Ronald Schettkat

Inequality and Employment

Natural rate theory has dominated interpretations of economic trends and policy prescriptions over many decades, as economists contrasted high unemployment and lower inequality in Europe with the great American job machine. This paper discusses the relationship between skill structure and wage distributions and investigates the claim that inequality creates incentives which facilitate human capital formation. The big tradeoff between efficiency and inequality is dismissed as a fallacy, as it is demonstrated that redistribution lays the foundation for human capital investment rather than impeding it.

"The ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed the world is ruled by little else." – John Maynard Keynes, 1936.[1]

Natural Rate Theory

Almost all highly industrialised countries have experienced rising wage and income inequality over the last two or three decades.[2] This is often described as an unavoidable response to changing economic conditions, i.e. to the complementarity of skills and technological change (skill-biased technological change), a changing industry structure, globalisation, etc. Any impact on employment was thought to depend on the flexibility of the price (wage) system. The higher the flexibility of wages, the better the repercussions for employment; but inflexible wages – identified as the inability to respond to changing market conditions – would lead to unemployment, the "big tradeoff"[3] between the efficient allocation of resources and inequality or the "two sides of a coin" argument. Countries with "flexible" wage-setting systems, low employment protection, limited welfare state institutions and low influence of unions would experience rising wage dispersion while countries with less flexible wage structures and with developed welfare state institutions would experience unemployment. The choice was apparently

between two evils:[4] higher inequality or higher unemployment.

This interpretation was based on "natural rate theory", which predicts that the distortion of markets through institutional arrangements determines a unique level of equilibrium unemployment to which economies will always return (the Phelps-Friedman version) or at which they will remain (the "rational" expectations Lucas version).[5] Defining unemployment as "natural", as determined by optimisation within a given institutional arrangement, Friedman[6] argued that expansionary fiscal and/or monetary policy can (at best) reduce unemployment below the "natural rate" in the short run, but that in the long run, it can only cause inflation. The "natural rate of unemployment", in turn, would depend on the incentive structure. Economic agents would discover that Keynesian-type macroeconomic policy only affects nominal values, but that once the "money veil" has been lifted the economy returns to its former equilibrium.

The development of economic policy guided by natural rate theory since the 1970s provides dramatic confirmation of Keynes' statement. Unemployment was no longer a waste of (human) resources but rather the result of an optimisation process in a given institutional setting, a structural problem. Macroeconomic reasoning for transatlantic differences in employment trends were neglected[7] or even declared intellectually flawed.[8] Transatlan-

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1 J.M. Keynes: The General Theory of Employment, Interest, and Money, Cambridge 1936, Macmillan Cambridge University Press, p. 383.
2 OECD: Divided We Stand – Why Inequality Keeps Rising, Paris 2011, OECD.
3 A. Okun: Equality and Efficiency: The Big Tradeoff, Washington DC 1975, Brookings Institution.
4 For some economists inequality is not an evil but a virtue (see below).
5 D. Staiger, J. Stock and M. Watson argue that estimates of the NAIRU in the USA are extremely unstable. See D. Staiger, J. Stock, M. Watson: The NAIRU, Unemployment and Monetary Policy, in: Journal of Economic Perspectives, Vol. 11, No. 1, 1997, pp. 33-49.
6 M. Friedman: The Role of Monetary Policy, in: American Economic Review, Vol. 58, No. 1, 1968, pp. 1-17.
7 R. Solow: Broadening the Discussion of Macroeconomic Policy, in R. Schettkat, J. Langkau (eds.): Economic Policy Proposals for Germany and Europe, London and New York 2008, Routledge Taylor & Francis Group, pp. 20-28.
8 See P. Krugman: The freshwater backlash, in: New York Times, 23 September 2009.

tic differences in employment and inequality seemed to fit this theoretical reasoning quite well.[9] Identify the USA with unfettered labour markets and Europe with over-regulated labour markets and the way to move forward seems clear: deregulate European labour markets, allow for more inequality and employment in Europe will rise.

Natural rate theorists claimed theoretical rigour and microfoundations – which often meant sticking to the perfect market model and other assumptions.[10] Actually the evidence in favour of the theory was dwarfed by its political impact. Less regulated labour markets, more inequality but also enormous employment growth in the USA were regarded as sufficient evidence to propose the deregulation of European welfare state institutions, which, it was claimed, would start up a "great European job machine".[11] Deductions from an idealised theoretical model became general guidelines for economic policy. The benchmark for evaluating real-world institutions was the perfect market: the frictionless and timeless artificial economy, where no severe disturbances occur and in which only the equilibrium is analysed. Markets always performed optimally if left undisturbed by public policy. The public sector should therefore be restricted to a minimum. Consequently, the top marginal income tax rates fell by 20 percentage points on average in the OECD between 1980 and the mid-2000s.[12] The OECD's Jobs Study[13] was designed according to natural rate theory, which diffused even into the thinking of social democratic politicians (e.g. New Labour, German Social Democrats).

Empirical Research: Dents in the Widely Accepted Story

Empirical research often failed to identify institutional changes as responsible for the major differences in transatlantic employment trends. Cross-country studies

Figure 1
Unemployment and Inequality Trends in the USA and Germany, 1970-2010

Source: based on OECD data; inequality is measured by D9/D1 ratios.

produced doubts as to the "institutional rigidity story".[14] Flow and duration analysis of unemployment and vacancies in the USA and Germany showed tremendous mobility, suggesting that Germany was suffering from an aggregate demand deficiency rather than labour market rigidity.[15] Institutional change in Germany from the 1980s to the 2000s fails to explain the rise in unemployment. Reforming institutions should have lowered rather than increased unemployment in Germany in that period.[16] As the OECD[17] reported, microeconometric studies focusing on wage compression in Europe (the main argument used to explain high European unemployment) fail to establish evidence that wage compression caused labour market

