In the wake of financial crisis and the context of calls for rebalancing of economies, everyone now loves manufacturing! With unions self-evidently more significant in some nations than others, this renders the longstanding question of the implications of unions for manufacturing employment growth all the more pressing.

For some in the academic industrial relations community, and at least some practitioners more closely involved in joint regulation, it appears obvious that unions must promote manufacturing employment growth, because they have favourable governance effects on industrial performance generally, deliberately preserve jobs in particular and/or have a particular interest in the health of the manufacturing sector specifically. For many management practitioners and economists though, the deleterious implications of unions, given the inevitable compromising of managerial prerogative implied by their influence, are equally self-evident, and indeed, there are some who regard these effects as borne out by empirical study after empirical study at establishment level. The finding that unions impede employment growth has even been mooted as the ‘one constant’ in the findings of the empirical studies of the effects of unions (Addison and Belfield, 2004).

Much of the focus of comparative industrial relations over the last couple of decades has been on the procedural formalities of bargaining and contracting – on extension and collective bargaining coverage but more particularly on the highest level at which bargaining ostensibly occurs (i.e. the
‘centralization of bargaining’) and on the formal derogation of bargaining rights by higher level actors to lower (i.e. ‘articulation’ (Crouch, 1993), or ‘organized decentralization’ (e.g. Traxler et al, 2001). Yet recent cross-national comparative analyses of the effects of unions and joint regulation have suggested that the intricacies of formal bargaining arrangements may have limited relevance to outcomes. Marginson and Sisson (2006) suggest that what may appear organized decentralization from above is often, rather, a matter of the accommodation of arrangements at higher bargaining levels to the shifting realities of workplace- and establishment-level negotiations. Stokke (2008) stresses that the functioning of tiered bargaining depends crucially on union organization at multiple levels. Ibsen (2014 on-line first) argues with particular reference to the Nordic countries that analyses of bargaining coordination have unduly neglected the significance of power relations to outcomes. More quantitatively, Vernon (2011) shows that the formalities of bargaining procedure cannot offer an explanation of the enormous differences in aggregate pay dispersion amongst the European, or indeed coordinated market, economies of the established OECD, but the rate of unionization can (as well as offering a more general account of comparative variation in aggregate pay dispersion).

Unionization rates (union densities) are a ready indicator of ‘union strength’ deployed in comparative historical work more than is sometimes acknowledged (e.g. Korpi, 1983, Visser, 1992; Crouch, 1993). Other contributions have suggested that unionization rates can be regarded in a rather more specific manner, as gauges of the ‘weight of joint regulation’ (Vernon, 2006) or the ‘strength of unions in joint regulation’ (Vernon and Rogers, 2013).

Remarkably, despite the emphasis on the intricacies of formal bargaining arrangements in the comparative industrial relations literature of the last couple of decades, and many efforts to demonstrate their substantive implications, there are no systematic quantitative comparative (or comparative historical) studies showing any effect on the performance of manufacturing sectors. However, recent literature has thrown much light on the effects of unions on manufacturing productivity growth. Vernon and Rogers (2013) and Vernon (2013 on-line first) have recently shown the significance of the strength of unions or joint regulation, as gauged by unionization rates, for the development of manufacturing productivity growth in the OECD. Crucially, though, this analysis shows that the productivity growth effects of unions hinge upon the predominant organizing principle (POP), or external union structure, with stronger unions promoting productivity growth in countries of industrial or encompassing unionism and impeding it in countries of segmented unionism, most particularly under a craft and general tradition.

The authors treat these findings, in the spirit of Streeck (e.g. 1992), as expressive of the character of the governance provided by growing union strength under distinct predominant structures, and thus traditions and ideologies, of unionism. In particular, Vernon and Rogers (2013) and Vernon (2013 online first) interpret their findings as displaying the distinct implications of unions with different structural legacies for internal labour market structures.

Streeck’s (e.g. 1992) discussion of the implications of unions, focusing on a comparison of the (West) German experience with that in the UK and US, suggests that differences in governance have broad-based effects on industrial performance, such that impacts on productivity growth would also be expected to be expressed in employment growth. Though his overall approach is quite distinct, Hirsch (e.g. 2004) also suggests that the implications of unions for productivity growth will be apparent in employment growth in his suggestion that deleterious implications of US unions for innovation, investment and productivity growth must inevitably find expression in union decline as union strongholds shrink under the weight of their underperformance. Yet if as Hirsch suggests effects of unions on productivity growth find an echo in effects on employment developments then
Vernon and Rogers (2013) and Vernon’s (2013 online first) findings on productivity growth suggest that it is very unlikely that the effects will hold in all national contexts, indicating rather that the effects of stronger unions in countries of encompassing unions will be quite distinct to those in countries of segmented unions, and most of all to those in countries with a tradition of craft and general.

