competition or a wage floor for trainees is potentially restrictive. First, trade unions might be expected to bargain up skilled pay too, and indeed more strongly than trainee pay, in which case unionism would be associated with lower, not higher, relative pay for trainees. Second, the employer may enjoy buyer power in markets for training places, not just those for skilled workers, in which case it can offer low trainee pay and pursue 'production-oriented' training, using trainees to reduce current production costs (as cheap labour) rather than to increase future skills supply, as under 'investment-oriented' training (Backes-Gellner and Mohrenweiser 2010; Wolter and Ryan 2011).

If trainee pay is central to the economics of training, it is typically neglected in the political economy of skills and training. Institutionalist debates concerning skill formation in national 'varieties of capitalism' rarely consider trainee pay, notwithstanding widespread interest both in the incentives that underpin institutional functioning and in complementarities between training systems and other institutions, including corporate ownership and employment protection law (Busemeyer and Trampusch 2012). The exceptions concern trade unions' training-related goals, apprentice organisation and militancy, and the distinctiveness of the apprenticeship contract (Streeck et al. 1987: 23; Thelen 1991, 2004; Garonna and Ryan 1991; Marsden and Ryan 1991a; Ryan 2010).

Finally, trainee pay has attracted policy interest. Calls for cuts in apprentice pay to increase training have featured in both Britain and Germany (Wagner 1999; Woessmann 2004; Steedman 2008). In Britain, the Youth Training Scheme of the 1980s was developed in the name of lower trainee pay and more training (Marsden and Ryan, 1991b). The German government has promoted Alliances for Work and Training, encouraging employers to offer more training places in return for union acceptance of lower apprentice pay (PIB 1999; Hyman 2001: 137-40). However, the feasibility, efficacy, and desirability of cutting apprentice pay have all been questioned (Beicht 2011).

National training systems

[2] Higher trainee pay is predicted then to induce *more* training, as the incentive to the firm to turn trainees into skilled employees increases. However, this paradoxical result depends on the implausible assumption that capital markets, in which trainees may borrow to finance training, are perfectly competitive (Stevens 1999).

This paper focuses on apprenticeship, the longest and costliest form of work-based training, which combines work-based learning with vocational education, aims at an intermediate occupational skill, and is subject to externally established and enforced training standards.

We focus on craft apprenticeship in metalworking ('engineering') in Britain, Germany and Switzerland. The choice of country is motivated both by the authors' areas of expertise and the countries' differences in terms of pay setting and pay outcomes. The choice of sector and occupation is motivated by the similarity of training content across the three countries and by the importance of metalworking skills for economic performance.

Apprenticeship is known to be smaller, more heterogeneous and of lower quality in Britain than in Germany or Switzerland. The ratio of 'apprentices' to total employment is only 0.7 per cent in Britain (England), as compared to 6.5 and 4.8 per cent in the other two countries (Table 1).[3] Britain's Apprenticeships programme shows less educational content and more erratic training standards than do German and Swiss apprenticeships (Steedman 2010).

In metalworking crafts, the comparisons are less unfavourable to Britain, but still mixed. In the absence of official data on apprentice stocks, we estimate an apprentice-employment ratio of 2.4 per cent, less than half as large as in German and Swiss metalworking (Table 1). Cross-national similarity is greater for training content. In all three countries, apprenticeship lasts at least 3.5 years, training standards are set by publicly empowered external bodies, and vocational education plays an important role – as reflected in the four-fifths or more of their time that first-year apprentices spend away from production in the companies studied here (Table 2).[4]

Evidence

Our evidence comes primarily from on-site interviews with senior managers, mostly in the human resources/personnel function, in 24 establishments, spread equally across the three countries (Table 2). Target plants were chosen so as to match pairs or triples across countries by detailed product line (four-digit SIC code) and employment, while differentiating them by

[3] Excluding for Britain lower (Level 2) qualifications, and for Germany and Switzerland pre-apprenticeship programmes. The difficulty of defining apprenticeship in Britain is discussed in (Ryan et al. 2011: sec. 3).
[4] While training duration is in principle determined in Britain by the time it takes to attain 'competence', the 3.5 year norm in metalworking crafts is promoted by both the maximum duration of the public training grant and sector traditions (Ryan et al. 2011: sec. 3).

bargaining coverage and corporate ownership, the foci of the wider research project. Product categories were sought for which comparable plants existed in all three countries: specifically pumps, turbines, compressors, and transport control systems, resulting in a spread of matched producers in each country, varying by detailed product line and batch size, and ranging from large batches of small standardised pumps to one-off bespoke turbines.[5]

British and Swiss establishments were identified first, using a Dunn and Bradstreet database, starting with those British ones with 300-650 employees for which a good Swiss match could be identified. Matched German plants, for which more choice existed, were then identified from trade directories. Refusers were replaced by other establishments in the same SIC category.[6]

Our sample is dominated by mid-sized plants, owned by large transnational companies and accounting typically for between five per cent (Britain) and eleven per cent (Germany) of parent employment (Table 2). Ten of these plants are owned by a company that operates one or more other plants in the sample, in one or both of the other two countries. Although training apprentices was not a condition for inclusion, all 24 plants operate an apprenticeship programme.[7] The intensity of training, as measured by the average ratio of apprentices to skilled employees in the same occupation, is similar in the British and German samples (7.2 and 7.8 per cent respectively) but higher in the Swiss one (12.8 per cent). Substantial differences between companies within countries, particularly Switzerland, are indicated by the high standard deviations (Table 2).