9 In R. Schettkat, R. Sun: Monetary Policy and European Unemployment, in: Oxford Review of Economic Policy, Vol. 25, No. 1, 2009, pp. 94-108, the authors argue that the major institutional difference between the USA and Germany affecting employment trends is the freedom the Bundesbank gained in the post-Bretton Woods era of floating exchange rates. Fears of inflationary pressure led the Bundesbank to slow economic expansions but to let recessions go. Germany's potential was almost permanently underused.
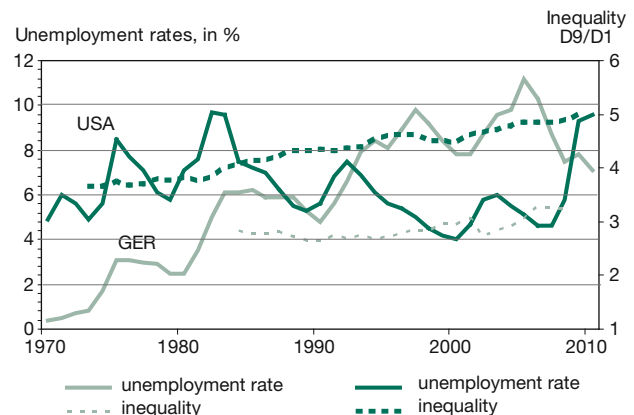
10 See J. Kay: The Map Is Not the Territory: An Essay on the State of Economics, 2011, http://ineteconomics.org/blog/inet/john-kay-map-not-territory-essay-state-economics.

11 See R.B. Freeman: Labour market institutions without blinders: The debate over flexibility and labour market performance, NBER Working Paper No. 11286, Cambridge, April 2005, on the plausibility of this claim made by the IMF.

12 OECD: Historical Tax Base, 2012, http://www.taxpolicycenter.org/taxfacts/Content/Excel/oecd_historical_toprate.xls.

13 OECD: Jobs Study, Paris 1994, OECD.

14 A. Glyn, D. Howell, J. Schmitt: Labor Market Reforms: The Evidence Does Not Tell the Orthodox Tale, in: Challenge, Vol. 49, No. 2, 2006, pp. 5-22, M.E. Sharpe, Inc.; D. Howell, D. Baker, A. Glyn, J. Schmitt: Are Protective Labor Market Institutions at the Root of Unemployment? A Critical Review of the Evidence, Capitalism and Society, 2007; R. Schettkat: Is Labor Market Regulation at the Root of European Unemployment? The Case of Germany and the Netherlands, in: D. Howell (ed.): Fighting Unemployment, Oxford 2005, Oxford University Press, pp. 262-283; J.J. Heckman, M. Ljunge, K. Ragan: What are the Key Employment Challenges and Policy Priorities for OECD Countries, Boosting Jobs and Incomes, Toronto 15 June 2006, fiercely criticise the revised OECD view, arguing that the analysis of aggregates is flawed, and that the unemployment rate is not the right measure because corporatist countries hide unemployment in active labour market programmes, early retirement, etc.

15 R. Schettkat: The Labor Market Dynamics of Economic Restructuring: The United States and Germany in Transition, New York 1992, Praeger Publishers.

16 W. Carlin, D. Soskice: Reforms, Macroeconomic Policy and Economic Performance in Germany, in: R. Schettkat, J. Langkau (eds.): Economic Policy Proposals for Germany and Europe, London and New York 2008, Routledge Taylor & Francis Group, pp. 72-118.

17 OECD: Wage-setting Institutions and Outcomes, in: Employment Outlook 2004, Paris 2004, OECD, pp. 127-181.

Table 1
Top 1% Share of Income and Change in the Share, Wage Distribution

	USA	Great Britain	Canada	Germany	Switzerland	Ireland	Portugal	Italy	Japan	New Zealand	Australia	France	Spain	Finland	Belgium	Denmark	Norway	Sweden	Netherlands
Top 1% share of income																			
2007	18.3	14.3	13.3	11.1	10.5	10.3	9.8	9.5	9.2	9.0	8.9	8.9	8.8	8.6	7.7	7.4	7.1	6.9	5.7
1990	13.0	9.8	9.2	10.9	9.7	6.6	7.2	7.8	8.1	8.2	6.3	8.2	8.4	4.6	6.3	5.1	4.4	4.4	5.6
Change	5.3	4.5	4.1	0.2	0.8	3.7	2.6	1.7	1.1	0.8	2.6	0.7	0.4	4.0	1.4	2.3	2.7	2.5	0.1
D9/D1																			
1990	4.3	3.4		2.6		4.1		2.2	3.2	2.4	2.8	3.3	3.8	2.5	2.3	2.2		2.0	2.8

Source: OECD.

problems.[18] But the OECD concluded that, "nevertheless" rising wage inequality in the USA was the market response to demand shifting away from less skilled labour (skill-biased technological change) and also the right cure for Europe. In Europe, minimum wages (statutory, negotiated or implied by social assistance and unemployment benefits) and generous unemployment benefits prevented wage inequality from rising, but the result was greater unemployment among less skilled labour. The less skilled, so the argument went, were being excluded from jobs, priced out of the market by enforced and excessively high minimum wages and by a compression of the wage distribution at the lower end.

The proposition that labour market institutions caused unfavourable labour market trends in Europe was also challenged by Prescott.[19] He wrote that his initial view was that labour market institutions cause the different employment and unemployment trends in the USA and Europe, but after analysing the tax rates on the two sides of the Atlantic, he found that these explain the entire difference. Within the OECD, it did not go unnoticed that certain countries with drastically different institutions performed equally well with respect to unemployment and participation rates and differently with respect to inequality.[20] The

2004 revision of the Jobs Study was therefore much more cautious and modest in its conclusions and admitted that different institutional arrangements might lead to similar outcomes.[21]

International Differences in Wage Distribution

That wages reflect marginal products is arguably one of the most accepted assumptions in economics. High-wage workers simply contribute a lot, whereas low wages imply small contributions. There is no conflict: high-wage workers do not adversely impact the income of low-wage workers. High wages are earned; an increase of income at the top of the pay scale even with constant wages at the lower end should be appreciated, as this creates a Pareto efficient situation.[22] Why not improve the situation of some if others do not have to suffer a reduction? However, that gains at one end of the pay scale do not coincide with losses at the other end does not necessarily indicate Pareto efficiency.

