Class Clues

Michael Tåhlin

Despite recurrent controversy, class theory remains the major sociological explanation of social inequality. While there are several approaches to class theory, one particular model has achieved dominance in empirical research over the last decades: the EGP (or Goldthorpe) class schema. In this article, the theoretical foundations of this model are tested empirically on the basis of unique Swedish data on employment relations. The outcome of the test is decisively negative for the theory. Reciprocal dependence relations between workers and employers—at the center of attention in current conceptual accounts, but never before explicitly measured—are conspicuously unimportant in a class context. Instead, the main source of class advantage among employees is the skill content of jobs. This accords well with parts of the early theoretical justifications of the EGP class model, elements that have since been abandoned. It is suggested that future theoretical work on class inequality should return to the skill-based roots of the model and proceed from there. Such a return is additionally motivated by a wealth of evidence from the literature on work-life stratification that class research has so far tended to ignore.

Introduction

Despite recurrent controversy, class theory remains the leading sociological explanation of social and economic inequality—indeed, recent years have seen a growing theoretical activity in the field. While there are several distinct variants of class theory,[1] one particular model has achieved dominance in empirical research over the last decades: the EGP schema (Erikson *et al.*, 1979; Erikson and Goldthorpe, 1992, Ch. 2; Goldthorpe, 2000), also called the Goldthorpe class model. The most recent development is the construction of a new European socio-economic classification—ESeC—which is explicitly based on the EGP conception of class.[2]

My concern in the present article is the theoretical foundations of this model, which I attempt to assess empirically on the basis of new and unique Swedish data. I will show that a vital part of the original rationale behind the EGP class schema was basically sound and highly useful: the emphasis on occupational skill requirements. In contrast, the more recently developed rationale, based on the notion of employment relations, appears to be out of line with the data. The empirical findings strongly indicate that the main source of class advantage among employees is the skill content of jobs, while reciprocal dependence relations between workers and employers—at the centre of attention in current conceptual accounts— are relatively unimportant. Future theoretical work on class inequality would therefore do well by returning to the skill-based roots of the EGP model and proceed from there.

The article is organized as follows. I begin with an overview of the theoretical rationale behind the EGP class schema, and how it has evolved over time, highlighting the shift from skills to employment relations in the conceptual apparatus. I then describe the data and analytical strategy, before turning to the

I	Professionals, administrators and managers; higher-grade	(ESeC 1)
II	Professionals, administrators and managers; lower-grade, and higher-grade technicians	(ESeC 2)
IIIa	Routine nonmanual employees; higher-grade	(ESeC 3)
IIIb	Routine nonmanual employees; lower-grade	(ESec 7)
IVabc	Small proprietors and employers, self-employed workers	(ESeC 4-5)
V	Lower-grade technicians, supervisors of manual workers	(ESeC 6)
VI	Skilled manual workers	(ESeC 8)
VII	Nonskilled manual workers	(ESeC 9)

Figure 1 The EGP class schema (from Goldthorpe, 2000: 209; ESeC numbers from Rose and Harrison (2007); see also http://www.iser.essex.ac.uk/esec/guide/table1.php)

empirical results. In a concluding section, I discuss implications of the findings and suggest productive ways forward.

Theoretical Foundations of the EGP Schema

The EGP schema (see Figure 1 for the current version, including the corresponding new ESeC class labels) has two similar but distinct origins, usually not clearly separated in the literature, both developed in the 1970s. One origin is from John Goldthorpe. An occupational scale of 'general desirability' (Goldthorpe and Hope, 1974) with 36 (originally 124) rank-ordered categories was collapsed into a schema of seven categories ('classes') with both hierarchical and non-hierarchical properties (Goldthorpe and Llewellyn, 1977) for the purpose of mobility analyses. The class schema was intended to differentiate between occupations according to the 'market and work situations' of their incumbents.[3] Beyond this, little was offered in the way of explicit criteria for the classification. There was a brief reference to Renner's (1953) discussion of what he calls the 'service class' ('*Dienstklasse*') to indicate the conditions of classes I and II of the schema. At the other end of the structure (classes VI and VII), a distinction was made between 'skilled' and 'non-skilled' manual occupations, but aside from that skills were not explicitly mentioned. It is notable, however, that the Goldthorpe–Hope scale of 'desirability' is explicitly based on the 'social standing' of occupations as perceived by British respondents. Social standing, in turn, was shown to correlate very highly with several underlying dimensions of which the most influential was the perceived 'qualifications' of the occupational incumbents (Goldthorpe and Hope, 1974: 14–17, 157).

The other origin of the EGP schema is from Robert Erikson. In revising the Swedish socio-economic classification in the 1970s, Erikson and colleagues (Gösta Carlsson among them) constructed a schema (called SEI) that resembled (but was independent of) Goldthorpe's simultaneous efforts, although with a few distinctive traits (Carlsson *et al.*, 1974). As in Goldthorpe's case, the theoretical considerations were not very elaborate (there is again a short reference to occupational variation in 'market and work situations'), but the SEI classification was based on three explicit criteria: (i) employment status (distinguishing between employers, self-employed without employees, and employees); and, within the category of employees, categories of occupations were distinguished by (ii) their technological character (manual versus non-manual tasks); and within these categories, by (iii) the typical skill requirements of the occupations, chiefly in terms of the amount of education required before the point of hiring. Skill is thus an explicit and vital discriminating criterion in the SEI schema,[4] which is still widely used in Sweden.

The Erikson–Goldthorpe joint model (EGP) in its first explicit formulation (Erikson *et al.*, 1979) was primarily based on the original Goldthorpe schema (Goldthorpe and Llewellyn, 1977), but in practice the overlap between EGP and the Swedish SEI is close to complete, especially as regards the category of employees. It is therefore clear that the differences in theoretical foundations—in particular the heavy emphasis on skill in the SEI case and the reference to the 'service class' in the Goldthorpe–Llewellyn case—were not very consequential for operationalizations.

The notion of the service class was significantly expanded on by Goldthorpe (1982) in a discussion of how to understand the class diversification among employees. Here he develops a theory of class as employment relations, distinguishing between two ideal-typical forms of the employment contract—the service relation and the labour contract. Extending the reference to Renner (1953), Goldthorpe writes that

'the labour contract provides for more or less discrete amounts of labour to be exchanged for wages on a relatively short-term basis; but the service relationship is such that the exchange in which employer and employee are involved has to be defined in a much less specific and longer-term fashion and with far greater moral content' (1982: 168–169). Crucially, the performance of service class employees depends on 'the degree of their moral commitment to the organization', elicited by the employer through 'rewards that are of an essentially *prospective* kind: that is, as embodied in understandings on salary increments, on security both in employment and after retirement and, above all, on career opportunities' (ibid; emphasis in original).

This conception forms the basis of the late theoretical formulation jointly made by Erikson and Goldthorpe (1992: 35–47). Here they write that a service relationship rather than a labour contract can be expected to emerge 'where it is required of employees that they exercise *delegated authority* or *specialized knowledge and expertise* in the interests of their employing organization' (p. 42, emphasis in original). The skill content of jobs would thus seem to be a crucial factor in distinguishing employee classes from each other, but this is not the case: 'While one would, then, from this point of view, expect to find a close association between type of employment relationship and the content of work tasks and roles, it should be emphasized that it is the *former* rather than the latter that, for us, is decisive in determining class position' (ibid., emphasis in original).