Interviews, which typically lasted around 1.5 hours, were conducted by two or more team members between April 2008 and May 2009, during the recession induced by the financial crisis. We also talked to senior officials in employers' associations, trade unions, public agencies, and other interested organisations (Ryan, Wagner, Teuber and Backes-Gellner 2011: sections 2, 4).

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[5] The SIC categories are 3511, 3561, 3563 and 3724 (1987 classification), to which were added for each country two plants in 3679 (Electronic components, n.e.c.) in order to increase sample size and to include a German plant without bargaining coverage. The German plants are located in the Ruhr, Baden-Wurttemberg, Bavaria, Hamburg, Schleswig-Holstein, and Berlin; the Swiss ones, in German-speaking cantons; the British ones, in England.

[6] The response rate among first contacts amounted to 61 per cent (including retailing companies) overall, and to 43, 60 and 79 per cent in Britain, Germany and Switzerland respectively.

[7] Two plants in our original sample are discarded because of the absence of close matches in the other countries: a British electronics producer with a single apprentice and a small Swiss pump producer with no apprentices.

Pay structure: outcomes

Apprentice pay, measured in base rates relative to the pay of skilled workers,[8] varies greatly across the three countries (Table 3). In our sample of plants, Swiss apprentices receive on average only one-fifth (19.5 per cent) of skilled pay (starting rate for newly qualified workers), as against one-third (33.4 per cent) in Germany and more than three-fifths (63.5 per cent) in Britain. There is also considerable variation across plants within countries, particularly in Britain, with a standard deviation of 13.1 percentage points, as against 4.5 and 2.9 points in Germany and Switzerland respectively.

How representative is our sample? In national survey data, pay ratios in metalworking are lower, at 41, 29 and 14 per cent, for Britain, Germany and Switzerland, respectively (Ryan et al. 2011: Table 23). The difference in levels between the two sources is consistent with differences in the denominator of the relative pay variable: the pay of just qualified skilled employees as opposed to that of all skilled employees, in the sample and the survey data, respectively. It may also reflect selection biases in our sample.[9] The key point, however, is that the pattern of cross-national differences in apprentice pay is similar in our sample to that in national survey data.

Moreover, the cross-national pattern in metalworking is similar to that in the economy as a whole, for which apprentice pay ratios of 45, 27 and 18 per cent are found for Britain, Germany and Switzerland respectively (loc.cit.). In Britain, high apprentice pay is not confined to metalworking. In five other large occupational categories, for which the statistics on training and employment match each other closely, including construction and hairdressing, the pay of apprentices averages 54% of skilled employees' pay, i.e., even higher than in metalworking (Ryan, Wagner, Teuber and Backes-Gellner 2010: Table 8).

[8] Our pay variable excludes overtime pay, performance bonuses, and thirteenth month payments, and uses as denominator the pay of skilled employees in the same occupation-sector and country. Earnings-based measures are preferable in principle, especially as mostof our companies pay performance bonuses to apprentices (Table 4, below). Apprentice pay is available on an earnings basis from national surveys only for Switzerland.

[9] Such bias could be expected were large firms (not plants), which dominate our sample, to have higher relative pay for apprentices, though neither a priori reasoning nor evidence supports that possibility.

Pay structure: determinants

What might cause apprentice pay to vary so strongly across the three countries? We consider first the institutional factors that are potentially relevant to pay setting and pay outcomes. Then, given that decisions to offer and accept training are made by firms and individuals within markets for training places, we discuss market forces, primarily on the supply-side, as potential influences on pay. Five factors prove important: trade unionism, employer organisation, the contractual nature of apprenticeship, the supply of trainees, and public subsidy.

Trade union presence and goals

Trade unions are assumed in some economic models not only to want to raise apprentice pay, which might be widely accepted, but also to raise it more for apprentices than for skilled employees, which is far from evident; and to have the power to achieve those goals. The assumptions align with the history of British metalworking in the last century, during which trade unions conducted a protracted and eventually successful struggle for higher relative pay for apprentices (Ryan 2010). However, not all unions seek and attain that goal. We find that contemporary differences in apprentice pay across our three countries align in some respects with economists' assumptions about union presence and goals, but not in others.

Collective bargaining coverage, the principal indicator of union influence, is higher in Germany than in Switzerland or Britain, at 63, 48 and 34 per cent respectively (all sectors, 2008; Visser 2011). In the absence of similar data for metalworking, we turn to our sample plants, the great majority of which (20 out of 24) are covered by a collective agreement, either at sector level (Germany and Switzerland) or at company or plant level (Britain; Table 4). In Switzerland, however, the sector-level agreement does not cover pay, which is left companies to determine for themselves. Moreover, in only one of the British plants is apprentices' pay collectively negotiated, even though seven negotiate employees' pay. The upshot is that, of the eight plants for which apprentices' pay is bargained, seven are German.

Turning to goals, German unions also express interest in raising the relative pay of apprentices whereas their Swiss counterparts do not. A senior negotiator for *IG Metall*, the industrial union in German metalworking, told us that his union would like apprentices to

receive 35 to 40 per cent of the craft rate, rather than 30 to 35 per cent, as at present. He explained that wish in terms of the importance to the union of the recruitment and integration of young members (IGM 2010). By contrast, an official of *Unia*, the largest union in Swiss metalworking, told us that the union does not seek any general increase in apprentice pay, despite its low level. It seeks just the removal of instances of very low apprentice pay and the payment of a thirteenth month's pay to the one-third of apprentices who do not at present receive it (Unia 2008).[10] The Swiss official attributes *Unia*'s stance to concern not to reduce the supply of training places, and to the weakness of the union's youth organisation, caused partly by the limited resources available for recruiting apprentices.