Table 1 shows that with few exceptions the very top of the income ladder captured a rising share of total pre-tax income. For the United States, Picketty and Saez[23] documented income inequality over the long term. Dew-Beck-

18 The OECD cites S. Nickell, B. Bell: Changes in the Distribution of Wages and Unemployment in OECD Countries, in: American Economic Review, Papers and Proceedings, Vol. 86, 1996, pp. 302-308; D. Card, F. Kramarz, T. Lemieux: Changes in the Relative Structure of Wages and Employment: A Comparison of the United States, Canada and France, NBER Working Paper No. 5487, Cambridge, MA 1996, National Bureau of Economic Research; R.B. Freeman, R. Schettkat: Skill Compression, Wage Differentials and Employment Germany vs. the US, in: Oxford Economic Papers, Vol. 53, No. 3, 2001, pp. 582-603.

19 E. Prescott: Why Do Americans Work So Much More Than Europeans?, FED of Minneapolis, working paper, 2003.

20 See R.B. Freemann, op. cit.

21 OECD: Wage-setting…, op. cit.

22 M. Feldstein: Reducing poverty, not inequality, The Public Interest 137(Fall), 1999, pp. 1-5.

23 T. Picketty, E. Saez: Income Inequality in the United States, 1913-1998, in: Quarterly Journal of Economics, Vol. CXVIII, February 2001, pp. 1-39.

er and Gordon[24] found not only that the upper 10% of the wage distribution received 50% of the income growth, but also that within this privileged group the top 1% captured half of that increase. At the lower end, the 20% with the lowest income received 2% of the income growth. The authors argue that too much emphasis has been put on demand and supply issues to explain the widening wage dispersion in the United States. The increasing wage pressure at the lower end was probably due to declining unionisation and shrinking minimum wages, whereas at the upper end of the distribution, peer group behaviour raised the incomes of CEOs and financial managers.[25] Table 1 illustrates that the income share of the top 1% rose almost everywhere. Saez[26] shows that in the 2009/2010 recovery, the top 1% received a real income increase of 11.6% while the bottom 99% stagnated. Although the top 1% share does not necessarily influence the D9/D1 ratios, high shares occur mainly in countries that have a wider income distribution. It remains unclear, however, whether these incomes are substantially influenced by labour supply or effort. In addition, labour supply (effort supply) curves may be backward-bending at some level of income.[27]

Inequality may not reflect a Pareto optimal distribution but rather market failure. With imperfect capital markets,[28] inequality will reproduce inequality (see below), creating a class structure, and this inequality may become structural by increasing the polarisation of the income distribution.[29] With imperfect labour markets, firms may use wage-setting power. Even among advocates of inequality,[30] it is argued that society's self-interest should not allow extreme poverty among sections of the population, because this may lead to crime, violence and riots. Beneficial policies may be blocked in overly unequal societies either

Table 2
Components of the Standard Deviation of Wages, USA and Germany

		USA	Germany
1	Standard deviation of ln(wage)	0.466	0.335
2	Standard deviation of residual [ln(wage) regressed on years of schooling]	0.390	0.283
3	Coefficient of schooling (standard error)	0.1087 (0.0008)	0.0740 (0.0006)
4	Predicted standard deviation of ln(wage) if coefficients of schooling from the other country, initial residuals used	0.426	0.387
5	Predicted standard deviation of ln(wage) if distribution of schooling from the other country, initial residuals used	0.471	0.332

S o u r c e : Computations based on CGAS; sample size for USA 47068 cells; for Germany 42764 cells, workers 20-64 years (Comparative German American Sample), 1995, R. F r e e m a n , R. S c h e t t k a t : Skill Compression, Wage Differentials and Employment: Germany vs. the US, in: Oxford Economic Papers, Vol. 53, No. 3, 2001, pp. 582-603.

at the high end (e.g. securing privileges) or the low end due to fear of insecurity (e.g. resistance to technological change). Alan Krueger[31] also mentions access to political elites and stronger influence on the formulation of the policies. Finally, people care about their relative income position, the major explanation for resistance to nominal wage reduction for Keynes,[32] confirmed by recent research.

Following the pioneering work of Mincer,[33] economists analyse wages from the supply side, using human capital variables – formal training, usually measured by years of education (input) or some metric of skills (output), and informal training, usually measured by experience – as independent variables in regressions of log-wages. Human capital variables are thought to be proxies for productivity. Assuming that education and experience perfectly measure productivity and that wages reflect the marginal product, international differences in wage distributions could be due to differences in the distribution of skills and/or to differences in the rewarding of skills. If these measures are imperfect there will be an unexplained residual (unmeasured ability probably).

Skill structure vs. institutional effects was the major issue in the efforts to explain international differences in wage distributions. One analysis is summarised in Ta-

24 I. D e w - B e c k e r , R. G o r d o n : Where Did the Productivity Growth Go? Inflation Dynamics and the Distribution of Income, NBER Working Paper No. 11842, Cambridge, MA 2005, National Bureau of Economic Research; I. D e w - B e c k e r , R. G o r d o n : Controversies about the Rise of American Inequality: A Survey, NBER Working Paper No. 13982, Cambridge. MA 2008, National Bureau of Economic Research.

25 Ibid., for similar trends in Germany: S. B a c h , G. C o r n e o , V. S t e i n e r : From Bottom to Top: The Entire Distribution of Market Income in Germany, 1992-2001, DIW-Diskussionspapier No. 683, Berlin 2007.