By the early 1990s, then, the conceptual rationale of the EGP model had moved towards a theory of firm internal labour markets. Goldthorpe has since continued on this path, still a bit hesitatingly or inconsistently (1997) and then very explicitly (2000), which contains the clearest and most elaborate theoretical statement of class theory in the EGP variant thus far. In this piece, all reference to Renner (1953) is dropped. Instead, the reasoning is based on the transaction cost economics distinction between markets and hierarchies (Williamson, 1975). The idea is that the labour contract resembles a spot market in that both parties (workers and employers) are relatively independent from each other, while the service relation resembles the opposite situation: stable organization due to reciprocal dependence.

There are two factors in the work and market situation that give rise to this difference in employment relations: (i) the degree of difficulty that the employer has in monitoring the efforts of the employee; and (ii) the degree of 'human asset specificity', mainly the amount of firm-specific on-the-job training that the employee has acquired since entry, implying high training costs for replacements. In order (i) to increase the level of employee performance in jobs that are hard to monitor, and (ii) to reduce the risk of employee turnover in asset specific jobs, the employer needs to elicit *commitment* to the employing organization among the workers concerned. The instrument to achieve this is the service relation: a reward structure that ties the employee to the organization by offering employment security and good internal career prospects, not least with respect to earnings growth. Hence the class differences in work-life rewards.

Note that while the two determining factors of the employment relationship—monitoring difficulties and asset specificity—are distinct as causes, they are identical in their consequence, namely an employment contract of the service relation form. This causal model is based on a long tradition in organizational economics, mainly in the transaction costs framework (Williamson, 1975) but also incorporating elements from personnel economics (Lazear, 1981, 1990) and other models of incentives in firms (e.g. Milgrom and Roberts, 1992; Gibbons, 1997). In Williamson's (1981) main contribution directed at a sociological audience, he explicitly asserts that uncertainty (difficulty in metering productivity) and asset specificity (the degree to which valued skills are firm-specific) are the twin driving forces behind the design of employment contracts (1981: 563ff). According to Goldthorpe (2000), when either of these conditions is present— and especially when both are—the contracting parties enter into a service relation, characterized by reciprocal dependence (or 'bilateral dependency'; ibid.: 221).[5]

This theory—the application of transaction cost economics and internal labour market models to class inequality—has not been empirically tested. While there has been a fairly large amount of ambitious validity testing of the EGP class schema in recent years, with generally positive results, close to all of the validation activity has concerned aspects that are secondary to the concept of employment relations. Thus, British survey data from various sources show that members of the service class (classes I and II, or the 'salariat'), relative to manual workers and routine non-manual employees (classes VI, VII, and IIIb), are, *inter alia*, (i) paid through a monthly salary rather than on an hourly basis, (ii) have a higher degree of autonomy, both with respect to working hours and to carrying out their job tasks, (iii) have lower rates of unemployment, and (iv) have more positive age-earnings profiles.[6] None of these results comes

as a surprise, and all of them are consistent with empirical patterns of inequality found in many other countries. More importantly, however, none of the factors is directly related to the issue of how firm internal employment relations vary by class. And none of them is compared to (or examined controlling for) the class gradient in the skill requirements of jobs.

To properly assess the Class as Employment Relations (CER) theory, several kinds of data are needed. First, firm internal and external conditions must be separated and compared, in order for meaningful conclusions to be drawn. For example, class differences in age-earnings profiles are not informative of class differences in seniority-earnings profiles, which would appear to be the more relevant indicator in the CER context. Second, direct indicators of dependence relations between employers and their employees would facilitate an explicit test of the CER theory in its current form. Such data have not been available before, but have recently been collected in Sweden (see below), in the European Social Survey (ESS) 2004, and in the 2005 wave of the International Social Survey Program (ISSP). Third, the CER view of class should ideally be evaluated against alternative conceptions. The most relevant alternative in the EGP case is 'class as skill requirements', not only because this was a crucial element in the creation of the model, but also (and relatedly) because the EGP model is operationalized on the basis of occupations and, by a standard definition, 'occupations are collections of tasks which are differentiated primarily in the skill—the training and talent—necessary for their performance'.[7] In what follows, I attempt to move forward on all three of these fronts.

Dependence Relations

A common way to specify how deviations from pure competition ('spot markets') affect the distribution of rewards is to create theoretical dichotomies between market-like conditions and their opposite. Goldthorpe's (1982) distinction between the labour contract and the service relation is one instance of this general line of thought. Sørensen's (1983) distinction between open and closed positions is another influential sociological example. In economics, models of the same kind distinguish between markets and hierarchies (Williamson, 1975), external and internal labour markets (Doeringer and Piore, 1971), and outsiders and insiders (Lindbeck and Snower, 1988).

A general weakness of these dichotomous views is to contrast the independence of actors in the competitive market with only one state: *reciprocal* dependence in

Employer dependent on worker

		No	Yes
Worker dependent on employer	No	Market (no ties)	Worker dominates
	Yes	Employer dominates	Attachment (reciprocal ties)

Figure 2 Dependence relations between workers and employers

less market-like conditions. Actors A and B are seen as independent of each other in the market sector, but as tied together in a double bind in the other sector. Hence, situations of *asymmetric dependence* (i.e. domination) are ignored. But such states of course occur, may be common, and arguably should be more consequential for reward attainment than cases of reciprocal (in)dependence.

Consider the crosstabulation in Figure 2. A reasonable prediction is that the level of worker rewards (wages for instance) is highest in the cell 'worker dominates' and lowest in the cell 'employer dominates'. To see why, a market analogy is helpful. The 'employer dominates' situation may be seen as indicating an excess supply of labour relative to demand, pushing the price (wages) down, while wages are pushed up in the converse situation ('worker dominates', indicating excess labour demand relative to supply). By contrast, there is no strong reason to expect that rewards will generally be higher in the case of 'reciprocal ties' than in the 'market' because both situations indicate that supply and demand are in balance.[8] Other outcomes may be expected to vary across the two symmetrical states, however. For example, worker mobility out from the firm is probably significantly lower in the case of mutual dependence than in the market-like case, while the likelihood of firm-internal advancement is probably higher.

Data on Dependence

These dimensions were measured in the Swedish Level of Living Survey (LNU) 2000, through direct indicators of dependence between workers and their employers (as perceived and reported by employed respondents).

Table 1 Dependence crosstabulation

| | Employer dependent | | |
	No	Yes	Total
Worker dependent			
No	679	1012	1691
Percent of total	22.4	33.4	55.8
Yes	734	606	1340
Percent of total	24.2	20.0	44.2
Total	1413	1618	3031
Percent of total	46.6	53.4	100%

Note. No = response alt. 3, 4, 5; Yes = 1, 2 (see main text); No/No = Market (no ties); E Yes/W No = Worker dominates; E No/W Yes = Employer dominates; Yes/Yes = Reciprocal ties.

