

The Declining Educational Wage Premium and the Labour Process: Evidence from 15 Selected OECD Countries

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In the present paper we assess the validity of the dominant upskilling approach, according to which the technological advancements upgrade the skills demanded in labour process and lead eventually to higher remuneration and employment for skillful workers. However, the results from 15 OECD countries show that the skill-premium received by tertiary educated workers fails to serve as a possible interpretation of the widening wage differentials. The findings encourage research within the classical political economy deskilling according to which wages are determined by the socially necessary labour time required for their skill acquisition.

INTRODUCTION

The way that production is organized and how labour is affected and integrated in the process is an old and debated issue in economic analysis. Important within this debate is the theoretization of labour skills and their evolution. Two are the basic approaches: the first one, which is rooted in neoclassical tradition, argues for the continuous upgrading of labour skills due to a (skill-biased) technical change, while the second approach, which is founded on the classical political economy tradition, argues for an internally generated (endemic) deskilling trend. Although the origins of this theoretical discussion goes back to classical economists, the relevant debate was largely set by Harry Braverman's *Labour Process Theory* (1974) and is generally considered to have come to an end in the last decades with the dominance of the neoclassical views of upskilling approach. The empirical verification of this statement is typically based on the changing occupational structure, on the wage differentials among workers with different levels of education attendance and on the nature of the tasks performed in labour process.

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To our view this conventional upskilling approach forms an insufficient theoretical framework within which the effects of technical change on labour process cannot be well captured. Recent empirical literature identifies a ‘polarization’ of skills through the parallel expansion of jobs demanding both high and low qualifications. Moreover, our empirical findings suggest that wage differentials are not due to skill premium received by tertiary educated (skilful) workers. The remaining of the paper is organized as follows. Section 2 briefly presents the arguments put forward over the years related to the evolution of labour skills. Section 3 discusses the methodological and empirical implications of the various corridors that have been developed within the upskilling approach and tests the hypothesis that wage differentials originate in different levels of education attendance for 15 OECD countries. Section 4 outlines the need for the development of a theorization based on the classical tradition, which emphasizes the dynamic nature of the labour process. Finally, Section 5 summarizes and makes some concluding remarks.

THE SKILL DILEMMA IN THE RELEVANT LITERATURE

According to Form (1987, p 29) *“for over two centuries social scientists believed that the mechanization of labor and the factory system speeded up the division of labor, diluted workers’ skills, and increased their unhappiness”*. The origins of this unanimity would be found in the following quotation from Adam Smith’s *Wealth of Nations* (1776, pp. 303-303), which West (1970) calls ‘alienation passage’.

“In the progress of the division of labour, the employment of the far greater part of those who live by labour, that is, of the great body of the people, comes to be confined to a few very simple operations; frequently to one or two. But the understandings of the greater part of men are necessarily formed by their ordinary employments. The man whose whole life is spent in performing a few simple operations, of which the effects too are, perhaps, always the same, or very nearly the same, has no occasion to exert his understanding, or to exercise his invention in finding out expedients for removing difficulties which never occur. He naturally loses, therefore, the habit of such exertion, and generally becomes as stupid and ignorant as it is possible for human creature to become.”

Ricardo (1817, ch. 31), in turn, agreed that *“the opinion entertained by the labouring class, that the employment of machinery is frequently detrimental to their interests, is not founded on prejudice and error, but is conformable to the correct principles of political economy”*, referring to the ongoing substitution of crafted artisans by machines. Nevertheless,

Marx (1867) some decades later was the first who deal with the issue vigorously; he argued that the degradation of workers' position in the production process originates in the 'inner nature' of capitalism and the deskilling of workers is the outcome of the profit maximization motive, acknowledging though that this trend may not always be linear. Marx noticed that the introduction of machinery in the production process leads to the subdivision of labour tasks, the total subsumption of labour to machines and the overtime degradation of labour skills, since it replaces experienced craftsmen with blue-collar workers who simply operate the machines. More importantly, Marx related the concept of skills with the control over the labour process in total; that is, the idea of skillfulness and skillful labour is linked primarily to workers' overall control of the production process, their affiliation to the product produced and their involvement in the conceptualization and execution of the production process (Tsaliki, 2008).