Differences in bargaining coverage and union preferences are thus consistent with higher apprentice pay in German than in Swiss metalworking. They may also account for two further differences. First, there is the exclusion of apprentices from general pay adjustments in all of the Swiss plants. The pay of a Swiss apprentice must be contractually specified at the outset, in terms of absolute monthly amounts per year of training, and companies are under no obligation to give general increases during the training period. None of our sample does so. By contrast, in Germany apprentices share automatically, under percentage pay scales, in general pay rounds, in addition to progressing up the relevant pay scale during training.

Second, pay progression during training differs between the two countries. The difference between the scale rates paid to last year and first year apprentices is 5.8 percentage points in the German plants, as against 15.5 points in the Swiss ones (Table 3). The difference could be caused by a stronger growth in net output during training in Switzerland, but the reverse appears to be the case in practice.[11] More plausibly, the difference may be attributed to stronger unionism in Germany, along with egalitarian union preferences that embrace pay differentials between apprentices.

If the German-Swiss comparison suggests that union presence and goals affect apprentice pay, other aspects of our evidence indicate the limits of union influence. First, the

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[10] The significance of 13th month payment is not clear. Some Swiss employers insist that pay is assessed by young people on an annual basis, irrespective of whether it is paid as twelve or thirteen instalments.

[11] Data on apprentices' net output by year of training are not available for Germany at occupational level. However, across all training occupations, the growth of apprentices' output from the first to the third year (three year programmes) averaged 72 and 30 percentage points (of mean output during training) in 2000 in Germany and Switzerland, respectively– as compared to mean growth in apprentice pay of 23 and 54 points, in 2007 and 2004, respectively (Beicht et al. 2004: Fig II/20; Schweri et al. 2003: Table 27).

pay increase that *IG Metall* would like to achieve for apprentices (above) is not large, compared to the cross-national differences, nor is it a bargaining priority. The union's stance aligns with the view of German unions as not having used to the full their power to increase apprentice pay, in order to help sustain a training system that they value highly.[12] The difficulties encountered by attempts to induce *IG Metall* to accept lower apprentice pay in return for more apprenticeship places might seem to contradict that interpretation (Hyman 2001; VBM 2007). However, the union's reluctance to strike such deals is attributed by the same IGM official, not to any unwillingness to negotiate, but rather to the absence of an employer commitment to any specific number of additional training places. An official of *Gesamtmetall*, the sector's peak employers' association, in turn attributes the weakness of the association's support for such proposals to concern among members that pay cuts would reduce the appeal of apprenticeship to young people.

Second, when the comparison is extended to include Britain, union presence and goals can no longer be central to an explanation. We have seen that, although seven of the eight British cases negotiate with trade unions for employees, in only one are apprentices covered by collective bargaining. Moreover, in none do managers report that trade unions show interest in apprentice pay. Yet apprentice pay is much higher than in Switzerland, despite similarly low coverage levels.

The British situation is exemplified by a unionised pump producer, which no longer negotiates apprentice pay, but which still pays the high scale rates of the last sector-wide pay agreement (1988). The personnel manager attributes the lack of trade union interest in apprentice pay to the firm's high pay rate. His view is supported by a regional official of Unite, the largest union in metalworking, who has personally never come across a dispute over apprentice pay, and who sees shortages of suitably qualified young applicants as keeping apprentice pay high without requiring any effort by the union. Not surprisingly, he recommends firms starting apprenticeship training to adopt the high scale rates of 1988; more surprisingly, he finds that some do so.

Apprentice pay might also be influenced by employee representation at the workplace, in the shape of Works Councils or employer-sponsored consultative bodies – particularly in

[12] Streeck et al. (1987), Thelen (1991), Marsden and Ryan (1991a), Busemeyer (2009).

Germany, where councils are legally mandated in all but small plants, possess codetermination powers over training, and have informally influenced pay setting in metalworking plants (Thelen 1991). All of our German and Swiss plants have a functioning Works Council. However, in only one case – a British plant with a consultative committee – have employee representatives shown interest in apprentice pay, as opposed to training methods and the retention of apprentices on completion. The lack of interest in apprentice pay among workplace representatives is attributed by managers variously to low representation of apprentices on the representative body, and a lack of discontent about pay among apprentices themselves – in Switzerland as well as Germany.

Employer organisation

Although economic models of training typically assume that, in the absence of collective bargaining, trainee pay is set by competition (market clearing), that may not be the case. Employers may possess market power as buyers of labour (monopsony power). This is to be expected when labour markets are characterised by fewness of employers, or by pay coordination by employers, or by costs to workers of information about and mobility to job vacancies (Manning 2003). Concerning apprentice pay, monopsony power is potentially most relevant in training markets that lack collective bargaining and have an abundant (and pay-insensitive) supply of youth to training – as potentially in Switzerland.