Table 2 Impact of dependence relations on wages (ln wage/h)

	B	SE	*t*	Sig.
Attachment	0.011	0.016	0.7	0.465
Employer dominates	−0.048	0.015	−3.2	0.002
Worker dominates (ref = Market)	0.074	0.014	5.3	0.000
R^2	0.231			
Attachment (scale 1–9)	0.007	0.004	1.9	0.055
Dominance (scale 1–9)	0.030	0.003	9.9	0.000
R^2	0.236			

OLS regression, N = 2,916.
Note. Education (years) and experience (years, incl. sq. term) included in models.

The indicators consist of the following two interview questions:

(A) How difficult do you think it would be for your employer to replace you if you left?

(B) How difficult do you think it would be for you to get a job as good as your current one if you for some reason had to leave your employer?

There were five response alternatives to both questions: 1 = 'very difficult', 2 = 'fairly difficult', 3 = 'not especially difficult', 4 = 'fairly easy', and 5 = 'very easy'. The results show that very few employees see themselves as being in a clear-cut market situation.[9] Only 11 per cent of all workers think that it would be 'very easy' for them to find another job of the same quality as their current one if they were forced to search for alternative employment. An even smaller fraction, 5 per cent, think that it would be 'very easy' for their employer to replace them if they quit.

If the market requirement is relaxed a bit, however, to include all responses implying that replacements could be found on either side (worker and employer) without significant difficulties, around 22 per cent of all employees appear to be in a market-type situation (see Table 1). Almost as many, 20 per cent, have an employment relation marked by reciprocal ties. Hence, less than half of all employment consists of open (market) or closed (double-bind) positions.

A majority of all jobs are situated in asymmetrical dependence relations. Interestingly, the most common case (33 per cent of all workers) is that employees see themselves as stronger (less dependent) than their employer. Only 24 per cent see themselves as the weaker party in the employment relation.

The two indicators are combined to form two continuous measures of dependence, for each of the two diagonals in Figure 2. The first goes from 'market' to 'attachment' (reciprocal ties), while the second goes from 'employer dominates' to 'worker dominates'. The definition is 11 − (a + b) in the first case and 5 + (a − b) in the second, where (a) and (b) are responses to the two interview questions (A and B) mentioned earlier.

Validation

It is important to validate these measures based on subjective perceptions against information of a harder kind. In Table 2, we see that the dependence measures are strongly and significantly related to individual wages in the expected direction. (For definitions and descriptive statistics of all variables used in the empirical analyses of the article, see Appendix). In order to make the results as transparent as possible with regard to how employer and employee dependence, respectively, are related to wage and mobility outcomes, two separate models are estimated.[10] First, wage differences across the four dependence states are examined. Compared to market-type relations (the reference category), in which workers and employers are relatively independent of each other, wages are significantly higher in worker dominated states and significantly lower in employer dominated states. Dependence states marked by reciprocal ties, however, do not differ (on average) from market wages. All these effects are clearly in line with theoretical expectations. Second, turning to the

Table 3 Impact of dependence relations on expected firm exit

	B	**SE**	*t*	**Sig.**	**Exp(B)**
Attachment	−1.02	0.17	−6.0	0.000	0.36
Employer dominates	−0.58	0.15	−3.9	0.000	0.56
Worker dominates (ref = Market)	−0.39	0.13	−3.1	0.002	0.68
R^2 (Nagelkerke)	0.122				
Attachment (scale 1–9)	−0.28	0.04	−7.9	0.000	0.76
Dominance (scale 1–9)	0.02	0.03	0.7	0.492	1.02
R^2 (Nagelkerke)	0.135				

Logistic regressions, N = 2,986.
Note. Education (years) and experience (years, incl. sq. term) included in models.

continuous scales, we see that the wage impact of worker dominance is very strong, while the impact of the market-attachment dimension is not significant.

As an additional validation, the association between dependence states and job mobility is considered. It is to be expected that the worker's probability of leaving the current employer is systematically related to her/his assessment of alternative employment prospects. The situation most conducive to job mobility is the market, with a relatively high degree of independence between workers and employers, i.e. with good alternative prospects on both sides of the employment relation. Conversely, job matches of a closed employment type, with reciprocal ties between the parties, are especially unlikely to be dissolved. Asymmetrical dependence states should fall between these two extremes, with worker dominated relations closer than employer dominated relations to the market since most job shifts are 'voluntary', i.e. worker initiated.

These expectations are entirely borne out by the two models shown in Table 3 (again, education and experience are included in both models). Workers who see themselves as being in a market-type situation are by a good margin the ones who are most likely to think that they will leave their current employer within one year. At the other end, employees who view themselves as having reciprocal ties with their employers are the ones least probable to exit. In between these two categories, individuals in the asymmetric dependence states are found. As predicted, workers who are less dependent on their employers than *vice versa* are more likely to leave than more dependent

workers are. The model with continuous scales shows a strong association between expected mobility and the market-attachment dimension, and an insignificant mobility impact of the dominance dimension. Hence, as expected, the outcome is the converse of the findings in the wage case.

Class Analysis

Having thus validated the measures of dependence, it is now time to connect them to the issue of testing class theory.[11] In a first step, I examine whether the distinction between the service relation and the labour contract is empirically associated with dependence relations between workers and employers in the way that the CER theory claims. While this examination by itself goes a long way toward an empirical validation of the class model, a proper test of the underlying theory requires more. The analysis should go beyond the contemporaneous association between class position and contract form and illuminate the causal processes that are assumed to shape this association. In a second step, therefore, I look at the causes of class and contract. In the CER theory, the form of the employment contract is explained by two factors, monitoring difficulties and human asset specificity. In regression models with dependence relations and class as outcome variables, I assess the impact of these two factors, and compare their influence with the effect of skill requirements. Finally, in a third step, I examine class consequences. As an explanation of inequality, it is obviously required of the CER theory that it succeeds in accounting for the distribution of labour market rewards. Prospective remuneration, *inter alia* in the form of earnings growth, is typically singled out by the theory's proponents as an especially important aspect of class advantage. In what follows, I look at both wage levels and wage growth.[12]

Step 1: Class and Dependence

According to CER theory, the labour contract—resembling a spot market situation—is characterized by mutual independence between workers and their employers, while the service relation forms the polar opposite case—reciprocal dependence. It is therefore to be expected that members of the service relation classes (I and II) should have high values on the market-attachment scale while members of the labour contract classes (IIIb, VI, and VII) should have low values on the same scale. In contrast, there is no clear expectation regarding how much these two categories of employees differ from each other along the other
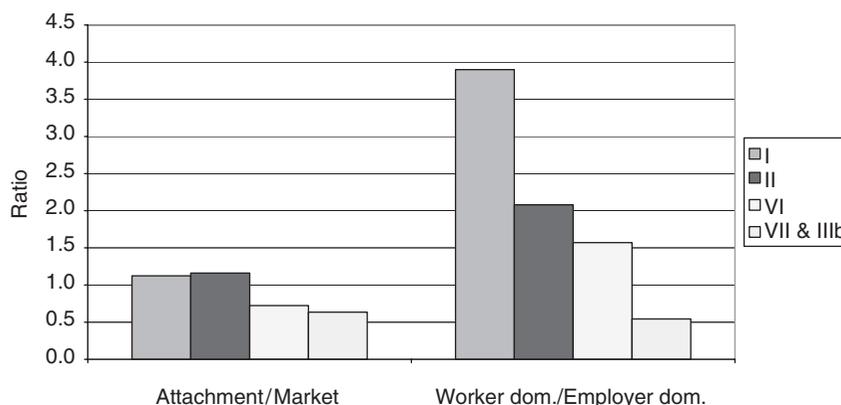
Note: The figure is based on the following data (*the two groups of staples show the two right-most columns*):

EGP	Market	Attach	Edom	Wdom	Sum	Attach/Market	Wdom/Edom
I	16.89	18.98	13.09	51.04	100 %	1.12	3.90
II	18.05	20.96	19,80	41.19	100 %	1.16	2.08
VI	25.00	18.10	22.13	34.77	100 %	0.72	1.57
VII, IIIb	27.96	17.79	35.12	19.13	100 %	0.64	0.54

Figure 3 Dependence relations by class

dimension of dependence, i.e. that of dominance. While informal or common-sense reasoning suggests that the service class has a stronger position than the working class vis-à-vis the employer, the employment relation theory of class is explicitly concerned with the attachment dimension only, and silent on the dominance dimension. Evidently, the attachment dimension is seen as the significant driver of class inequality.