Thus, recent literature suggests that unions and joint regulation may have a significant influence on developments in manufacturing employment growth, and that this may hinge upon the strength and predominant structure of unions. Comparative historical analysis may throw much light on the matter of whether there is indeed ‘one constant’ (Addison and Belfield, 2004) in the effect of unions; that they impede employment growth. Moreover, as we shall see, comparative historical analysis not only promises a more general overview of the implications of unionism across countries, but offers analytical advantages over the type of micro-econometric studies which have dominated the extant literature on unions and employment growth.

In sum:

- Unionization is a key measure of joint regulation, indicating its strength or purchase
- There is probably not a ‘one constant’ effect of unions on employment growth
- Union structure may well be crucial to the effects of unions on employment growth

The present paper throws comparative historical light on the effects of the strength of unions or joint regulation on the growth in manufacturing employment, deploying two samples of data on the OECD. Empirical examination of the effects of unions on manufacturing employment growth has thus far consisted of micro-econometric, establishment level studies almost exclusively for countries of the Anglo-Saxon world, studies which have moreover either been cross-sectional or have made very limited use of the potential of the panel data on which they depend, deploying only pooled panel estimators (see below).

Extant literature.

Reasoning on the effects of unions on employment growth tends to involve the familiar discourse of the two faces of unions: ‘monopoly’ and ‘voice’ (Freeman and Medoff, 1984). In practice, the ‘monopoly’ face is taken to include all deleterious implications of unionism, and the voice face all beneficial implications (see Vernon and Rogers, 2013). In principle, unions might be thought to promote manufacturing employment growth because they have (‘voice’ type) generic performance enhancing effects either directly or via their implications for managerial/employer behaviours. They might also be viewed as particularly concerned with preserving and promoting employment – an effect which might be viewed as an aspect of monopoly, or an expression of their self-interest as institutional actors.

There is a fairly large establishment-level literature on the employment growth implications of unionism in manufacturing, particularly for Anglo-Saxon countries (e.g. Addison and Belfield, 2004; Bryson, 2004; Long, 1993; Wooden and Hawke, 2000). Unionism is sometimes considered in terms of
presence and/or recognition but often in terms of unionization rates. This literature has rather dried up recently, perhaps as some have come to the view that final conclusions have been reached, although there is the more recent Walsworth (2010) for the private sector more generally.

Much work, particularly for North America, is cross-sectional, and even where panel data is deployed there is often little effort to exploit its potential, with the estimations reported simply being on the basis of pooled data, with panel estimators such as fixed and random effects and indeed the possibilities of taking account of selection effects and the endogeneity of unionism disregarded (e.g. Addison and Belfield, 2004; Walsworth, 2010).

Obviously, the focus of the empirical literature on the Anglo-Saxon countries, the neglect of matters of unobserved heterogeneity, and indeed the typical focus on pure cross-section data problematizes any suggestion that there might be ‘one constant’ (Addison and Belfield, 2004) in the empirical literature on the effects of unions, that they are detrimental to employment growth, with the potential to reduce growth, or speed decline, by around 1-2% p.a.

Vernon and Rogers (2013) deploy aggregate panel data on manufacturing in the OECD to show, in the spirit of Wolfgang Streeck (e.g. 1992), that the impact of union strength on productivity growth hinges upon the union structure (POP!). specifically, stronger industrial or encompassing unions give productivity performance advantages over segmented unions (especially where these are stronger), and, to a lesser extent, suggest that such unions give a productivity performance advantage over a union-free environment in which management acts unconstrained by joint regulation (see also Vernon, 2013 early view).

If the effects of unions on manufacturing productivity growth are expressive of their general effects on industrial performance, or indeed if these employment effects are at least in part a product of effects on productivity, then the implications of unions for manufacturing productivity growth are crucial for the manufacturing employment growth effects of unions. However, even given these effects of the strength of unions or joint regulation under differing union structures the broader extant literature suggests that there may be uncertainties and complexities with respect to the implications for employment growth.

Streeck’s (e.g. 1992) work suggests that the effects of unions will be felt, in a similar direction, across indicators of industrial performance, though he does not elaborate the character of the relationships or inter-relationships involved. Conventional wisdom in economics suggests that faster productivity growth improves nations’ employment performance (e.g. Nickell (2005) on unemployment), and this is reflected in for example the argument of Addison/Hirsch (2004?) that deleterious implications of unions for productivity growth imply deleterious implications of unions for employment growth.

However, industrial relations scholars may suspect that improved productivity performance might actually cost jobs as employers take advantage of improved productivity to reduce the numbers employed. Thus, the implications of the findings of Vernon and Rogers (2013) on the effects of unions on manufacturing productivity growth for the matter of the implications of unions for manufacturing employment growth are unclear.

Moreover, unions might affect manufacturing employment growth in ways which do not involve productivity growth per se, and are in this sense more direct. Thus, for example, unions might affect employment growth more directly via influencing (one way or another!) investments in employment itself (!) and in plant and innovation.
Here too there are further uncertainties in the causal chain, as such investments might in principle either be promoted or inhibited (e.g. Booth, 1995) by unions. Moreover we might expect that any such effects might be contingent on POP/structure, either being more or less strong according to structure or even perhaps hinging, in terms of the sign of the effect, on structure.