The most nationally specific of the potential sources of monopsony power is pay coordination by employers' associations, which cover a larger share of employment and have greater regulatory power over apprenticeship in Switzerland than in either Germany or Britain. The high associational propensity of Swiss employers is widely recognised, with an overall coverage rate around 80 per cent at national level, as compared to 60 per cent in Germany and only 35 per cent in Britain (Visser 2011).[13] The same ranking of countries applies in metalworking, in which the three largest Swiss associations are estimated to cover

[13] Given the paucity of better-based data on the coverage of employers' associations, we estimate national coverage (of employment) at 88 per cent in Switzerland. SGV, which organises small and medium sized businesses, claims around three million; VSU (Economiesuisse) and SAV, which focus more on larger, foreign-oriented businesses claim two million between them – by comparison to total employment (2007) of almost four million. Overlaps in membership between SGV and VSU are said by their officials to be moderately large; a 50 per cent overlap is assumed here, along with a 100 per cent between SAV and VSU. Traxler, Blaschke and Kittel (2001: 49) estimated combined coverage of 78 per cent in 1990.

at least two-thirds of employment,[14] as against one-half in Germany,[15] and undoubtedly much less in Britain, where sector-wide bargaining ended in 1990, and the Engineering Employers' Federation, having survived large membership losses, now claims to represent only one-quarter of companies.[16]

Employers' associations play central roles in the organisation of apprenticeship in both Germany and Switzerland, but in Swiss 'social partnership' they possess more power than in its German counterpart. In both countries, sector-level associations are represented on the committees that draw up and revise skill profiles and training requirements for particular occupations. In Germany, trade unions have parity of representation on those committees. In Switzerland, however, the association normally constitutes the committee: a government official estimates that 90 per cent of the regulatory committees (*Berufsverbände*) are sector-level employers' associations.[17] They are required to consult other parties with an interest in the outcome, including trade unions and educators. However, our interviewees, in federal government and trade unions alike, see unions as typically neither well resourced nor interested enough to participate at sector-level.

The contribution of employers' associations to pay coordination appears to be stronger in Switzerland than in Britain or Germany – even though Swiss sector-level associations are not involved in pay bargaining, and their role is formally confined to collecting data on apprentice pay from their members, and making the results available to them.[18] These pay surveys are seen by two officials whom we interviewed, one in federal government and the other in one of the two largest employers' associations in metalworking,[19] as facilitating the informal coordination of pay setting – and specifically as encouraging members to avoid

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[14] Total employment covered by *Swissmem* and *Swissmechanic*, which organise larger and smaller employers respectively, and the clockmakers' association (*CPIN*), amounts to 255,000, as compared to sector-wide employment (NOGA 24-30) of 369,000 in 2008 (BFS 2012). This estimate is upward biased by any overlaps in membership between these associations, but downward biased by not including the metalworking members of smaller associations (e.g., *SMU*).
[15] Interview with *Gesamtmetall* official.
[16] Purcell (1993); www.eef.org.uk/about/How+we+work/default.htm.
[17] The dominance of sector-level employers' associations in the steering of Swiss apprenticeship is emphasised by Trampusch (2010) and Gonon and Mauer (2012).
[18] Official statistics on apprentice pay are compiled only at canton level, and then only by some cantons, including Zurich.
[19] In metalworking, *Swissmem* and *Swissmechanic* share *Berufsverband* responsibilities for particular occupations (Oesch 2007).

competing for apprentices on pay, as opposed to competing on reputation, advertising, the content of training, and the timing of recruitment.[20]

How might pay coordination through employers' associations restrain the breaking of ranks by profit-seeking individual employers? Extension agreements, which might make association's recommendations legally binding on both members and non-members, do indeed apply to the content of apprenticeship training, but not to pay setting. Indeed neither metalworking association issues pay recommendations, but rather leaves members free to pay what they wish. Employers' cohesion is taken to depend instead on the social norms that pervade Swiss business communities, with their exceptionally dense networks of associational contacts.[21]

Similarly, in Britain, pay setting for metalworking apprentices lies outside the aegis of the sector-level employers' association |(EEF), which also circulates the results of its pay surveys to members, who, according to a senior association official, are also concerned to keep apprentice pay in line with other employers in their districts. The difference from Switzerland is taken to consist of a mix, among British employers, of lower associational coverage, greater territorial dispersion of members, and weaker collective orientation. The lower dispersion of apprentice pay across companies in our sample in Swiss than in British metalworking (Table 3) is consistent with a stronger coordinating role for the Swiss associations. We therefore take pay coordination to be more extensive and effective among Swiss employers than British ones.[22] Moreover, any aspiration by *Gesamtmetall* to such a role in Germany is frustrated by the high coverage of collective bargaining.

Even if pay co-ordination holds down apprentice pay in Switzerland, an interpretation couched in terms only of 'employer organisation' may be inadequate: low apprentice pay may be tacitly accepted by government, trade unions, and parents too. The potential social benefits

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[20] Swiss sector-level employers associations are seen by Soskice (1990) and by Eichenberger and Mach (2011) as informally coordinating pay setting in general.

[21] A role for shared norms is suggested by a recent instance of their weakening: the introduction of pay-based competition for apprentices in food retailing by a newly arrived German discount chain, acting as a classic outsider with a low stake in prevailing business customs – a development to which an association official showed some aversion (Ryan et al. 2010).