Figure 3 displays the empirical class differences in dependence relations. For each of the four classes concerned (IIIb and VII have been merged here), the figure shows the ratio between (i) the proportion of employees in one state of dependence and (ii) the proportion in the opposite dependence state. The prediction from the CER theory is that the attachment/ market ratio should differ greatly across the four classes concerned, while the class differences in the dominance ratio case should be much less marked. As can be clearly seen in the figure, precisely the opposite pattern is found: class inequality in dependence relations is much more an issue of differences in asymmetrical dependence than of differences in mutual attachment. In fact, class differences in attachment are conspicuously small. This is a first strong sign, with

several others to follow shortly, that the employment relations theory of class is empirically problematic.

In the following, I concentrate on the classes primarily involved in the labour contract—service relation distinction. In contrast to class analysis orthodoxy, but in line with the theoretical reasoning underlying the Labour Contract—Service Relation (LC–SR) dimension,[13] I construct a continuous scale (CC) from 0 to 1, with classes IIIb and VII assigned 0, class VI = 0.2, class II = 0.8, and class I = 1. While the exact numbers are of course arbitrary, their internal relations are not: the important points are that (i) the ranking is clear and well-motivated, (ii) there should be a difference in numbers both within and between the LC and SR states, and (iii) the difference within states should be smaller than the difference between states.

Step 2: Class Causes

I now turn to the determinants of class relations. In the CER theory there are two explicitly stated contractual hazards that lead to variation in employment relations: monitoring difficulties and human asset specificity. I measure the first by employee autonomy in carrying out work tasks[14] and the second by the amount of firm-specific on-the-job

Table 4 Dependence relations and class predicted by individual and job characteristics

	Attachment		Dominance		Class	
	B	**t**	**B**	**t**	**B**	**t**
Education	−0.084	−7.5	0.092	7.2	0.032	12.8
Skill req.	0.045	3.4	0.062	4.2	0.074	25.7
Seniority	0.326	4.5	−0.319	−3.8	0.003	0.2
Gen OJT	0.001	0.5	0.021	7.6	0.004	8.1
Spec OJT	0.027	7.5	−0.020	−4.9	0.002	3.0
Autonomy	0.102	7.4	0.109	6.9	0.026	8.4
R^2	0.071		0.136		0.560	
N	2,897		2,897		2,356	

OLS regressions.
Notes. Seniority is measured as (years of seniority)/(years of experience).
The third model excludes classes IIIa and V (see explanation in main text).

training (OJT). As a contrast to the latter, I also use an indicator of the amount of OJT in the present job that is *general*, i.e. useful with other employers (according to the respondent). In addition, an alternative measure of attachment and firm-specific training is included: the proportion of the total time in gainful employment that the respondent has spent with her/his current employer (seniority divided by experience). Finally, the skill requirements of the job are indicated by the number of years of post-compulsory education needed in the present job (as assessed and reported by the respondent).[15]

Consider the following correlations (Pearson's *r*) between class (CC) and these five measures.

Autonomy	0.33
Specific OJT	0.08
General OJT	0.39
Seniority	0.04
Skill requirements	0.71

Several important conclusions follow from this small set of simple numbers. First, the association between class and human asset specificity is close to zero. This is in line with the findings above on dependence relations. Second, not only is asset *specificity* a conspicuously weak factor in the class context, but asset *generality* (general OJT) is quite strongly related to class. This is again in line with the dependence relation results, which showed that good outside options are an important class corollary. Third, there is a clear positive association between class and autonomy, in line with much previous research. Finally, the association between class and skill

requirements is very strong, by far the strongest in the distinguished set. This correlation is not surprising, considering the skill-based origin of the class model, and appears much too strong to be ignored in future theoretical work.

In Table 4, attachment, dominance, and class are modelled as three separate outcomes, with the five measures of antecedents (plus education) as predictors. The results on the two dependence scales show strong relations largely in line with theoretical expectations. Thus, the indicators on human asset specificity—seniority and firm-specific OJT—have a highly significant positive impact on the attachment scale and a significantly negative impact on the domination scale. Conversely, the indicator on general training has a very strong positive effect on domination (worker strength vis-à-vis the employer), but is unrelated to the market–attachment dimension. These findings accord well with standard models of internal labour markets, further corroborating the validity of the asset specificity and dependence measures.

Class (CC) is the outcome in the third model. Three conclusions emerge. First, human asset *generality* is much more important in the class context than is asset specificity. The seniority relation with class is close to zero, while the amount of specific OJT has a significant effect in the expected direction, but the association is much weaker than that between general training and class. Second, worker autonomy is strongly class-related. In order to interpret this association, it is useful to examine the relations between autonomy and dependence. Autonomy is strongly related to both attachment and domination. This indicates that autonomy reflects (at least) two underlying processes, of which one may be the monitoring difficulties to which the CER model is tied. The other process could then be autonomy as general skill development (cf. Halaby and Weakliem, 1989: 556f) that may enhance workers' external employment opportunities. Third, the skill requirements of the job again stand out as the major class differentiating factor. Note that this very large effect is net of education (which by itself, as a skill measure on the supply side, is strongly associated with class).

Taken together, the results of the second step of the empirical analysis lend considerable support to the internal labour market perspective that the CER theory is based on: contractual hazards in the form of uncertainty and asset specificity indeed appear to be important driving forces behind employment relations. Crucially, however, these relations seem largely unrelated to class. Instead, class is tightly connected to skill requirements.

Table 5 Wage (ln wage/hour) predicted by individual and job characteristics

	B	t	B	t
Female	−0.137	−14.6	−0.162	−15.6
Education (years)	0.021	9.8		
Experience (years)	0.014	10.2	0.010	4.7
Exper. sq./100	−0.022	−7.5	−0.019	−4.2
Seniority (years)	0.001	1.1	0.003	2.8
Skill req. (years)	0.029	12.6		
General OJT	0.005	11.0		
Specific OJT	−0.001	−1.4		
Autonomy	0.017	7.2		
Class			0.302	9.4
Class × experience			0.014	3.9
Class × exper. sq./100			−0.023	−2.9
Class × seniority			−0.005	−3.2
R^2	0.404		0.401	
N	2,872		2,379	

OLS regressions.
Note. The second model excludes classes IIIa and V (see explanation in main text).