The potential of aggregate comparative historical analysis

Sectoral (i.e. manufacturing) data allows panel analysis, affording general coverage across countries and time. This potential to range beyond the Anglo-Saxon world which has been the focus of so much attention is a distinct advantage, allowing the possibility of assessment of the generalizability of the relationships apparent at establishment-level for the Anglo-Saxon world.

Moreover, proper deployment of comparative historical panel data at the level of sectors offers distinct analytic(al) advantages over the cross-sectional establishment-level samples and pooled panel estimation approaches which have dominated the literature. These advantages are marked given the problems of causal inference in cross-sectional establishment-level studies (see Bryson and Dale-Olsen, 2008) and indeed with pooled panel approaches.

Firstly, deployment of comparative historical panel data offers the possibility of the attenuation of selection concerns. There are almost endless possibilities of such selection biases, though some are more plausible than others, and some may be better justified with reference to literature than others. For example, establishment-level findings in pure cross-sectional analysis, or indeed in a simple pooled panel analysis, that unionism is associated with slower manufacturing employment growth (or more rapid decline) of the sort which are common in the literature might emerge as more heavily unionized establishments tend to be vintage in their physical technology/capital equipment or indeed their product market niche. Though control for industry might attenuate this effect to some extent (Bryson and Dale-Olsen, 2008), it may well find expression within industries. Alternatively, it is conceivable that if a positive association between unionism and manufacturing employment growth is identified this is because more heavily unionized establishments attract better quality/qualified employees (given superior pay and conditions), or because their very survival indicates better management.

Secondly, deployment of comparative historical data offers the potential to tackle endogeneity concerns. Again, the possibilities are in principle almost endless. For example, it might be the case that findings in the extant literature of association between unionism and slower employment growth might express a tendency for employees in establishments with slower employment growth to seek the protection of unions in difficult times, in much the same way that it has been argued recently German employees seek the protection of works councils in difficult times. Alternatively, any finding that there is a positive association might in principle be a product of a tendency for faster employment growth to promote unionization by mitigating employees’ fear of the implications or repercussions of their involvement union activity.
With further regard to endogeneity, with an eye to workforce composition effects, in principle it could be that more rapid employment decline impedes unionization as older, unionized, workers are made redundant, or alternatively promote unionization as LIFO protects the senior/unionized (!). Again, endogeneity biases may profoundly contaminate the findings in simple cross-sectional and pooled panel analysis.

The extant establishment-level literature on unions and employment growth most often deploys some measure of union presence (whether there are union members, whether there is a local union representative, whether unions are recognised for the purposes of collective bargaining) as its gauge of unionism, but sometimes makes reference to union density. Reference to such union presence as a discriminating indicator of union activity or joint regulation is impracticable and impossible at the level of whole sectors – an alternative is required. In comparative historical analysis, given the focus here, unionization rates fit the bill.

Sample 1: 1960-1995 quiennial

The initial quiennial (5 year block) regression analysis for 1961-1995, using a sample which allows the introduction of extensive controls, spans 11(10) established OECD countries through 1961-95. To simplify estimation and interpretation, the analysis deploys encompassing and mutually exclusive dummy (EMED) variables (see Brambor et al, 2006) expressing the predominant union structure and interacts these with unionization rates. Moreover, following Vernon (2013 online first) and given that the principle distinction in the findings of Vernon and Rogers (2013) is between the implications of the strength of unions under industrial unions on the one hand and the strength of craft and general and of enterprise unions on the other, a two way distinction between encompassing and segmented unions is deployed. Following standard sources in comparative industrial relations, the 4 countries of segmented unions are the US, UK, Canada and Japan, whilst the remaining 7(6) (EU) countries are of industrial or encompassing unionism. The data on unionization are from Vernon (2006).

Through the estimations, a time trend captures influences on manufacturing employment growth common across the established OECD whilst other controls are introduced incrementally.
Findings for Sample 1: 1961-1995 (cluster robust SEs)

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>FE</th>
<th>FE</th>
<th>FE</th>
<th>FE</th>
<th>RE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encompassing</td>
<td>FE</td>
<td>FE</td>
<td>FE</td>
<td>FE</td>
<td>RE</td>
</tr>
<tr>
<td>Enc*Unionization</td>
<td>-3*</td>
<td>-3**</td>
<td>2(ns)</td>
<td>0(ns)</td>
<td>0(ns)</td>
</tr>
<tr>
<td>Seg*Unionization</td>
<td>-10***</td>
<td>-10***</td>
<td>-16***</td>
<td>-17****</td>
<td>-10****</td>
</tr>
<tr>
<td>Growth hrs per employee</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0(ns)</td>
</tr>
<tr>
<td>Productivity growth /hr</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Productivity level /hr</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profit share (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital accumulation (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D intensity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time trend</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obs (N*T)</td>
<td>77</td>
<td>77</td>
<td>64</td>
<td>52</td>
<td>52</td>
</tr>
<tr>
<td>N</td>
<td>11</td>
<td>11</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

Sample 2: 1960-2010 triennial

In some respects extensive control may appear desirable, as it takes account of influences on manufacturing employment growth aside from the strength of unions and joint regulation under distinct union structures. However, a more extensive and larger sample is possible without such control. Moreover, it might well be considered favourable to avoid control for influences on manufacturing employment growth which might be channels via which unions might act on manufacturing employment growth!