[22] Our interpretation is consistent with the findings of surveys of employers' training costs. Most Swiss companies that train apprentices, but few of their German counterparts, earn a surplus during training – a pattern suggestive of monopsonistic rather than competitive pay setting in Swiss training markets (Dionisius et al. (2009) – though which types of monopsony power might be involved remains open (Muehlemann et al. 2011).

of low apprentice pay include more gradual youth transitions, both from school to work and from dependence on parents to household autonomy. Many Swiss may see apprentices as youngsters who need or deserve only a low income, and to have no claim, until they qualify, to buy a car, for example, as do some British metalworking apprentices. Three considerations favour such an interpretation: the country's traditionally discursive, inclusive, and consensual approach to socioeconomic policy-making (Fluder and Hotz-Hart 1998); trade unions' acquiescence in low apprentice pay – though that factor may overlap with their inability to do much about it; and the country's higher living standards and overvalued currency, which make the pay of Swiss apprentices higher in absolute than in relative terms.[23]

Contractual status

A further institutional aspect of apprentice pay concerns the contractual distinction between training and employment, and the links between trainee pay and labour market structure. When training involves a clear distinction between trainees and employees, contractually and in relation to productive activity, along with the external regulation of training standards, trainees can more readily be paid a low rate, relative to regular employees, than in the case of short, informal training programmes for newly hired personnel, in which case the norm 'rate for the job' tends to apply to trainees too. This is because lower pay is legitimated by the separateness of the trainee from the employee, in the eyes of both employees and the trainees themselves. Apprenticeship training potentially satisfies those conditions. It is associated in the first instance more with occupational labour markets, and the 'regulated inclusion' of youth at the workplace, than with internal labour markets and the informal exclusion of youth from the workplace (Garonna and Ryan 1991).[24]

Higher apprentice pay in Britain is consistent with a weaker differentiation of apprenticeship from regular employment, in both law and policy. Although in all three countries apprentices nowadays have the legal status of employee, in Germany and Switzerland the training contract remains central, and the rights and duties associated with employee status are read into it as secondary attributes (Deissinger 1996; XXXX 2012).

[23] At current (purchasing power parity) exchange rates, Swiss metalworking apprentices in sample plants were in 2008 paid absolutely on average 79 (73) per cent as much as their German counterparts, though only 45 (36) per cent as much as British ones (Ryan et al. 2010: Table 12).

[24] Some observers associate Germanic apprenticeship more with firm-specific than with marketable skills, a view consistent with its substantial work-based content (Soskice 1994). That view is however undermined by both the high standardisation of training content across plants and the low cost of adapting externally trained recruits to firms' skill requirements (Pfeifer, Schönfeld and Wenzelmann 2011).

Moreover, in both countries the pay of apprentices is formally differentiated from that of employees.

In Britain, by contrast, government has promoted, initially in administrative practice and lately in legislation, employee status for participants in the Apprenticeships programme.[25] All apprentices in our sample hold an employment contract, and, as such, were entitled at the time of our interviews to a minimum income of £80 per week, in contrast to the minimum allowance of £40 per week for Apprentices with trainee status alone.[26] The convergence of apprenticeship on regular employment thus contributes to the comparatively high pay of British apprentices.

Contractual status may however be partly endogenous to market conditions. The British government's promotion of employee status reflects its efforts to improve the appeal of Apprenticeship to youth, by dissociating it clearly from other labour market programmes, with their reputation for low pay and low quality. Contractual status thus interacts with supply conditions in fostering high apprentice pay.

Market forces: youth supply

An institutionally oriented discussion must also consider market forces proper in interpreting the cross-national pattern of apprentice pay. Of the three potentially relevant aspects – the level and content of skill, the demand for apprentices by employers and the supply of potential apprentices among youth – our evidence suggests that only the last is important.

The level and content of skill determine in human capital theory the overall cost of training and the degree to which costs fall to the trainee as opposed to the employer. This factor is however neutralised for metalworking apprenticeship by the exceptional similarity of skill levels and training methods across the three countries.[27] Similarly, while the demand for

[25] The 2009 Apprenticeships Act stipulates that an Apprenticeship agreement constitutes an employment contract, *not* a contract of apprenticeship, which denies participants the rights held by the apprentice under common law, notably concerning security of tenure during training (Parliament 2009: 15-16).
[26] DIUS (2008): 6, 22; Ryan (2012).
[27] The (Austrian-born) apprenticeship manager of a large British company, with responsibility for metalworking training in its German and British plants, views the content of the two programmes, which both satisfy national requirements, as highly comparable. Other research support this view, for metalworking crafts at least (Steedman, McIntosh and Green 2004).

apprentices is expected to vary by firm, sector and country, its role is curbed here by the limitation of our sample to employers who train apprentices and by the broad similarity of the scale of training programmes across the national samples – though the higher training rate in the Swiss establishments may reflect the effects of lower apprentice pay on employers' decisions.

The market attribute that does differ substantially across countries is the supply of potential trainees. Three aspects stand out: the return to training, the age of apprentices, and the availability of suitably qualified and interested young people.

The first factor in the supply of young people to training is the return to training, as represented by the increase in future earnings to be expected from becoming skilled. Skill normally brings with it a higher probability of employment, and also higher pay when employed. The larger both of these are, the lower the pay that young people, viewed as rational actors, are prepared to accept during training.