26 E. S a e z : Striking It Richer: The Evolution of Top Incomes in the United States, 2012, http://elsa.berkeley.edu/~saez/saez-UStopincomes-2010.pdf.

27 M. F e l d s t e i n , op. cit., argues that the high incomes of investment bankers and lawyers are related to very long working hours, i.e. the labour supply curve is forward-bending.

28 J. S t i g l i t z , A. W e i s s : Credit Rationing in Markets with Imperfect Information, in: American Economic Review, Vol. 71, 1981, pp. 399-410.

29 Often used arguments to play down inequality are that low income (very low income) is transitory, that low-wage workers live in households with several incomes, that they have other undeclared incomes, etc. See e.g. M. F e l d s t e i n , op. cit.

30 F. W e l c h : In Defense of Inequality, in: The American Economic Review, Vol. 89, No. 2, 1999, pp. 1-17.

31 A. K r u e g e r : Inequality, Too Much of a Good Thing, in: J.J. H e c k m a n , A.B. K r u e g e r : Inequality in America – What Role for Human Capital Policies?, Cambridge, MA, London 2003, The MIT Press.

32 J.M. K e y n e s , op. cit.

33 J. M i n c e r : Investment in Human Capital and Personal Income Distribution, in: The Journal of Political Economy, Vol. 66, No. 4, 1958, pp. 281-302.

ble 2. Based on a standardised data set for the USA and Germany,[34] it turns out that neither the educational distribution nor the coefficients of schooling explain much of the deviation of wages.

When estimating Mincer-type wage regressions, education and experience often explain only 20-30% of the variance. There may be several reasons for this: education (skills) and experience are imperfectly measured and/or ability (productivity) depends on unobserved characteristics.[35] If this is the case, then the unexplained variance may just reflect unobserved ability, and therefore wages may still reflect the marginal product.[36] The market works. If this assertion is correct, a compressed wage structure – e.g. with legal minimum wages, entitlements to transfers, etc. – will cut off employment. Policy interventions that compress the wage structure will lead to unemployment. A compressed wage structure deviating from the distribution of productivity is, in this view, costly, as it will exclude less productive workers from employment.[37] Labour market behaviour deduced from theoretical assumptions produced a strong prior on the wage compression at the lower end of the wage scale. Consequently, the most celebrated hypothesis for high unemployment in Germany (and in Europe) was an overly compressed wage structure at the low-wage end. A typical example is Prasad,[38] who claimed in a 2004 IMF paper that Germany's major problem is a compressed wage structure, even though inequality had been rising since the mid-1990s![39] Microeconometric comparison between the lower ends of the US and German wage structures showed higher dispersion of the D5/D1-measure in Germany than in the USA.[40] However, the widening wage distribution in Germany since the 1990s went unnoticed or was ignored.

The strong theoretical prior might explain the vociferous arguments by the heads of the leading economic research institutes against any potential legal minimum wage in Germany.[41] However, if the relation between pay and marginal product is not that strong, if firms have at least some discretion to determine wages,[42] the effects of minimum wage laws are not as clear as in the textbook model. This, however, puts a dent in the theory. Therefore, Card and Krueger's[43] finding that an almost 20% rise in the legal minimum wage in New Jersey did not cause employment losses resulted in much intense discussion which continues today even after more than 20 years.

Does Wage Inequality Facilitate Human Capital Formation?

The Ely lecture "In Defense of Inequality"[44] by Finis Welch[45] is arguably the most emphatic paper on this subject, arguing that rising wage dispersion in the USA opened investment opportunities for new entrants into the labour force. Rising returns to education[46] should be an incentive to invest in human capital. High wage dispersion among education or skill groups may enhance human capital investments, but within educational groups high wage dispersion raises ex ante the risk of human capital investments, i.e. it may be a disincentive.[47] Welch[48] decomposed the total variance of log-wages into variation across educational groups, variation across experience levels with a given education and variation within education-experience cells (see Table 3). He showed that the total variance in the USA increased from 1970 to about 1995 and that the variance of experience within educational groups rose in the 1970s but then remained constant. The variance across educational groups rose until the 1990s. Welch took the increase in educational

34 R.B. Freemann, R. Schettkat, op. cit.

35 A. Krueger, L. Summers: Efficiency Wages and the Inter-Industry Wage Structure, in: Econometrica, Vol. 56, 1988, pp. 256-29, mention that when giving much weight to unobservables, one needs to assume that these are not correlated with the observables.

36 D. Card: Deregulation and the Labor Earnings in the Airline Industry, NBER Working Paper No. 5687, Cambridge, MA 1996, National Bureau of Economic Research, found that the dispersion of compensation of pilots after the deregulation of the US airline industry increased substantially.

37 Conversely, it is argued that the integration of the unemployed requires a widening of the wage distribution.

38 E. Prasad: The Unbearable Stability of the German Wage Structure: Evidence and Interpretation, in: IMF Staff Papers, Vol. 51, No. 2, 2004, pp. 354-385.

39 R. Schettkat: Lohnspreizung: Mythen und Fakten, Düsseldorf 2006, edition der Hans-Böckler-Stiftung 183; C. Dustmann, J. Lundsteck, U. Schönberg: Revisiting the German Wage Structure, in: Quarterly Journal of Economics, Vol. 124, No. 2, 2009, pp. 843-888.

40 J. Möller: Wage Dispersion in Germany Compared to the US – Is there Evidence for Compression From Below?, ZEW Discussion Paper, Mannheim 2005, ZEW.

41 H.W. Sinn, U. Blum, C. Schmid, M. Hüther, D. Snower, T. Straubhaar, K. Zimmermann: Beschäftigungschancen statt Mindestlohn, Gemeinsamer Aufruf der Präsidenten und Direktoren der Wirtschaftsforschungsinstitute, März 2008, ifo.