The triennial sample of sample 2 is much larger, not only as triennial as opposed to quinquennial sampling allows more observations but as this second sample spans 16 nations through 1960-2010. Segmented countries now also include Korea, Australia and Denmark (!), whilst encompassing now also include Belgium and the Netherlands, implying 7 countries of segmented and 9 of encompassing unionism. However, the sample does not allow the (incremental) control: in each estimation there is a time dummy, and also, in results shown here (but see below) control for productivity growth. The data on unionization in sample 2 are from Jelle Visser’s database.
Sample 2 results

(RE-IV & FE-IV standard errors only as yet non-robust....)

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>OLS</th>
<th>RE</th>
<th>OLS-IV</th>
<th>RE-IV</th>
<th>FE</th>
<th>FE-IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encompassing</td>
<td>.**(*)</td>
<td>-*</td>
<td>.**</td>
<td>-*</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Enc*Unionization</td>
<td>0(ns)</td>
<td>0(ns)</td>
<td>0(ns)</td>
<td>0(ns)</td>
<td>0(ns)</td>
<td>0(ns)</td>
</tr>
<tr>
<td>Seg*Unionization</td>
<td>-28***</td>
<td>-26*</td>
<td>-28***</td>
<td>-26*....</td>
<td>0(ns)</td>
<td>0(ns)....</td>
</tr>
<tr>
<td>Productivity growth/hr</td>
<td>.**(*)</td>
<td>.**<em>(</em>)</td>
<td>.**(*)</td>
<td>.**(*)</td>
<td>.***</td>
<td>.**(*)</td>
</tr>
<tr>
<td>Instruments</td>
<td>N/A</td>
<td>N/A</td>
<td>2 lags</td>
<td>2 lags</td>
<td>N/A</td>
<td>2 lags</td>
</tr>
<tr>
<td>Time dums (vs. trend!)</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Obs (N*T)</td>
<td>237</td>
<td>237</td>
<td>237</td>
<td>237</td>
<td>237</td>
<td>237</td>
</tr>
<tr>
<td>N</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

Some further results are worthy of note at least. In the absence of control for productivity growth the available sample is slightly larger, at n=239. With period dummies and robust standard errors as above, results are broadly similar. The coefficient on the encompassing dummy is 0(ns) throughout, the coefficient on the enc*unionization interaction remains 0 (ns) and regarding the coefficient on the interaction seg*unionization the findings under OLS are rather weaker but still significant -20* (p=0.085) and the random effects (RE) findings are somewhat stronger (-17*(*) p=0.051). In such estimations without control for productivity growth, if a simple time trend is used in place of the series of time dummies, the findings are rather clearer, being essentially the same for all variables but the seg*unionization interaction, but with stronger results for this key variable: this is true under OLS (-25(*), p=0.057) and under RE (-25**, p=0.016) (need to check what happens if a time trend is used in place of time dummies where there is control for productivity growth, i.e. the findings in estimations as in the table above, but with a time trend rather than time dummies).

It is striking in the table above that any suggestion of country specific fixed effects erodes the findings and in particular that with fixed effect estimation in columns 5 and 6 of findings there is no significant result at all. However, if the sample is restricted to be more similar to that of sample 1 discussed above, fixed effects (FE) estimation does (as there) deliver significant results for the crucial seg*unionization interaction. Specifically, if observations post-1995 are deleted, and all observations for Denmark are also deleted, 146 observations remain across 15 nations, and the FE coefficient for seg*unionization is then -76*, p=0.090 (sic regarding magnitude of coefficient!), whilst under FE-IV...
the coefficient is trivially different (robust standard errors and thus z-ratio not yet calculated for FE-IV).

The pattern of findings is also robust to the use of an alternative indicator of the strength of joint regulation which does not rely solely (as above) on unionization rates. Indeed, the pattern of results is sharper still if the union structure dummies are interacted with a composite measure of the strength of joint regulation itself a multiplicative of unionization by (adjusted) collective bargaining coverage rates to allow for the possibility that coverage in the absence of unionization does provide some limited further purchase of joint regulation (cf Vernon, 2006). Results are then sharper under OLS, with the significance of the coefficient on the segmented unionism*strength of joint regulation interaction increased substantially, to 5%, in the absence of control for productivity growth, and being essentially unchanged, still significant at 1%, with control for productivity growth. Under random effects (RE), the results are very much sharper, with the significance of this key coefficient is much increased, to 1% (from 10% (sic)), regardless of control for productivity growth. Thus, estimation with this alternative indicator of the strength of joint regulation underscores the results above, suggesting indeed that the original estimations deploying unionization as a measure of this strength provide conservative estimates of the effects of the strength of joint regulation on manufacturing employment growth under segmented unionism.