Differences between the three countries in expected earnings align only partly with those in apprentice pay. The pay differential between skilled and unskilled employees in metalworking industry, which is expected to generate expectations, is higher in Switzerland than in Germany, and that difference is consistent with the reverse difference in apprentice pay. However, as the skill differential in pay is similar in Britain and Switzerland, the high pay of British apprentices cannot be explained in such terms.[28] Data are not available on young people's employment expectations, but some worsening can be inferred for all three countries in recent decades as a result of industrial restructuring and reduced employment, particularly in Britain. Switzerland's more successful unemployment record should however generate more favourable youth expectations of the return to training than in Germany or Britain.[29] Higher returns to skill may therefore contribute to the lower pay of Swiss than of German and British apprentices.

[28] In various recent years, the earnings premium received by skilled over semi-skilled manual workers in metalworking has been 36, 32 and 14 per cent in Switzerland, Britain and Germany respectively (Ryan et al. 2011: Table 27).

[29] In the absence of comparable data on unemployment rates by occupation and sector for the three countries, we note that in Switzerland the aggregate survey-based unemployment rate averaged only 3.3 per cent during 1998-2007, as against 5.3 and 9.2 per cent in Britain and Germany respectively (http://stats.oecd.org/...)

Second, the older, more educated and more experienced is the entering apprentice, the greater his or her prior skill, productivity during training, and therefore, under competitive pay setting, pay during training. The three countries differ considerably on this count. Switzerland stands out, with a mean age of entry to apprenticeship nearly two years lower, at 17.6 years, than in Britain and Germany, at 19.3 and 19.4 years, respectively.[30] The national pattern is mirrored in our sample. The principal age of entry is 15-17 years in all of the Swiss establishments, and in most of the British and German ones as well (12 out of 17), but nearly one third of the plants in the latter two countries recruit primarily 18-20 year olds, many with upper-secondary qualifications, and the same number take on at least some adults (>20 years; XXXX 2011, Table 12).

The difference between Switzerland and the two other countries is associated with a lower minimum school leaving age than in Britain (15 versus 16 years), and with a higher rate of direct movement from lower secondary schooling to apprenticeship than in Germany, where a large minority of young people complete upper secondary schooling before starting apprenticeship.[31]

Swiss apprentices therefore have less schooling and experience than their British and German counterparts, and their lower pay is consistent with that. However, the scales applied to the many German and British youth who start apprenticeships early, at age 16-17, are higher than those paid to Swiss apprentices of the same age (Table 3, above). The youthfulness of Swiss apprentices therefore explains only partly their low pay.

The final supply-side attribute is the number of young people qualified for and interested in training. If either attribute is deficient, supply constraints favour high trainee pay. The issue might be thought unimportant, in that our employers report in all three countries that they receive more acceptable applications than they offer vacancies (Table 5). However, the British establishments have lower ratios of acceptable applications to vacancies than do the German and Swiss ones, despite higher pay. Three of them express particular concern about the supply of applicants. They attribute the deficiency variously to: the sector's record of employment loss and redundancy; low youth attainments in lower secondary education, particularly in science and maths; the low status of apprenticeship in the eyes of

[30] In 2008, 2005-6 and 2007, respectively (Ryan et al. 2010: Table 10).
[31] BBT (2010): 12; BMBF (2010): Table E1-2web.

parents and teachers, as part of the poor image and low status of manual skill; a widespread preference for full-time education among moderately qualified 16-18 year olds, consistent with the rapid expansion of – (at the time) highly subsidised – full-time tertiary education; funding incentives to schools to steer 16 year olds into full-time study; and ignorance among youth of the opportunities available to apprentices for continuing education and occupational mobility. One employer did see high apprentice pay as generating more applications, but for potentially suspect reasons ('they're only in it for the pay').

Not all British firms suffer from supply constraints. Two large turbine manufacturers with strong corporate reputations both attract large numbers of acceptable applications, despite accounting for a considerable share of local employment. Also, a pump producer that had until recently found it hard to fill its training places reports an easing of the problem, associated with rising youth educational achievements, the introduction of a GCSE in engineering, and an increase in its recruitment effort. But it still pays its apprentices the high sector-wide rates of 1988, claiming thereby to increase loyalty.

Nor are all of the German and Swiss firms free from supply constraints, as indicated by the standard errors in Table 5. A large turbine manufacturer, located in a large German city with considerable unemployment, decided recently, given disappointing applications, not to fill any of its vacancies for apprentices. Two of the three smallest plants in the Swiss sample reported having at most two acceptable applicants per vacancy.

The Swiss situation is again striking, given the scale on which apprenticeship operates: how might firms face a comparatively favourable supply of eligible and interested youth when the apprenticeship system is so large? The answer involves four factors. Two are shared with Germany, but not Britain, first, the high social status of intermediate vocational qualification (*Beruf*); second, the near-absence of better paid unskilled youth jobs, which an official of SEMTA, the Sector Skills Council for metalworking, sees as diverting young British people from apprenticeship.

Two other two factors are distinctively Swiss. The first is the rationing of access to full-time general upper-secondary education (*Gymnasium*), which is attended by only one-fifth of the youth population cohort. Evidence of rationing is visible in variations in full-time participation, both across cantons, according to the availability of full-time places, and

cyclically over time.[32] The second factor is the presence of well established ladders of progression from apprenticeship to tertiary education. Swiss apprentices have the option of studying part-time for the vocational upper-secondary qualification (*Berufsmaturität*) that gives the right to enter tertiary education. Around 12 per cent of apprentices do so, whether during training or thereafter (BBT 2010). The option increases the appeal of apprenticeship to young people, particularly the more energetic and able ones. By contrast, while the desirability of establishing ladders from apprenticeship to tertiary education is widely recognised in both British and German metalworking, while some of our companies establish such ladders and help their apprentices to climb them, and while some German federal states have introduced a *Fachabitur* that can be taken alongside apprenticeship, neither country has as yet developed a comparable, nationally available mechanism to allow apprentices to qualify for higher studies as part of their training.