Table 6 Wage growth (ln wage/h t_2–ln wage/h t_1) predicted by individual and job characteristics measured at t_1 ($t_1 = 1991$, $t_2 = 2000$)

	B	t	B	t
Female	−0.082	−7.4	−0.077	−6.5
Education (years)	0.016	6.3		
Experience (years)	−0.012	−6.0	−0.011	−4.0
Exper. sq./100	0.021	4.0	0.018	2.4
Seniority (years)	0.000	0.6	0.002	1.4
Skill req. (years)	0.012	4.1		
General OJT	0.001	2.9		
Specific OJT	−0.002	−2.7		
Autonomy	0.009	3.5		
Class			0.178	4.5
Class × experience			0.008	1.6
Class × exper. sq./100			−0.020	−1.4
Class × seniority			−0.005	−2.3
R^2	0.249		0.229	
N	1,880		1,470	

OLS regressions.
Notes. Both models include a control for wage at t_1. The second model excludes classes IIIa and V (see explanation in main text).

Step 3: Class Consequences

Finally, we turn to class consequences by examining wage determination. The association between class and the *level* of wages has not been a central interest in the class literature since the early writings of Wright and Perrone (1977) and Wright (1979).[16] In the employment relations theory of class, earnings *growth* is singled out as the crucial factor, in line with the emphasis on prospective rewards. But current wages must also be considered: if earnings levels are unimportant, it is hard to see why the development of earnings would be of interest.[17] In what follows, I examine both.

There are two wage regressions in Table 5, both with current wages as outcome. The first is a standard Mincer model, with the indicators of seniority, skills, training, and autonomy as additions. All predictors have highly significant effects, with two conspicuous exceptions: the measures of human asset specificity (seniority and firm-specific OJT). Skill requirements and general training have the strongest impact of all factors. The second model begins to address the issue of wage development, by looking at the slope of the seniority-wage profile and its interaction with class. Note first the strong main effect of class on current wages. Secondly, the prediction from CER theory on wage development profiles is not supported in this limited (cross-section) model: contrary to expectations,

service class employees have a *flatter* wage profile than labour contract employees across levels of seniority.[18] According to these estimates, seniority wage returns are small although significantly positive for the labour contract classes but close to zero for service class employees. In contrast, experience-wage gradients, given seniority, are significantly steeper for members of the service class than for others. The opposite signs of the class interactions with experience and seniority, respectively, are in line with the finding above that asset generality—but not specificity—is an important source of class inequality.

Analyses of wage growth, based on panel data from 1991 and 2000, are shown in Table 6. The outcome variable is wage change between these two time-points, while all determinants are measured at the first time-point. All main results from the cross-sectional (wage level) analyses are replicated here. Hence, skill requirements and general training have large positive effects on the rate of wage growth, together with autonomy, while the indicators of asset specificity have a weak or insignificant impact. According to the second model, given class—which again has a very strong effect—the impact of seniority on wage growth is close to zero for labour contract employees. Crucially, the class-seniority interaction effect is significantly negative, in line with the wage level case.

This result again disconfirms an important prediction from the CER perspective.

In sum, Goldthorpe's conception of class as employment relations appears to be out of line with the data across the entire causal chain, from determinants (contractual hazards) through correlates (dependence relations) to outcomes (economic rewards). Indeed, it is rare to find such a decisively negative outcome of a test when assessing a theory that is so widely accepted and used. But this is also the first proper test of the theory, on the basis of data that have not been available before. To the extent that the empirical results are valid, theoretical modifications are called for. In the concluding section below, I sketch the directions that I believe such modifications should take.

Before doing so, let me underline that the negative results for the CER theory are conditional on two important limitations. First, the predictions put to test are based on my reading of the theory, which may deviate at some points from the intentions of the theory's proponents. I believe, however, that discussion of possible disagreements in this regard will enhance clarity and precision in future theoretical work. Second, the empirical tests are based on data from one country only (but see note 18), and in crucial parts rely on indicators that are new in the literature. Further work on other kinds of data, or on similar data for other countries, may obviously motivate revised conclusions. The analyses in the present article provide class clues, not definitive evidence.

Concluding Discussion

In current theoretical accounts, social class in its EGP (or the new ESeC) version is based on the notion of employment relations—specifically, among employees, on the distinction between the service relationship and the labour contract. As shown above, this *post hoc* theoretical rationale for the class schema does not seem to work empirically. The promising route forward takes as its point of departure the notion of occupational skill requirements (OSR). The grounds for this view are the following. (i) OSR is—in contrast to employment relations—highly correlated with class as conventionally operationalized (EGP), which in itself is not surprising given the original class definition by Erikson; (ii) OSR is strictly a demand side dimension of stratification, i.e. it is a characteristic of the position held by an individual rather than a trait of the individual her/himself, which

is crucial since class is supposedly a positional concept; (iii) OSR is—in contrast to social standing (or prestige)—not tied by construction to any of the determinants or outcomes of stratification that class is supposedly connected to in the empirical world, such as schooling or income; (iv) OSR can be expected, however, to be empirically tied to these determinants and outcomes through theoretically sound mechanisms.

These mechanisms revolve around a theoretically central notion that is conspicuously absent from most sociological writings on stratification and inequality: productivity. Indeed, 'productivity' (at the individual or firm level) is not even listed in the index of the main current reader on stratification (Grusky, 2001). Service class employees may be expected to reap relatively large benefits from productivity in two ways. First, the productive value of the job is high, at least in the eyes of the employer who is therefore prepared to pay relatively well for its execution. This mechanism is supported empirically by many studies (see, e.g. overviews in Farkas *et al.*, 1997; Kerckhoff *et al.*, 2001). It is also compatible with a Marxist perspective on inequality in job rewards among employees (see, e.g. the discussion in Sørensen, 1991, 2000).[19] Second, by carrying out complex tasks the employee may become more productive, in ways that are useful both with current and future employers. This mechanism is related to the notion of 'jobs as training slots' (Thurow, 1975) and to the wide array of findings on the mental impact of job complexity (Kohn and Schooler, 1983; Schooler *et al.*, 2004). The provision by employers of general training, out of line with standard human capital theory, is now widely recognized by labour economists as an empirically pervasive phenomenon and the subject of very active theoretical work (see the overview in Leuven, 2005).

The concept of productivity, even if neglected in most stratification research, is clearly connected to the more standard sociological concept of 'life chances', meaning resources that individuals can use to achieve desired life-goals. Economists often refer to these resources as 'human capital'.[20] Regardless of terminology, the thought that inequality in rewards is tied to inequality in resources is highly straightforward. From this point of view, research on class inequality should address three distinct distributional issues: (i) how differences in productivity (or resources) emerge (i.e. inequality of opportunity), (ii) how productivity in turn affects rewards, and (iii) how differences in rewards, given differences in productivity, emerge.