42 A. Manning: Monopsony in Motion – Imperfect Competition in Labor Markets, Princeton, NJ 2003, Princeton University Press.

43 D. Card, A.B. Krueger: Myth and Measurement – The New Economics of the Minimum Wage, Princeton, NJ 1995, Princeton University Press.

44 G.S. Becker, K.M. Murphy: The Upside of Income Inequality, in: The American Magazine, May/June 2007, pp. 1-5; M. Feldstein, op. cit., argue along similar lines.

45 F. Welch, op. cit.

46 Returns to education are usually based on years of education rather than on the actual costs.

47 J. Aggell: On the Benefits from Rigid Labour Markets: Norms, Market Failures, and Social Insurance, in: The Economic Journal, Vol. 109, No. 453, February 1999, pp. 143-164.

48 F. Welch, op. cit.

Table 3
Variance Decomposition, Log-wages in the USA, Based on Welch Data

Year	Overall	Education	Experience	Education-experience cells
Variance log-wages				
1970	0.22	0.03	0.02	0.16
1980	0.35	0.05	0.04	0.26
1990	0.46	0.10	0.03	0.31
1997	0.46	0.12	0.03	0.29
Distribution (%)				
1970	100	14	10	76
1980	100	13	11	76
1990	100	23	7	70
1997	100	26	7	66
1970 = 100				
1970	100	100	100	100
1980	159	150	171	163
1990	209	333	157	194
1997	209	383	152	181

Source: Compilation from F. Welch: In Defense of Inequality, in: The American Economic Review, Vol. 89, No. 2, 1999, pp. 1-17, rounding errors.

attainment among younger cohorts as evidence that the incentives of the "college wage gap" worked.[49]

Table 3 displays the variance decomposition based on Welch's data. Clearly the share in the overall variation attributed to education increased, but only about a quarter of the variance is explained by education. Two-thirds is variation within education-experience cells (the residual), i.e. two-thirds of the wage variation remains unexplained. Welch regards a world where the residual variance is small as a boring world. In the extreme one would only make one decision – the human capital investment decision – and then the wage path would be determined by experience. He frames his argument as if the position within the education-experience cells is based on individual choice or ability. However, what if the wage position in the educational group does not depend on individual decisions but is, rather, stochastic? Being at the right place at the right time may lead to a wage premium. Then the wage premium related to education can only be calculated with great risk. And risk is costly.[50]

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49 Although the supply of higher skilled labour increased, the "college wage premium" can nevertheless increase if demand increases even faster, see L.J. Katz, K.M. Murphy: Changes in Relative Wages, 1963-1987: Supply and Demand Factors, in: Quarterly Journal of Economics, Vol. 107, No. 1, February 1992, pp. 35-78.
50 The threat of unemployment can be a disciplinary device and may also be an incentive to invest in human capital. See J. Aggell, op. cit.

Table 4
Educational Outcomes and Socioeconomic Status

Maths performance in the 8th grade	Family income position		
	Low	Medium	High
% completing bachelor degree			
Low	3	8	29
Medium	7	21	47
High	30	51	74

Source: M. Fox, B. Connolly, T. Snyder: Youth Indicators 2005, Trends in the Well-Being of American Youth, National Center for Educational Statistics, Washington, DC 2005, U.S. Government Printing Office.

Is high and rising wage inequality needed to stimulate human capital investment? Few people would regard education as a pure investment, and international comparative studies all identify the USA as a country with exceptionally high variation in earnings, for good or for bad. Freeman and Devroye[51] use skills as measured in the International Adult Literacy Survey (IALS)[52] – an output variable – rather than education – an input variable – to investigate the US wage distribution. They find higher wage dispersion within narrowly defined skill groups (10 percentage points skill groups on a scale from 0 to 500 points) in the USA than in the entire Swedish economy.[53]

If rising college wage premiums are incentives to which individuals respond by investing in human capital, what happened in the Scandinavian countries, where educational attainment increased substantially but wage differentials were small? Sweden has the highest median scores among the participating countries in the IALS and the most narrow skill distribution, but access to, and the success of, education in Sweden (as in other Scandinavian countries) depend much less on the parents' socioeconomic status (see below) than elsewhere. Apart from the fact that schooling decisions are certainly driven by factors beyond pure economic variables – although they are important – the equation "rising inequality = rising educational attainment" is based on an idealised world of equal opportunity without capital constraints influencing investment decisions. In actuality, capital markets are imperfect, one cannot capitalise human capital and the

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51 D. Devroye, R. Freeman: Does Inequality in Sills Explain Inequality of Earnings Across Advanced Countries?, NBER Working Paper No. 8140, Cambridge, MA 2001, National Bureau of Economic Research.
52 OECD: International Adult Literacy Survey, Paris 1997, OECD.
53 D. Devroye, R. Freeman mention that in the USA wage may be ex ante equal for "identical" persons, but that contracts make future earnings dependent on the success of the company not in the control of the individual, i.e. Americans conclude risky contracts. The authors argue that such a possibility is different from luck. L. Thurow: Generating Inequality, London 1975, MacMillan, argues that on-the-job training causes heterogeneity in wages.

social status of the family (parents) seems to be a strong influence.

Inequality and Public Services

The "big tradeoff"[54] between efficiency and equity was established on the grounds that taxing high incomes creates a disincentive for work or effort at the upper end of the pay scale, whereas transfers have a similar effect at the lower end of the pay scale. In addition, the "leaky bucket" of administrative costs further lowers efficiency. The bucket may be especially leaky if high incomes are related to effort (or talent to be developed). However, the argument loses plausibility if the rise in inequality is concentrated among the "superstars". Nonetheless, economic policy has been guided by theories claiming that reducing taxes for high-income earners would generate social benefits, because the income elite would raise their efforts, which would result in higher growth, benefiting the lower end of the wage distribution, too (trickle down). The argument was accompanied by the claim that public service provision is inefficient and that public activity should therefore be reduced and shifted to the private sector. If the private sector is more efficient, tasks should be performed there, but sometimes it is the public sector that is more efficient. Measures of inequality are usually based on monetary income before or after taxes. However, there is a substantial amount of indirect income, services in kind, which can have extremely different effects on inequality. Following the work of the Luxembourg Income Study Group and others, the OECD provided new estimates including in-kind benefits from public services.