Overall findings.

There is no ‘one constant’ (!) but rather there are union structure, or ‘regime’, specific results. In countries of segmented unionism, although the detrimental effect of stronger segmented unions on productivity growth promotes manufacturing employment growth. That is segmented union strength typically has had a (net) detrimental effect on manufacturing employment growth.

However, the Danish experience under union strength rapidly growing in the 1970s and then sustained at exceptionally high levels shows that such negative implications could be counteracted, an extremely interesting finding which is starkly at odds with the findings in Vernon and Rogers (2013) for productivity growth, in which the pattern for Denmark was exactly in line with the pattern for other countries of craft and general unionism.

Also, by the 1990s the further erosion of segmented unionism elsewhere no longer made any further difference to manufacturing employment growth (!)

In contrast to the findings for segmented unionism, under encompassing unionism, the strength of unions or joint regulation is irrelevant to manufacturing employment growth.

Making sense of the findings: Part 1 general findings...
The general pattern of results with varying control (particularly sample 1) shows that the deleterious effect of segmented unions on manufacturing employment growth does not express any inhibition of aggregate profitability. Nor indeed does it express their inhibition of aggregate productivity (quite the opposite!!!).

This points to stronger segmented unions’ undermining of employers’ enterprise-level appropriability conditions (i.e. security of employers’ rent extraction) around investments in workforce expansion/maintenance. Alternatively, or perhaps relatedly, it is possible that the results are an expression of employers’ discomfort with/limited sense of responsibility regarding national workforces with strong segmented organization.

Throughout, the results suggest that stronger encompassing unions do not threaten employers’ enterprise level appropriability as they contain enterprise-level rent-sharing by tying pay to post (see e.g. Vernon and Rogers, 2013) (or perhaps relatedly do not discomfort employers by challenging so directly workplace managerial prerogative).

Making sense of the findings: Part 2 Contingencies within contingencies...

a) The nature and meaning of the Danish experience

After stability in the 1960s, and then around the turn of the decade, in the decade from 1972 to 1982 aggregate unionization in Denmark grew from 60% to almost 80%, then fluctuated at 75%-80% until the mid-1990s, before a persistent but gradual decline to just under 70% by 2010 (Scheuer, 1992; Visser, XXXX). The limited available data suggest a similar pattern of growth in manufacturing specifically, though unionization was already around 80% by 1970, so that unionization was near total, effectively 100%, by the early 1980s (Visser, 1992).

What is remarkable for present purposes is that the implications of this development in Denmark for manufacturing employment growth were not at all in line with what might be expected given the findings here for the other countries of segmented unionism, nor indeed given the findings for the sample including Denmark where this does not centre exclusively on the longitudinal co-variation in the unionization and manufacturing employment growth. Remarkably, the development of manufacturing employment growth in Denmark belies, by the standards of the more general findings, the growth in unionization from what was already a very high level to an extremely high level, and then its maintenance at something close to this extremely high level before gradual decline back towards – but never reaching – the former sort of very high level (!!!). This cannot just be a matter of there being no further effects of the further unionization growth in Denmark in the 1970s because unionization was already high, i.e. a slight non-linearity in the longitudinal relationship between unionization and employment growth because the limits of the employment destroying effects of segmented unionism had already been reached with the unionization rates of the 1960s and very early 1970s, because the longitudinal co-variation between unionization and manufacturing employment growth is such that the inclusion of Denmark actually destroys the fixed effect finding here, i.e. the surge in unionization in Denmark was associated with an increase in
manufacturing employment growth, or at least a slowing of its decline, rather than with a slowing of employment growth, or faster rate of job loss, as would be expected.

In the first instance at least, this was very definitely not because the bargaining partners or labour market parties reacted to the growing unionization rates by improving their coordination within a continuing voluntaristic system to mitigate any ill-effects of this growing strength of unions (or indeed to go beyond this and render this growing strength manufacturing employment promoting). Rather, as Danish unionization rates grew dramatically in the 1970s from what were already very high levels, the coordination and articulation of a Danish bargaining widely acknowledged now and then as essentially voluntaristic quite suddenly collapsed (Scheuer, 1992; Crouch, 1992; 1993). There was prolonged conflict in the 1973 bargaining round. Then, from the 1975 round, there was profound, sustained, state intervention in what had previously been a voluntaristic system of joint regulation, with parliamentary intervention imposing a settlement in the successive rounds 1975, 1977, 1979 (Scheuer, 1992, Table 5.12).