All three issues are central to stratification, and all require taking productivity into account.[21]

While 'class as skill requirements' is certainly a theoretical view that accounts well for observed empirical regularities, via the productivity mechanisms spelled out earlier, it needs to be explicitly related to two individual characteristics: education and ability. With regard to education, it is obvious that the skill requirements of jobs are strongly related to individuals' attained level of schooling. Nonetheless, they are distinct, both conceptually and empirically, since one is a positional characteristic and the other a personal. Indeed, there is a large literature in the economics of education that explicitly models their separate and combined contributions to economic rewards. This literature started with Duncan and Hoffman (1981), who showed that the pecuniary payoff to education and/or to skill requirements is highest when the two are well matched. This result has been replicated in virtually all published studies since then (see Rubb, 2003 for an overview). The implication is that neither human capital theory (considering only the supply side, or the person) nor an exclusively structural approach (considering only the demand side, or the position) is sufficient in accounting for the distribution of labour market rewards.

With regard to the role of ability in stratification processes, the literature is less conclusive (see Farkas, 2003 for an overview). While it is well established that both education and cognitive ability are important determinants of labour market rewards, the causal relationships involved are complex. The most recent sophisticated estimates (Winship and Korenman, 1997; Hansen *et al.*, 2004) indicate that ability is the dominant causal factor in a reciprocal relationship with education, but that schooling also has a fairly strong net impact on economic rewards. Aside from cognitive ability, the impact of non-cognitive individual traits (such as persistence and conscientiousness) on labour market outcomes needs to be considered (in addition to the Farkas overview, see esp. Bowles *et al.*, 2001). In sum, several kinds of productivity related individual characteristics must be taken into account when assessing the causal impact of class on labour market rewards. It should again be underlined, however, that causal feedback loops are involved, such that the skill content of jobs ('class' in my view) may significantly affect individual productivity.

In conclusion, the empirical analyses above strongly indicate that the current operationalization of the EGP class schema is inconsistent with the 'class as employment relations' conceptual perspective. To the extent that these empirical results are valid, one can keep either the operationalization of the class schema or the theoretical conception of it, *but not both*. Considering the large amount of empirical findings across time and space that show many dimensions of inequality to be systematically related to social class as currently operationalized, it seems more productive to let go of the theoretical conception. But an alternative theory is then obviously needed. I have suggested, on both empirical and theoretical grounds, that this theory should be based on the concept of skill requirements. This is not a new idea, but a good idea, supported by a wealth of evidence. It should not have been abandoned.

Notes

1. For a recent overview, see Wright (2005b). See also the symposium in AJS (2000).
2. See Rose and Harrison (2007) and http://www.iser.essex.ac.uk/esec/.
3. This conception emanates from Weber; see also Lockwood (1958).
4. SEI was slightly modified in the 1980s; see Andersson *et al.* (1981).
5. Although the contractual hazards brought about by monitoring difficulties may have other solutions than the hazards that asset specificity gives rise to, like piece-rates or direct supervisor control, these are typically not of interest with regard to monitoring the work of service class employees. Instead, the typical solution singled out by Goldthorpe is delayed payment and other prospective reward schemes, such as in Lazear (1981). This solution requires long-term employment relationships involving reciprocal dependence.
6. On (i) and (ii), see, e.g. Evans (1992) and Evans and Mills (1998). On (iii) and (iv), see, e.g. Goldthorpe and McKnight (2006). In general, see the overviews in Rose and O'Reilly (1997), esp. O'Reilly and Rose (1997), and Rose and Pevalin (2003).
7. Siegel (1971: 8), quoted in Stolzenberg (1975: 650).
8. This is unless the double-bind state allows workers to capture economic rents, but these are not an essential feauture of standard attachment models (such as Lazear, 1981), which Goldthorpe relies heavily on. While long-term employment relationships may entail positively sloping wage profiles over internal careers, there is no expected net bonus.

9. The overall distribution of respondents across dependence states is probably affected by the general conditions of the macro-economy at the time of interview. However, these general conditions should affect most or all respondents fairly equally and therefore—as an approximate constant—not bias the associations between estimated dependence and other variables (such as class location).

10. Both models include education and experience (coefficients omitted in the tables).

11. The positive validation also implies that reliability—a necessary condition for validity—is reasonably high.

12. The empirical association between class and contract form indicates the degree of *criterion* validity of CER, since class is *defined by* contract form, while the empirical associations between class and its theoretically stipulated *causes* and *consequences* indicate the degree of *construct* validity of CER.

13. See especially Goldthorpe (2000: 223); also O'Reilly and Rose (1997) who construct a continuous 'service relation score'.

14. Autonomy and monitoring difficulties are not the same thing, but their overlap is significant. Autonomous jobs tend to be more difficult to monitor than narrowly circumscribed jobs, although there are exceptions. While direct survey measures of monitoring are difficult to design in a way that is relevant across technologies and organizational levels, indicators of autonomy are more generally useful.

15. The reliability and validity of this indicator is high. The correlations (Pearson's r) (i) between self-reports in interview and re-interview, and (ii) between self-report in interview and external assessment (by the Public Employment Exchange as a basis for the SEI classification of Statistics Sweden; see above) of educational requirements in the respondents' occupation are 0.88 and 0.83, respectively.

16. But see, e.g. Halaby and Weakliem (1993) and Bihagen (2005).

17. Goldthorpe's original (Goldthorpe and Llewellyn, 1977) and dominant (Erikson and Goldthorpe, 1992) interest in class analysis lies in issues of mobility and class formation rather than of inequality in rewards (such as earnings). As Sørensen (1991: 76) points out, however: 'A theory of how class causes unequal opportunities is of less interest than a theory of how class causes positional rewards. There is a simple reason for this. If class is unrelated to inequality, differential mobility propensities are irrelevant for class formation. Unequal access to equal positions upsets nobody'. Breen and Rottman (1995: 457–458) make a similar argument.

18. One reviewer suggested that this result might be due to Sweden's labour market institutions, and that in less regulated markets (like Britain) the class-seniority wage interaction would be clearly positive (i.e. the economic pay-off to seniority would be relatively large in the service class). Data from the European Social Survey (ESS) 2004 indicate, however, that Sweden is typical rather than special in this regard: With a model specification identical to the one in Table 5, the class-seniority interaction is significantly negative in Britain as well. This is also true for France, while in Germany the interaction is again negative but not significant and in Spain it is close to zero. A joint model of these four countries shows a significantly ($t = 2.5$) negative interaction ($b = -0.009$).

19. Sørensen (1991: 78) cites Roemer (1988: 196): 'The neoclassical model of the competitive economy is not a bad place for Marxists to start their study of idealized capitalism', and goes on to say (ibid.) that '... Marxist theory will be the same as neoclassical theory about income differences among the employed. Systematic differences in wages among people then reflect differences in their productivity'. Wright (2005a: 12) agrees: 'Both skilled and unskilled workers occupy working class locations insofar as they do not own or control means of production and must sell their labor power in order to obtain their livelihood, but vary [in] the amount of one specific resource, skill'.

20. '(A)ctivities that influence future monetary and psychic income by increasing the resources in people ... are called investments in human capital' (Becker, 1964, 1993: 11).

21. Weeden (2002) is a useful analysis of the third issue, successful assessments of which lead to a fourth area of inquiry: how access to reward enhancing resources unrelated to productivity is determined.

Supplementary Material

Supplementary material can be found at ESR Online.

Acknowledgements

References

American Journal of Sociology (AJS). (2000). *Symposium on Class Analysis*, **105** (**6**), 1523–1591.