Benefits from public services affect low-income households much more than high-income households, and they reduce inequality. When comparing the distribution of cash income (after tax) with the distribution of extended income (cash income plus public in-kind services), inequality is reduced by 20 to 30% depending on the measure used.[55] Even if in-kind benefits are equally distributed across the income groups, they will represent a much higher share of the extended income in the lower income groups. The income of the bottom quintile is raised by about 75% in the OECD average, whereas the income of the top quintile increases only by about 14% (Table 5). The effects of educational services and of early childhood education and care (ECEC) show a similar pattern: the income of the bottom quintile is raised substantially if the in-kind services are included. Cutting back on public services will then affect the lower end of the income distribution much more strongly than the top end. This will

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54 A. O k u n, op. cit.
55 See OECD: Divided We Stand…, op. cit.

Table 5

Income-Increasing Effect of In-kind Benefits from Public Services by Quintile, OECD27 Average, 2007

	Q1	Q2	Q3	Q4	Q5	Total
Public in-kind benefits relative to income						
Total	75.8%	46.4%	33.5%	24.3%	13.7%	28.8%
Education	30.6%	18.5%	14.2%	10.4%	5.6%	11.8%
ECEC	40.7%	24.9%	16.9%	12.4%	7.4%	15.2%
Distribution of ECEC in-kind benefits over quintiles						
OECD21	19.8%	22.2%	22.8%	18.7%	16.4%	100.0%

S o u r c e : Compilation based on OECD: Divided We Stand – Why Inequality Keeps Rising, Paris 2011, OECD, Table 8.1.

have severe long-term consequences, especially if educational services are affected.

Public expenditures can reduce Gini coefficients by around 20%.[56] For the OECD21 (not including the new OECD countries), the percentage of expenditures on in-kind services in GDP is 13.4% compared to cash transfers, which account for 13.2% of GDP. Educational services account for 5.1%. Consequently, the relation between changes in public service provision and the reduction in inequality appears to be quite strong. Countries that reduce public service provision experience an increase in inequality and vice versa.[57] Restricting public services to the minimum will harm efforts to equalise opportunities and may reduce the growth potential.[58]

Inequality and Opportunity: Intergenerational Mobility

The strength of the relationship between the incomes and educational positions of two consecutive generations may serve as an indicator for equality of opportunity. Equality of opportunity would imply a loose relationship, i.e. a low elasticity of the socio-economic status of consecutive generations. Naturally, in all countries the influence of parents on their children's educational and income achievement varies and may be substantially affected by public policy. In a strictly privately financed educational system, the link between the parents' income position and the educational attainment of their children will be strong. The more unequal the income distribution in the parents' generation, the more unequal will be educational attainment and income in the children's generation. Although taxes may discourage work, higher educational attainment en-

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56 Ibid., p. 317, Table 8.2.
57 See ibid., Figure 8.11.
58 M. D a u d e r s t a e d t : Social Growth, Model of a Progressive Economic Policy, International Policy Analysis, Bonn 2012, Friedrich-Ebert-Stiftung.

courages work. Therefore, the impact of taxes on work is not as clear-cut, even if a discouragement effect of taxation is assumed. Table 6 shows that public expenditure on education increases extended income in the lower part of the income distribution substantially.

If investments in education depend on private resources or if public education is locally financed, low intergenerational income mobility may reinforce inequality. Income heterogeneity in neighbourhoods will lead to segregation[59] into wealthy and less wealthy areas, reinforcing intergenerational income stability. Therefore, not only the parent-children ties but also the repercussions in society affect human capital investments and income positions: inequality creates inequality. Neighbourhood effects will not only arise because of differences in the access to resources but also because social interaction and role models may be missing in less wealthy neighbourhoods with low educational resources.[60]

Heckman and Caneiro[61] argue that preschool education is especially beneficial because the returns are much higher than the costs. Early childhood education may break, or at least loosen, the link between parents' socio-economic status and the educational attainment of their children. Learning causes learning. Roughly equally distributed across the income quintiles (bottom row in Table 5), the effects of publicly provided educational services relative to income are substantially higher at the lower end of the pay scale. Naturally, public services for young children affect young families most. Their extended income rises from 4% in the USA through 8% in Germany up to 24% in Sweden. It should be noted, however, that the Swedish value is extreme even among the Scandinavian countries, where the values range from around 10% (Norway) to about 16% (Denmark).[62]

Intergenerational income elasticity is often measured by the log of relative income position of the children to the relative income position of the parents. That is, if the children's income relative to the mean income is high and parents had a similar income position, the elasticity is high, if the parents had instead a low income position, the elasticity is low.[63] As the results presented in Table 6 show, the USA appears to have not only high inequality

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59 T. Schelling: Micromotives and Macrobehavior, Morton 1978.
60 S. Durlauf: A Theory of Persistent Income Inequality, Working Paper No. 4056, National Bureau of Economic Research NBER, Cambridge, MA 1992.
61 P. Caneiro, J. Heckman: Human Capital Policy, in: J.J. Heckman, A.B. Krueger: Inequality in America – What Role for Human Capital Policies?, Cambridge, MA 2003, MIT Press, p. 91.
62 OECD: Divided We Stand…, op. cit.
63 $\ln(Y_{ci}/Y_c) = a + b \ln(Y_{pi}/Y_p) + u$ where Y_{ci}/Y_c = relative income of children, Y_{pi}/T_p = relative income of parents, coefficient b = elasticity.