The 1980s – a period in which the now very high level of unionization was sustained – then saw a return to voluntarism, but, significantly, this was now in the shadow of the repeated state interventions of the 1970s, and indeed saw a further imposition of a settlement by the state in 1985. Yet with the exception of 1985 further state imposition of settlements was then no longer necessary as coordinated joint regulation was reasserted (Scheuer, 1992). Significantly, new procedural regulations were introduced by the bargaining parties, with the introduction in 1983 of a ‘wage regulation mechanism’ limiting the frequency of local bargaining (which had often happened several times a year) and allowing employers’ associations to put a ceiling on local pay increases even where these were legitimated in terms of productivity, a mechanism renewed in the 1985 round (when parliament again imposed a settlement) and tightened in 1987 (Scheuer, 1992, 192). 1987 also saw a (tripartite) Common Declaration on competitiveness emphasising the need to control labour costs to promote employment (Madsen et al, 2011; Ibsen, 2014). Scheuer (1992, 192) argues that the new central controls on joint regulation, and in particular the wage regulation mechanism, contributed to the reduction of industrial conflict, leapfrogging, wage drift and inflation. More recently the further development and extension of bargaining cartels from the late 1980s suggests some further elements of coordination or even centralization in joint regulation (Madsen et al, 2011), with the terms of sectoral agreements framing local negotiations.

How then might this period of state intervention and innovation in joint regulation in its shadow have meant that, uniquely amongst countries of segmented unionism, a surge in unionization in Denmark was associated not with a reduction in the growth of manufacturing employment growth but, if anything, an increase? As the voluntaristic system crumbled and state intervention intensified, inter-industry snapshots show a massive compression of pay dispersion between 1973 and 1985 (Rowthorn, 1992a, b), whilst national sources suggest that for both manual and white-collar employees in industry the 1970s saw a dramatic compression of pay dispersion across individuals approaching that in Sweden (Iversen, 1996, 413). Certainly by the early 1980s the Danish aggregate decile ratio D9:D1 (based on gross earnings of full-time employees) was only just above the totemic Swedish aggregate decile ratio (OECD), the lowest in the advanced industrialised world, and Danish overall pay dispersion remained only a little above that in Sweden through the 1980s. Interestingly, as voluntarism became entrenched again and the memory of state intervention faded, there was a significant decompression. OECD Employment Outlook earnings dispersion data (see e.g. CESifo spreadsheet) show that the aggregate decile ratio, D9:D1, increased rather more rapidly in Denmark than in the other Nordic countries in the 1990s, and then much more rapidly in the 2000s, so that by 2010 Denmark had parted company with the other Nordics, with its D9:D1, at 2.80, also then
markedly higher than in Belgium and Italy, and almost touching the levels in France and the Netherlands. Still, though, even by 2010 aggregate pay dispersion remained a little below that in these latter countries, and much below the levels then seen in the UK and indeed Germany. Thus, particularly and most pertinently before Danish unionization began to persistently fade once more from the mid-1990s, the aggregate pay compression wrought in the decade to the early 1980s, taking overall pay dispersion to lows little above those in Sweden, was sustained. State intervention in the 1970s compressed the overall pay dispersion markedly by the early 1980s, and a resurgent voluntarism in its shadow maintained this aggregate compression, bringing lows in pay dispersion close to the totemic Swedish, until the early 1990s when it began to gradually unwind, and increasingly unwound as unionization began to fade again.

Yet even as overall pay dispersion began to grow, Danish bargaining arrangements had implications for employers which are highly pertinent here. Although branch minima within Danish manufacturing are typically very low relative to prevailing rates (Kudsk-Iversen & Jorgensen, 2005; Ilsoe, 2011/12), at least outside food manufacturing (Ilsoe, 2013), branch agreements often provide for ‘pay sum bargaining’ mandating the average extent of local increases (Plasman et al, 2007). Correspondingly, findings for Denmark on inter-industry pay differentials (Gannon et al, 2007 Ec&SocRev, Table4), size-related pay premia (Plasman & Rycx, 2007 Empirica) and indeed even the implications of SEB (Plasman et al, 2007) all show that with regard to average enterprise-level pay Scheuer (1992) is right to assert that no significant differences in outcomes have been tolerated (at least to the mid-1990s!). Crucially, this implies that individual employers can invest in equipment, innovation, and indeed in expanding or maintaining employment itself, knowing that the establishment-level pay bill per employee or indeed hour worked will respond little if at all, i.e. that employees will claim very little if anything in response, so that employers can be secure in the knowledge that they will appropriate almost the entire additional surplus generated.

Thus, Danish inter-enterprise compression has implied that the appropriability conditions facing employers have been extremely favourable. Most importantly for present purposes they are very much more favourable than would be expected under segmented unionism of the strength of the Danish, particularly as it developed through the 1970s.

Yet this inter-enterprise compression has not, in the Danish case, been achieved via an intra-occupational or intra-post compression, i.e. via a tying of pay to post or ‘equal pay for equal work’. Denmark is distinct from Sweden in this sense, as a detailed review of the micro-level evidence on Danish vs. Swedish pay structures below makes clear.