Andersson, L.-G., Erikson, R. and Wärneryd, B. (1981). Att beskriva den sociala strukturen. Utvärdering av 1974 års förslag till socio-ekonomisk indelning. (To describe the social structure. An evaluation of the 1974 proposal for a Swedish socio-economic classification. (SEI)). *Statistisk Tidskrift (Statistical Review, Statistics Sweden)*, **19**, 113–136.

Becker, G. S. (1964/1993). *Human Capital*, 3rd edition. Chicago: University of Chicago Press.

Bihagen, E. (2005). Labour Market Rewards and the Neo-classical Soup. *Acta Sociologica*, **48**, 63–84.

Bowles, S., Gintis, H. and Osborne, M. (2001). The Determinants of Earnings: A Behavioral Approach. *Journal of Economic Literature*, **39**, 1137–1176.

Breen, R. and Rottman, D. (1995). Class Analysis and Class theory. *Sociology*, **29**, 453–473.

Carlsson, G., Erikson, R., Löfwall, C. and Wärneryd, B. (1974). Socio-ekonomiska grupperingar. (Socio-economic Groupings.). *Statistisk Tidskrift (Statistical Review, Statistics Sweden)*, **12**, 381–400.

Doeringer, P. B. and Piore, M. J. (1971). *Internal Labor Markets and Manpower Analysis*. Lexington: D. C. Heath.

Duncan, G. J. and Hoffman, S. D. (1981). The Incidence and Wage Effects of Overeducation. *Economics of Education Review*, **1**, 75–86.

Erikson, R. and Goldthorpe, J. H. (1992). *The Constant Flux. A Study of Class Mobility in Industrial Societies*. Oxford: Clarendon Press.

Erikson, R., Goldthorpe, J. H. and Portocarero, L. (1979). Intergenerational Class Mobility in Three Western European Societies: England, France, and Sweden. *British Journal of Sociology*, **30**, 415–441.

Evans, G. (1992). Testing the Validity of the Goldthorpe Class Schema. *European Sociological Review*, **8**, 211–232.

Evans, G. and Mills, C. (1998). Identifying Class Structures: A Latent Class Analysis of the Criterion-related and Construct Validity of the Goldthorpe Class Schema. *European Sociological Review*, **14**, 87–106.

Farkas, G. (2003). Cognitive Skills and Non-Cognitive Traits and Behaviors in Stratification Processes. *Annual Review of Sociology*, **29**, 541–562.

Farkas, G., England, P., Vicknair, K. and Stanek Kilbourne, B. (1997). Cognitive Skill, Skill Demands of Jobs, and Earnings Among Young European American, African American, and Mexican American Workers. *Social Forces*, **75**, 913–940.

Gibbons, R. (1997). Incentives and Careers in Organizations. In Kreps, D. M. and Wallis, K. F. (Eds), *Advances in Economics and Econometrics: Theory and Applications*. Cambridge: Cambridge University Press.

Goldthorpe, J. H. (1982). On the Service Class, its Formation and Future. In Giddens, A. and MacKenzie, G. (Eds), *Social Class and the Division of Labour*. Cambridge University Press, pp. 162–185.

Goldthorpe, J. H. (1997). *The 'Goldthorpe' Class Schema: Some Observations on Conceptual and Operational Issues in Relation to the ESRC Review of Government Social Classifications*. In Rose and O'Reilly (Eds), pp. 40–48.

Goldthorpe, J. H. (2000). Social Class and the Differentiation of Employment Contracts. In Goldthorpe, J. H. *On Sociology: Numbers, Narratives, and the Integration of Research and Theory*. Oxford University Press, pp. 206–229.

Goldthorpe, J. H. and Hope, K. (1974). *The Social Grading of Occupations. An Empirical Analysis and a New Scale*. Oxford: Oxford University Press.

Goldthorpe, J. H. and Llewellyn, C. (1977). Class Mobility in Modern Britain: Three Theses Examined. *Sociology*, **11**, 257–287.

Goldthorpe, J. H. and McKnight, A. (2006). The Economic Basis of Social Class. In Morgan, S. L., Grusky, D. B. and Fields, G. S. (Eds), *Mobility and Inequality*. Stanford University Press, pp. 109–136.

Grusky, D. B. (Ed.) (2001). *Social Stratification. Class, Race, and Gender in Sociological Perspective*, 2nd edition. Boulder: Westview Press.

Halaby, C. N. and Weakliem, D. L. (1989). Worker Control and Attachment to the Firm. *American Journal of Sociology*, **95**, 549–591.

Halaby, C. N. and Weakliem, D. L. (1993). Ownership and Authority in the Earnings Function:

Nonnested Tests of Alternative Specifications. *American Sociological Review*, **58**, 16–30.

Hansen, K. T., Heckman, J. J. and Mullen, K. J. (2004). The Effect of Schooling and Ability on Achievement Test Scores. *Journal of Econometrics*, **121**, 39–98.

Jonsson, J. O. and Mills, C. (Eds) (2002). *Cradle to Grave. Life-course Change in Modern Sweden*. Durham, UK: Sociology Press.

Kerckhoff, A. C., Raudenbush, S. W. and Glennie, E. (2001). Education, Cognitive Skill, and Labor Force Outcomes. *Sociology of Education*, **74**, 1–24.

Kohn, M. and Schooler, C. (1983). *Work and Personality. An Inquiry into the Impact of Social Stratification*. Norwood, NJ: Ablex.

Lazear, E. P. (1981). Agency, Earnings Profiles, Productivity, and Hours Restrictions. *American Economic Review*, **71**, 606–620.

Lazear, E. P. (1990). *Personnel Economics*. Cambridge: MIT Press.

Leuven, E. (2005). The Economics of Private Sector Training: A Survey of the Literature. *Journal of Economic Surveys*, **19**, 91–111.

Lindbeck, A. and Snower, D. J. (1988). *The Insider-Outsider Theory of Employment and Unemployment*. Cambridge: MIT Press.

Lockwood, D. (1958/1989). *The Blackcoated Worker*, 2nd edition. London: Allen and Unwin.

Milgrom, P. and Roberts, J. (1992). *Economics, Organization and Management*. London: Prentice-Hall.

O'Reilly, K. and Rose, D. (1997). *Criterion Validation of the Interim Revised Social Classification,* In Rose and O'Reilly (Eds), pp. 62–77.

Renner, K. (1953/1978). The Service Class. In Bottomore, T. and Goode, P. (Eds), *Austro-Marxism*. Oxford: Clarendon Press, pp. 249–252.

Roemer, J. E. (1988). Should Marxists be Interested in Exploitation? In Roemer, J. E. (Ed.), *Analytical Marxism* Cambridge University Press, pp. 260–282.

Rose, D. and Harrison, E. (Eds), (2007). Social Class in Europe: An Introduction to the European Socio-economic Classification. London: Routledge.

Rose, D. and O'Reilly, K. (Eds), (1997). *Constructing Classes. Towards a New Social Classification for the UK*. Swindon: ONS/ESRC.

Rose, D. and Pevalin, D. J. (Eds), (2003). *A Researcher's Guide to the National Statistics Socio-economic Classification*. London: Sage.

Rubb, S. (2003). Overeducation in the Labor Market: A Comment and Re-analysis of a Meta-analysis. *Economics of Education Review*, **22**, 621–629.