Table 6
Intergenerational Mobility of Earning and Income Inequality

Intergenerational earning elasticity	Gini coefficients of income inequality			
	20-25	25-30	30-35	35-40
0.1-0.2	DNK	FIN NOR	CAN AUS	
0.2-0.3	SWE			
0.3-0.4		GER	ESP	
0.4-0.5		FRA	GBR ITA	USA

Intergenerational earning elasticity	Private returns to education			
	2-6	6-10	10-14	14-18
0.1-0.2	DNK	AUS CAN	NOR	FIN
0.2-0.3		SWE		
0.3-0.4		GER ESP		
0.4-0.5		FRA ITA	USA GBR	

Source: OECD: A Family Affair: Intergenerational Social Mobility across OECD Countries, Going for Growth, Paris 2010, OECD.

but also high intergenerational income elasticity, whereas the countries with the lowest inequality have much lower intergenerational income elasticity (i.e. higher mobility).

Combining estimates of intergenerational income elasticity with inequality measures of countries produces the data displayed in Table 6 (upper panel). Higher income inequality seems to be related to higher intergenerational income elasticity, i.e. lower intergenerational income mobility.[64] The great opportunity of higher inequality does not show up in the data. Also, estimates of private returns to education indicate a negative correlation to measures of income inequality.

Redistribution vs. Employment?

Higher individual returns to education may positively influence the individual's decision to invest in human capital, *ceteris paribus*. But opportunities to enrol in education are severely influenced by family backgrounds, institutional frameworks, access to educational services and other

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64 A. Björklund, M. Jäntti: Intergenerational Income Mobility and the Role of Family Background, in: W. Salverda, B. Nolan, T. Smeeding: The Oxford Handbook of Economic Inequality, Oxford 2009, Oxford University Press, pp. 491-521, here p. 502, indicate that estimates of intergenerational income elasticity have large confidence intervals, making a ranking of countries with respect to intergenerational mobility difficult.

Figure 2
Labour Market Indicators and Redistribution, OECD Countries, 1985 and 2005

Employment to population rates

Unemployment rates

Hours worked/population (15-65)
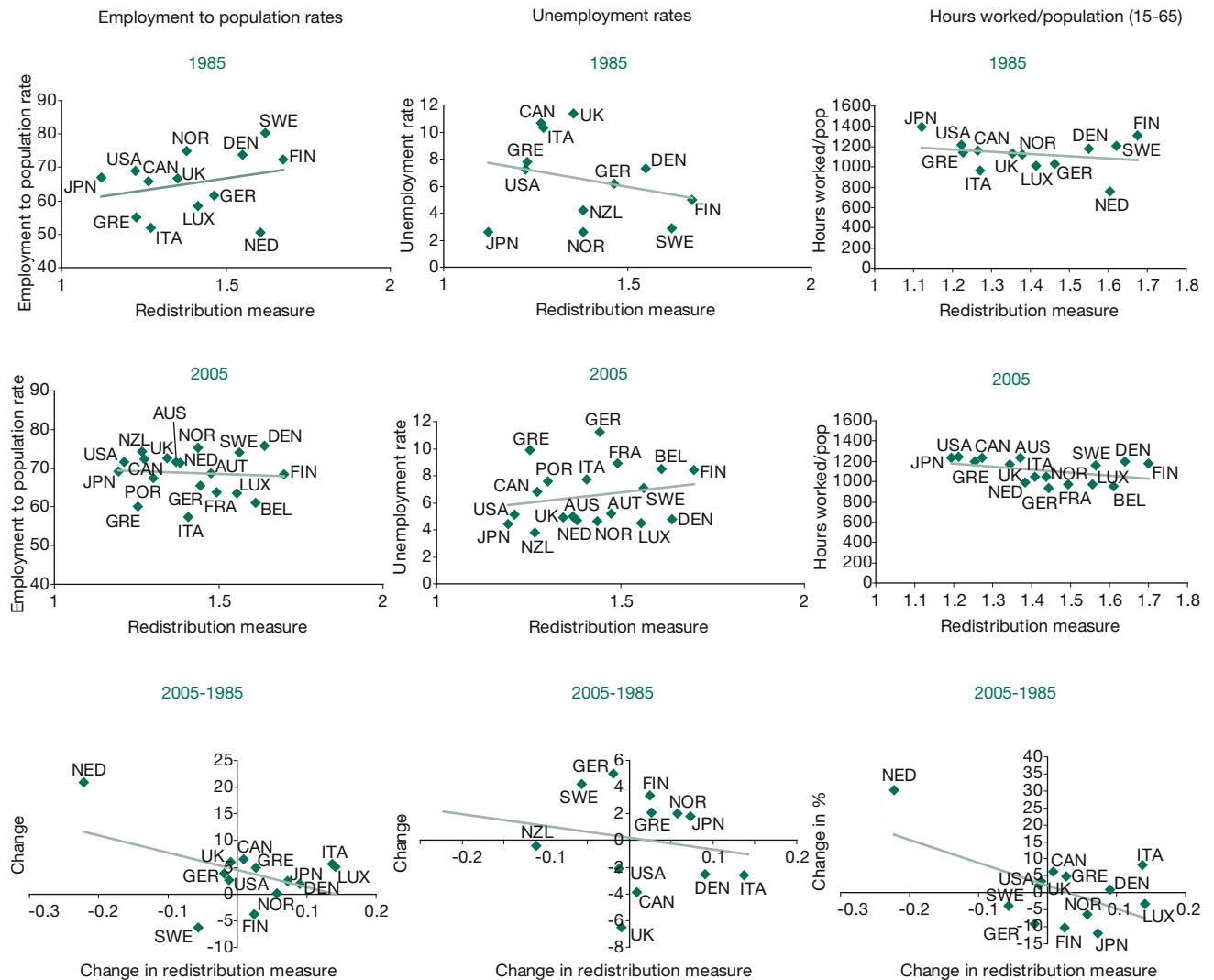
Source: Computation based on OECD database.