Even during the period of marked aggregate pay compression the structure, and structuring, of pay in Denmark was quite distinct to that in Sweden, other Nordic countries and indeed countries of encompassing unionism with significantly weaker unions. The extent of the pay premium attaching to union membership in the mid- to late 1990s (Bryson, 2007) is remarkable, clearly distinguishing Denmark from other Nordic countries but also countries of encompassing unionism generally. Moreover, Plasman et al (2006; 2007) show that in Denmark single-employer bargaining (SEB) has effects on pay differentials quite distinct from those in the other countries their study spans (Belgium and Spain), with SEB in Denmark not only increasing the returns to seniority – something which in isolation might be considered an element of promoting ILMs – but, remarkably, increasing returns to education, the firm-size differential, occupational and ‘skill’ differentials, and indeed even the gender pay gap! In contrast, in Belgium and Spain SEB either further decreases such pay differentials or is inconsequential, except with regard to returns to education in Belgium, which are increased by SEB, but only by half as much as they are in Denmark (Plasman et al, 2006, Appendix 2).
Dell’Aringa & Pagani (2007) show that the implications of SEB in Denmark contrast also with those in Italy, though Italy is often considered a country with particularly active local unions.

It is clear from the large union membership premium (Bryson, 2007), the implications of single-employer agreements for pay differentials (Plasman et al, 2007), and indeed the growth in the variability across enterprises in the returns to education and in the gender pay gap as the state stepped back in the 1980s that Danish unions do disrupt the systematic tying of pay to post (just as Vernon and Rogers, 2013 suggest).

Moreover, Erikson & Westergaard-Nielsen (2009, Table 3.8) show that through 1980-1995 – as the state stepped back - there was a dramatic growth in the variation across Danish enterprises in the extent to which schooling was rewarded, and indeed in the extent of the gender pay gap, showing that even before aggregate decile ratios were pushed up by the growing inter-enterprise pay dispersion from 1990 (Erikson & Westergaard-Nielsen, 2009), the reassertion of voluntarism was bringing an increasingly unstructured pay distribution (i.e. one in which equal pay for equal work already applied still less).

The contrast of the Danish pay structure (or relative absence of it) with the continuity in the systematic tying of pay to post in Sweden is apparent in detailed studies of the structuring of pay in the latter nation. Vernon (2006; 2013/2015) outlines the manner in which sector and branch agreements confine pay rates in Sweden, suggesting that this closely links pay and post (see also Skedinger, 2007). Lazear and Oyer (2004) provide direct evidence that post or role is the overwhelming determinant of the pay of white collar employees, who it is often argued have their pay less confined by joint regulation. However, their sample is confined to employees of the 100 largest Swedish companies in the late 1980s, and it might be expected that these results hold only within such a large firm sample.

Yet Heyman et al (2007 Jint’IE ‘Is there really a foreign ownership wage premium?’) use matched employee-employer data for the entire Swedish private sector 1996-2000 to show that enterprise characteristics (particularly those beyond skill composition) are of very limited relevance to pay, and specifically that although mean enterprise-level pay is higher in larger enterprises (2007, Table 2), size per se is inconsequential, and even capital intensity – with which size is typically related – only increases pay by 2% (2007, Table 4). This implies that Lazear and Oyer (2004) may well express the general situation in Sweden even in the late 1990s.

As Vernon (2013 on line first/2015) argues, Hibbs and Locking (2000) show that amongst Sweden’s blue collar industrial employees, despite growing overall pay inequality from 1983 (specifically, 1987), even by their last year, 1993, inter-establishment pay dispersion was no greater than it had been in 1974 (i.e. after the great ‘equal pay for equal work’ compression). This suggests distinct limits to any possible departures from pay for post for blue-collar employees in industry 1987-1993.

Skans et al’s (2009) findings concern an enormous sample of both white and blue collar employees in Sweden through 1985-2000. They show a remarkable upward trend in the proportion of overall dispersion associated with the employing plant in manufacturing (as more broadly) from 1988 to 2000 (2009, Fig 7.8). This might be taken to suggest a persistently growing departure from pay for post even in manufacturing specifically. However, Forslund and Lindh (2004, Fig 5) show that for employees in Swedish industry generally there was no trend in inter-establishment wage dispersion through 1970-1996 as a whole, nor indeed from 1983 specifically! (a rise 1985-1988 but a fall thereafter). Skans et al (2009, Figure 7.7) show that there was very little if any upward trend in overall pay dispersion in manufacturing through their sample period 1985-2000 as a whole (within-
plant variation fell, if anything, over their period as a whole, and particularly from 1988 (2009, Figure 7.9)). There was a sustained growth in overall pay dispersion in Sweden through 1997-2000 (2009, Fig. 7.7), in manufacturing specifically though more strongly more generally, but this appears predominantly a result of a dramatic improvement in the economy, with unemployment halving over a few years, with more recent domestic data (NIER, 2013 ‘Wage formation in Sweden’ Diagram 12) showing that the surge in pay dispersion did not survive the settlements of the 2001 bargaining round and OECD earnings dispersion data showing even the aggregate D9:D1 decile ratio stable 2001-2012 at around 2.2, extremely low by international standards, so that it is clear that most of the very limited increases in inter-establishment pay dispersion since the mid-1980s were compensated by declines in intra-establishment pay dispersion, hinting at stronger employee sorting.