Schooler, C., Mulatu, M. S. and Oates, G. (2004). Occupational Self-direction, Intellectual Functioning, and Self-directed Orientation in Older Workers: Findings and Implications for Individuals and Societies. *American Journal of Sociology*, **110**, 161–197.

Siegel, P. M. (1971). *Prestige in the American Occupational Structure*. University of Chicago: Unpublished PhD dissertation.

Sørensen, A. B. (1983). Processes of Allocation to Open and Closed Positions in Social Structure. *Zeitschrift für Soziologie*, **12**, 203–224.

Sørensen, A. B. (1991). On the Usefulness of Class Analysis in Research on Social Mobility and Socioeconomic Inequality. *Acta Sociologica*, **34**, 71–87.

Sørensen, A. B. (2000). Toward a Sounder Basis for Class Analysis. *American Journal of Sociology*, **105**, 1523–1558.

Stolzenberg, R. M. (1975). Occupations, Labor Markets and the Process of Wage Attainment. *American Sociological Review*, **40**, 645–665.

Thurow, L. C. (1975). *Generating Inequality*. New York: Basic Books.

Weeden, K. A. (2002). Why do Some Occupations Pay More Than Others? Social Closure and Earnings Inequality in the United States. *American Journal of Sociology*, **108**, 55–101.

Williamson, O. E. (1975). Markets and Hierarchies. *Analysis and Antitrust Implications*. New York: Free Press.

Williamson, O. E. (1981). The Economics of Organization: The Transaction Cost Approach. *American Journal of Sociology*, **87**, 548–577.

Winship, C. and Korenman, S. (1997). Does Staying in School Make you Smarter? The Effect of Education and IQ in the Bell Curve. In Devlin, B. *et al.* (Eds.), *Intelligence, Genes, and Success. Scientists Respond to The Bell Curve*. New York: Copernicus, pp. 215–234.

Wright, E. O. (1979). *Class Structure and Income Determination*. New York: Academic Press.

Wright, E. O. (2005a). *Foundations of a Neo-Marxist Class Analysis*. Ch. 1, In Wright (Ed) 2005b.

Wright, E. O. (Ed.) (2005b). *Approaches to Class Analysis*. Cambridge: Cambridge University Press.

Wright, E. O. and Perrone, L. (1977). Marxist Class Categories and Income Inequality. *American Sociological Review*, **42**, 32–55.

Table A Descriptive statistics of variables used. Data from LNU 2000 unless otherwise indicated

Variable	Mean	SD	Min	Max	r class	r sk. Req.	r wage
Market	0.22		0	1			
Attachment	0.20		0	1			
Employer dominates	0.24		0	1			
Worker dominates	0.33		0	1			
Attachment, scale	5.62	1.46	1	9	0.098	0.043	0.040
Dominance, scale	5.29	1.73	1	9	0.274	0.259	0.199
Education (years)	3.78	2.87	0	12	0.573	0.581	0.338
Experience (years)	19.59	12.38	0	53	0.025	0.042	0.169
Seniority (years)	10.23	10.22	0	49	0.063	0.078	0.126
Senp (sen/exp)	0.50	0.36	0	1	0.035	0.052	0.025
General OJT (months)	9.37	11.61	0	36	0.392	0.371	0.430
Specific OJT (months)	4.05	7.34	0	36	0.084	0.094	0.047
Autonomy, scale	5.35	1.99	0	8	0.329	0.246	0.290
Class, scale	0.47	0.43	0	1	1	0.709	0.542
Skill requirements (years)	3.05	2.63	0	12		1	0.480
ln wage/h (2000)	4.70	0.31	3.55	7.46			1
ln wage/h (1991)	4.49	0.27	3.50	4.49			
Wage growth 1991–2000	0.26	0.24	−0.80	1.67			
Expected firm exit	0.17		0	1			

SD = standard deviation; r = Pearson's correlation.

Author's Address

Swedish Institute for Social Research (SOFI), Stockholm University, SE-106 91 Stockholm, Sweden. Email: michael.tahlin@sofi.su.se

Appendix

Data, Descriptive Statistics and Variable Definitions

The data come from the Swedish Level of Living Surveys (LNU) 1991 and 2000. At each occasion, a national probability sample of about 6,000 adults (18–75 years) residing in Sweden were interviewed (by personal visits) about their living conditions along several dimensions, such as education, working conditions, health, housing, and family life. The non-response rate was 20.9 per cent in 1991 and 23.4 per cent in 2000. The samples have a panel structure, such that all individuals in the sample at t_1 are included in the sample at t_2 if still within the targeted age range and residing in Sweden. New members of the sample are drawn at each time-point, entering either through age or immigration. (For more information on the surveys, see, e.g. Jonsson and Mills, 2002.)

Variable Definitions

Market, Attachment, Employer dominates, Worker dominates, Attachment scale, and Dominance scale: see text, section 'Data on Dependence'.

Education: number of years of full-time education beyond compulsory school.

Experience: number of years in gainful employment.

Seniority: number of years spent with current employer.

Senp: seniority divided by experience. (Respondents with experience = 0 assigned missing.)

Skill requirements: the required amount of education in the worker's current job, according to the respondent's own assessment. The variable is based on two interview questions: (i) 'Is any schooling or vocational training above elementary schooling necessary for your job?' (Yes–No.) (ii) 'About how many years of education above elementary school are necessary'? (Number of years, ungrouped.)

General on-the-job training: the amount of informal training in current job that is useful with other employers. Constructed by multiplying two interview items, (i) and (ii), where (i) is the response to the question "Apart from the competence necessary to get

a job such as yours, how long does it take to learn to do the job reasonably well?'' and (ii) is the answer to the question ''Do you know of any employers where you would have good use for what you've learnt in your present job?'' The response alternatives to (i) are '1 day or less', '2–5 days', '1–4 weeks', '1–3 months', '3 months-1 year', '1–2 years', and 'more than 2 years', recoded to number of months, where the top code is 36 (or three years). The response alternatives to (ii) are 'Yes, many', 'Yes, some', 'Yes, one or two', and 'No', recoded to 1, 0.7, 0.3, and 0, respectively.

Specific on-the-job training: the amount of informal training in current job that is not useful with other employers. Constructed the same way as General OJT (see above), but with a reversed coding of item (b), such that $1 = 0$, $0.7 = 0.3$, $0.3 = 0.7$, and $0 = 1$.

Autonomy: the degree of influence over own work tasks and methods. Constructed by summing two interview items, (i) and (ii), where (i) is the response to the question ''To what extent do you have influence over what tasks you carry out?'' and (ii) ''... over *how* you carry out your tasks?''. The response alternatives to both questions are 'To a very large extent', 'To a large extent', 'To a certain extent', 'To a small extent', and 'Not at all', recoded to 4, 3, 2, 1, and 0, respectively.

Class, scale: position on the service relationship—labour contract dimension. Constructed on the basis of EGP class (employees only), where class $I = 1$, $II = 0.8$, $VI = 0.2$, $IIIb/VII = 0$, and $IIIa/V = $ assigned missing.

Wage/h: the sum of earnings in current job during a specific time period (usually one month) divided by the number of hours worked during the same period.

Expected firm exit: ''Do you think you will still be at your present workplace a year from now?'' $(Yes = 0, No = 1)$.