socio-economic variables such as neighbourhoods, role models, attitudes, etc. However, the residual dominates wage regressions, which may be due to unobserved ability. If so, equating wages with marginal products still holds but has to rely on unobserved variables. Any (long-term) persistence of wage distributions or lasting changes in the wage structure can then be interpreted as reflecting the marginal products. This strand of the literature concludes that natural rate theory holds up or that economists should at least stick to the theory until contradictory empirical evidence becomes overwhelming. We do not have a better theory? Critics of the natural rate theory argue that wages and marginal products are not (always) equal but that there are at least some degrees of freedom in wage-setting. Furthermore, for unobserved ability to determine the large residual in wage regressions, unobserved ability

would need to be uncorrelated with the observed characteristics.[65]

Equating wages with individual marginal products[66] – with the individuals' contributions to the economy – often leads proponents of the natural rate theory to interpret rising incomes of the very top earners to be Pareto efficient. They only get what they deserve, what they contribute. Reducing their incomes – directly or through taxes – will frustrate

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65 A. Krueger, L. Summers, op. cit., in their paper on "inter-industry wage differentials" observe that even workers dismissed from low-paying industries receive a wage premium when moving to a higher paying industry.

66 Of course, in economies relying on the division of labour, at a minimum one's working team but also society heavily influence a person's productivity.

efforts, the pie will shrink and nobody will be better off. Raising taxes will then have adverse effects, but there may be (at least) two effects related to redistribution. Taxes may discourage labour supply,[67] but taxes can enable (more) equal access to education and more equality of opportunities, which seems to affect participation in labour markets positively. Furthermore, in a dynamic economy, educational services may be especially important. To be able to function in a complex society requires a minimum level of education, better education may enhance technological advancement and it may also facilitate adaptation to rapidly changing environments.[68] Education may create positive spillovers. Individuals' investments in human capital would be sub-optimal, especially if households face credit constraints, as they of course do. Overcoming these impediments is not only socially but also economically beneficial. Moreover, an individual's productivity derived from education will depend on the educational level of society.

The data presented in Figure 2 are not perfect: we compare long time horizons (20 years), we use national aggregates hiding a lot of the variation and we have only a few data points.[69] But if redistribution has the proclaimed dominating negative effects on employment, one would expect to see this relation in cross-sections of countries. Countries with a high degree of redistribution should tend to show lower relative employment and higher unemployment.

Figure 2 displays relevant labour market outcomes as measured by employment-population rates, hours worked per head of population (15-65 years), and unemployment rates on the vertical axis and a measure of redistribution on the horizontal axis. Hours worked per head of population may be preferred over employment-population rates because hours may substantially influence employment figures, as in the case of the Netherlands. The disincentive to work should be highest where redistribution is strongest. As a measure for redistribution we use the ratio of the Gini coefficient[70] before taxes divided by the Gini coefficient

after taxes.[71] The measure displays high values whenever redistribution is strong. According to conventional reasoning, a high degree of redistribution should discourage high-wage labour supply (because some income is taxed away) but also low-wage labour supply (because transfers are available with little or no work). The relationship between employment-population rates and the redistribution measure in 1985 and in 2005 is essentially flat, however. If anything, in 1985 it slopes upwards, i.e. higher redistribution coincides with higher employment-to-population rates. When using differences in employment-to-population rates, a slightly negative (although insignificant) slope can be observed, but this is strongly influenced by the Netherlands. From 1985 to 2005 the Netherlands experienced a slight increase of 4% in the Gini coefficient for disposable income (after taxes), but the Gini before taxes (market income) declined by 10%, i.e. more equality in pre-tax incomes led to a decline in the redistribution. This more equal distribution of pre-tax incomes was due to a substantial rise in female labour force participation, largely driven by increased educational attainment.

Neither in 1985 nor in 2005 do we detect any important relationship between the measure of redistribution and the labour market indicators. If changes in the redistribution measure and in the labour market variables between 1985 and 2005 are used, the relation does not change. We cannot detect a relation. Similarly, if measures of inequality (Ginis or decile ratios) are used, the relationship hypothesised by natural rate theory cannot be detected. There may be multiple equilibria, i.e. different degrees of inequality seem to be compatible with similar employment and/or unemployment outcomes. There is not just one model every country has to follow; rather there are degrees of freedom leaving room for differences in institutional arrangements without harming labour markets.

Proponents of the positive effects of inequality emphasise individual incentives to invest in human capital and to work. But if higher equality (achieved in the market or by redistribution) leads to more equal opportunities and higher enrolment in education, the assumed negative impact on incentives may be well compensated or overcompensated for by a higher rate of technological progress. If the able children from less wealthy households are "credit constraints" (see Table 4), putting an end to this by means of public education will be socially, as well as also economically, beneficial.

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67 The neoclassical labour supply model is theoretically in-determined: the labour supply function may be forward- or backward-bending, depending on the strength of the substitution and the income effect. In this theory the latter is always negative – higher unearned incomes reduce labour supply. Thus the model's immanent conclusion is that transfers reduce labour supply.

68 A social security net may also improve the acceptance of technological change.

69 We picked the years 1985 and 2005, which seem to be at roughly similar stages of the business cycle. However, that may be debatable.

70 Gini coefficients usually refer to family or household income (before or after taxation), i.e. Ginis (usually) do not reflect the distribution of wages. Decile ratios of (gross) wages are therefore more direct indicators for the inequality in the labour market.

71 The redistribution measure was constructed from the Ginis before and after taxation: rdm=(Gini before taxation)/(Gini after taxation). Values above 1 indicate less inequality after taxation, and values below 1 would indicate more inequality after taxation, although empirically not observed. Changes over time computed as $rdm_t - rdm_{t-1}$ indicate a decline in redistribution when negative and a strengthening of redistribution when positive.