In sum, the older age of entry and the lower availability of qualified and interested young people contribute to higher apprentice pay in Britain than in Switzerland. The German-Swiss difference in pay is likewise associated with an older age of entry, but also with a lower private return to training rather than a more deficient youth supply.

Public subsidy

The three countries differ also in the scale and manner of public subsidy to youth training. In Germany and Switzerland, public subsidies focus strongly on part-time education in public colleges ('day release' in traditional British parlance), for which fees are not charged. By contrast, the cost of training at the workplace falls – outside the eastern German states – entirely on the employer and the apprentice.

In Britain, metalworking apprenticeship still resembles its continental counterpart in the continuing importance of part-time vocational education, in which fees are not charged for under-18s and are publicly subsidised for older apprentices. But the manner of public subsidy under the Apprenticeships programme is radically different. Public money flows not directly to further education colleges for providing part-time vocational education, but rather

[32] SKBE/CSRE (2010): Fig 71. As the marginal rate of entry to *Gymnasium* during demographic upswings is only one quarter the size of the average rate, rationing is taken either to arise or to intensify under such conditions (Muehlemann et al. 2009).

to the principal contractor for the training programme as a whole. In metalworking, that is typically the employer, who may then contract out specific functions, notably competence assessment and compliance-related paperwork. Substantial subsidy is involved: in 2007-08, at least £16,000 (€21,000) for a typical 16-18 year old entrant (LSC 2007).

Although the subsidy covers only part of the employer's cost for engineering Apprenticeships (Hasluck et al. 2008), and much is absorbed by the costs of assessment and administration, it may cause employers to pay their Apprentices more than in its absence. That is particularly likely if the supply of young people to engineering Apprenticeship is not only limited, as in most of our British plants, but also elastic with respect to pay during training – in which case competition for apprentices would be expected to pass part of the subsidy to the Apprentice. If so, it is both the level of public subsidy and its payment to the employer rather than to the public college that promote higher apprentice pay in Britain.

Trends

The striking differences between apprentice pay in the three countries nowadays raise questions about changes over time. Data on trends in relative pay, which are available only for Britain and Germany, point to declines in both countries, associated in each with the erosion of unionism and collective bargaining.

In British metalworking, the apprentice pay scales in our sample average 75 per cent across the four years of training, which is eleven percentage points lower than that in the last (1988) sector-wide agreement.[33] The apparent decline can be associated with the advent (in our sample) of low bargaining coverage for apprentices, and more generally with the fall in union presence in the sector.[34] However, the fall in apprentice pay scales has been limited, compared to that in union presence: the average apprentice pay rate in our sample is no lower than that in the sector-wide agreement of 1984 (Ryan 2010, Table 10.2).

In Germany, the relative pay of apprentices (manual occupations, all sectors) rose strongly in the reunification boom of the early 1990s before falling 5.4 per cent from its 1994

[33] Apprentice pay rates in federated engineering in 1988 were 47.5, 65, 80 and 90 per cent of the craft rate in the four successive years of training respectively (EEF 1993).
[34] The share of workplaces (25+ employees) in metal goods, engineering and vehicles with union recognition fell between 1980 and 1998 from 65 to 19 per cent (Millward, Bryson and Forth 2000: Table 4.6).

peak by 2005 (Wagner 1999; Beicht 2011, Table 3). The decline in pay can be associated with those in union presence and bargaining coverage, which have fallen steadily for two decades (Hassel 1999; Haipeter 2009; Addison et al. 2010). One link is compositional: if uncovered firms pay their apprentices less than do covered ones, relatively as well as absolutely, a decline in bargaining coverage causes relative pay to fall. Survey data show lower relative pay for apprentices in uncovered firms: 3.1 percentage points less in the economy as a whole, and 3.7 points less in metalworking.[35] The rise in the uncovered share of metalworking employment, from 35 to 49 per cent between 1995 and 2007 (*Gesamtmetall* 2007), can therefore be taken to have contributed, albeit only moderately, to the fall in apprentice pay.[36]

Conclusions

Focusing on craft training in metalworking industry, we analyse the pay of apprentices in three countries: compared to Germany, it is high in Britain and low in Switzerland. Evidence is taken from on-site interviews with the managers of 24 matched metalworking plants, with officials of employers' associations, trade unions and government, and from national surveys of pay and training costs.

The importance of the issue starts with the centrality of trainee pay to the economics of work-based training, dividing as it does the cost of training between the employer and the trainee, and thereby affecting incentives to provide and take training. Economic models mostly assume that trainee pay is set by labour market competition, though some assume the presence of a trade union intent on reducing skill differentials in pay. To what extent are these assumptions appropriate?

The evidence suggests some influence for both market forces and egalitarian trade unionism – specifically particular differences between Britain and the other two countries (supply of qualified and interested young people), and those between Germany and Switzerland (age of apprentices, union strength). But there is clearly more to it than that.