Indeed, there is strong direct evidence (Skans et al, 2009, Fig. 7.11) of growing sorting effects in Sweden (i.e. that, increasingly, individuals with greater observable human capital are concentrated in some plants [perhaps in part because they at least appear to offer individuals higher pay GV] and those with lesser ‘human capital’ in others). This echoes the suggestion of Heyman et al’s (2007) findings for the entire Swedish private sector 1996-2000 that differences in mean pay across enterprises with different characteristics are almost entirely due to differing workforce compositions (2007, Table 4 vs. Table 2).

Moreover, Forslund and Lindh (2004, Table A1) show for Swedish industry that the establishment level link between pay and productivity displayed no trend in the period 1970-1996, i.e that establishment-level pay did *not* become more responsive to establishment-level productivity, which findings as Skans et al (2009) argue suggest no growth in local rent-sharing.

All of this evidence points away from the argument that in Sweden the link between pay and post was significantly eroded from 1983 (by for example growing local rent-sharing) and towards the argument that even the limited, faltering, and often reversed, increases in inter-establishment pay dispersion in manufacturing from the mid-1980s were, when they applied, predominantly a matter of an increasingly marked concentration of individuals with better observed human capital (perhaps of blue collar employees more than white collar given Hibbs and Locking’s (2000) finding of at least a limited growth in inter-establishment pay dispersion amongst blue-collar industrial employees from 1987 ) in particular establishments. It may well be rather that there was predominantly a growing sorting of those employees with posts and roles evaluated more highly in sector and branch agreements into certain establishments and, maybe more particularly, a sorting of those evaluated more moderately in such agreements into some, smaller, establishments (which would contribute disproportionately to inter-establishment pay dispersion). These is thus no suggestion of any significant growth of inter-occupational/-role/-post dispersion, departures of equal pay for equal work in Sweden since the alleged degradation of MEB/hollowing of sector and branch agreements. The contrast with Denmark in terms of the structuring of pay – its extent - is marked.

Danish joint regulation has, perhaps uniquely, achieved inter-enterprise compression without intra-
 occupational or intra-post compression. This implies very favourable conditions for employer appropriability without what Vernon (2013 online first) terms ‘employee appropriability’. In Denmark, in contrast to Sweden, inter-enterprise compression co-exists with and veils an entrenched privilege at establishment level which stands in stark contrast to the systematic tying of pay to post across establishments in Sweden. In this sense, Denmark’s segmented unionism is very much manifest. It is thus that Denmark is an exceptional country of segmented unionism here, with reference to the implications of union strength for manufacturing employment growth,
and yet fits the pattern of countries of segmented unionism perfectly in Vernon and Roger’s (2013) study of productivity growth.

For present purposes though the crucial point is that the Danish experience from the 1970s shows that a strengthening of segmented unionism bringing exceptional union influence has not necessarily meant weaker manufacturing employment growth. However, the counteraction of the generic effect of stronger segmented unions requires state intervention and/or coordinated joint regulation in its shadow, together perhaps with some element of local cooperation which secures enterprise-level employer appropriability/comfort implying that stronger segmented unions then leave enterprise-level employer appropriability/comfort unthreatened in the way that stronger encompassing unions generally do.

The Danish experience shows that an unstructured pay compression, led and then, to the extent that it continues, underwritten by the state, can offer favourable employer appropriability conditions and thus support manufacturing employment growth even though it cannot offer the advantages to productivity growth of a structured pay compression such as that in Sweden (see Vernon and Rogers, 2013).

b) Historical contingency in the countries of segmented unionism more generally

It is clear from the findings from Sample 2 that although the cross-sectional relationships remain strong enough to support the OLS and random effects results, the longitudinal co-variation between unionization and manufacturing employment growth on which the fixed effects results depend generally breaks down from the early 1990s.

It seems that, by the early 1990s, segmented unions beyond Denmark were already so weakened that their further weakening no longer substantially strengthened local employer appropriability conditions. By this time, outside Denmark, unions in countries of segmented unionism were already so weak that their further weakening could offer employers no significant additional reassurance regarding their ability to extract surpluses from investment in equipment, innovation or the expansion or maintenance of employment. Notably, this is consistent with the indications of non-linearity in the findings overall (i.e. the weak indications of a positive simple segmented dummy not only where the strength of joint regulation is proxied by unionization rates but even where the strength of joint regulation is proxied by the multiplicative of unionization and coverage).

References to be added later.

Preliminary: please do not cite without written permission! Comments welcome.