[35] Unpublished results from BIBB's 2007 survey of employers' training costs, for which we thank Felix Wenzelmann and BIBB.
[36] The single non-*Tarif* firm in our sample, a producer of maritime control systems, had recently discarded *Tarif* coverage primarily in order to replace 13th month pay by performance-related pay, for apprentices as well as employees – though that change carries no clear implication for relative pay.

Union goals for apprentice pay differ between Germany and Switzerland. Moreover, other institutional factors are visible, notably: the strength of employers' associations and the rationing of access to full-time upper secondary education, which differentiate Switzerland from the other two countries; the distinction between apprenticeship and regular employment in law and public policy, where Britain stands out; and the extent and manner of public subsidy, with Britain again distinctive.

Our findings are suggestive rather than definitive, because of the fewness of national observations, the multiplicity and limited measurability of the potential causes, and the difficulty of establishing causality from cross-sectional associations. Nor do our results generalise straightforwardly to other occupations and sectors, as the cross-national similarity in training standards in metalworking between Britain and the other two countries is exceptional. In few, if any, other occupations is British practice, oriented as it is to short programmes with little or no educational content, comparable to that in the other two countries.

Finally, what is the importance of trainee pay, in both analytical and policy terms? As the content of metalworking training is similar in all three countries, differences in apprentice pay mean a higher employer share of total training costs in Britain than in Germany and Switzerland. The effect of that on training activity is however less clear. In our sample of metalworking plants, the average amount of training taking place, adjusted for employment, differs little by country. To that extent, apprentice pay may well be the marginal influence on training volume that economists sometimes take it to be. At the same time, the training rate in British metalworking as a whole is less than half that in Germany and Switzerland, and high apprentice pay may well contribute to that difference.

However, even were a reduction of apprentice pay considered attractive, the constraints on pay setting, both institutions and market forces, would require consideration. Notable here would be: in Germany, the acceptability of lower pay to trade unions; and in Britain, and for some German employers, the supply of eligible and interested young people.

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Table 1. Apprenticeship activity by country and sector

		Number of apprentices ('000)	Number of employees ('000)	Apprentice-employee ratio (%)
Metalworking	Britain	19.6[a]	826.5	2.4[a]
	Germany	230.8	3,964.0	5.8
	Switzerland	18.1	368.9	4.9
All sectors	Britain	161.5	23,073	0.7
	Germany	1,781.6	27,224	6.5
	Switzerland	194.3	4,017.1	4.8

Source: XXXX (2011), Table 8; revision to estimates for Britain are based on (www.thedataservice.org.uk/statistics/statisticalfirstrelease/sfr_supplementary_tables/Apprenticeship_sfr_supplementary_tables/).
Notes. Data are for 2007 (GB, DE) or 2008 (CH); British data are for Advanced Apprenticeship (Level 3+) programmes in England only; employment excludes apprentices
a. Apprenticeships in the Engineering and Engineering Technology frameworks; estimated for December 2007 from annual starts during 2003/04-2007/08, to which are applied a non-completion rate (1/4) calculated from the ratio of completions during 2006/07-2009/10 to entrants during 2002/03-2005/06, on the assumptions that (i) all apprentices start training in September, (ii) non-completers leave training in equal numbers in each of the first three training years and (iii) all completers complete on time.

Table 2. Attributes of participating establishments

	No of plants	Employment[a]		Number of apprentices[b]			Length of training (years)	Share of time spent in off-the-job training, year 1 (%)
		Median	Share of parent[c] (%)	Mean	Ratio to skilled employment[b] (%)			
					Mean	SD		
Britain	8	335	4.7	30	7.2	5.6	3.5	81
Germany	8	575	10.5	68	7.8	8.2	3.5	91
Switzerland	8	280	9.6	39	12.8	10.3	4.0	81

Notes. a. All occupations; median is mean of fourth and fifth plants in national rankings
b. Craft occupations in production and maintenance
c. Highest level parent company

Table 3. Relative pay of apprentices in participating establishments

Base rate of pay of metalworking craft apprentices (including 13th month and holiday pay) as percentage of that of recently qualified skilled employees in the same occupation and establishment

	Mean (by year of training)					SD	
	1	2	3	4	All [a]	All	Number of cases
GB	48.5	58.5	68.3	78.5	63.5	13.1	8
DE[b]	30.5	32.2	34.5	36.3	33.4	4.5	8
CH	12.4	16.0	21.5	27.9	19.5	2.9	7

Notes
Companies that gave full data only
a. Unweighted average
b. Establishment (or company) level base rates, where different from *Tarif* rates

Table 4. Bargaining coverage and apprentice pay setting in participating establishments

Number of establishments with the relevant attribute

	Bargaining coverage (employees)		------- Apprentice pay setting --------			Number of plants
	For any terms and conditions	For pay	By collective bargaining	Receive general pay raises [a]	Receive performance -related pay	
GB	7	7	1	5	5	8
DE	7	7	7	8	5	8
CH	6	0	0	0	6	8
All	20	14	8	13	16	24

Notes
a. Broadly, the same rate of increase at the same time as for regular employees

Table 5. Applications and vacancies for apprenticeship in participating establishments

	Ratio of applications to vacancies			
	All applications	Acceptable applications[a]		
	Mean	Mean	SD	Number of plants[b]
Britain	7.8	3.2	1.8	6
Germany	21.4	11.6	5.9	5
Switzerland	17.4	7.2	6.3	7

Notes: in last recruitment season
a. In some cases, limited to applicants offered an interview
b. Excluding companies that either use a third party to screen applications or did not provide data