The dreadful effects of the early mechanization on the labour process were also elaborated by economists and sociologists like Mill (1848), Durkheim (1893), Walker and Guest (1952) and Aronowitz (1973), *inter alia*. As a matter of fact, the continuous transformation of the former craftsman to a single component of the assembly line in the Fordist mode of production did not allow much space to doubt about the disturbing impact of machinery. These arguments were formulated to an integrated approach by Braverman (1974) who argued that constant deskilling through mechanization is inherent in the nature of the capitalist labor process which is designed not only to increase productivity but also to extent management's control over the workers. Braverman's view set up a theoretical debate which by the mid-1980s became the ground of research for many economists and sociologists. One major weakness in Braverman's work was that his analytical framework was considered consistent only with the Fordist mode of production;¹ hence, the shift to current more flexible forms of organization of production was perceived as a skills upgrading process. Not surprisingly, a large stream of critique on Braverman's view came from the field of sociology of work and the optimistic Post-fordist theories (Touraine, 1971; Bell, 1973; Perez, 1983; Castells, 1996), according to which manual and repetitive tasks would eventually vanish and the expanding service sector had little space for unskilled workers since it demands a more skillful, more educated and further more adaptive type of worker. This steam was followed by numerous neoclassical economists that argued for the skill biased character of the contemporary technical change which is considered complementary

to skillful workers (Griliches, 1969; Welch, 1970; Acemoglu, 1998; Autor *et al.*, 1998).

THE CORRIDORS OF THE UPSKILLING APPROACH

According to the neoclassical (popular) upskilling view, technological advancements create a new working environment in which workers are more educated, adaptive and flexible and perform a spectrum of different tasks and also to take part in decision making. Three are the analytical corridors that have been formulated over the years:

The first corridor proposes an empirical test based on a snap shot of the production process before and after the introduction of a new technology and compares the complexity and the detailed duties (tasks) of the labourers. Within this line, labour tasks are usually categorized as cognitive, manual, routine, non-routine, analytic, academic, generic, *etc.* (Stasz, 2001). The tip over of blue collar tasks by white collar ones and the alleged reduction of the routinization of labour tasks due to the introduction of new methods of organization and production are interpreted as outcomes of the upskilling process. Machin (1990) and Berman *et al.* (1994) claimed for a considerable shift towards non-manual tasks in UK and US manufacturing, respectively, during the 1980s. Haskel and Heden's (1999) study on 15,000 UK manufacturing enterprises supported the idea that computerization has changed the production process to the detriment of blue-collar workers, who are predominantly poorly educated. Kaiser (2000) detected the same results examining the German service sector. Autor *et al.* (2003) found that non-routine analytical tasks increased more than routine manual tasks since 1970s, while Spitz-Oener (2006) claims the same for the West German labour market.

Nevertheless, a growing number of authors state that skill trends should not be related simply to the differences between blue and white collar duties, since a clerk nowadays may find in his daily duties much commonalities with those performed by an industrial worker (Hugues, 1989; Carey, 2007). In addition, recent studies have shown that the initial optimism concerning the introduction of a new technology, *i.e.*, Computer Information Systems (CIS) gave space to a certain amount of scepticism. Dunne and Troske (2004) concluded that the so called up skilling process can only be identified in the case of the introduction of very advanced Information Systems (such as CAD systems). Berman *et al.* (2005) confirm a delay in the skill demand after the introduction of CIS in Indian industry during the 1990s, whereas O' Mahony *et al.* (2008) arrive to similar conclusions

for the US industry. Moreover, Piva *et al.* (2005), in a sample of 400 Italian industries, find that any observed skill up-grading outcome should be attributed to organization-administration changes rather than to technological changes, whereas for the Italian textile industry the impact of the introduction of CIS does not upgrade labour skills at all (Baccini and Cioni, 2010).

In the second corridor, the upskilling approach is identified in the rising demand for certain occupations whose wage differentials allegedly reflect skills differences. Ottersten (1998) reports a decreasing share of low-skill jobs for France, Netherland, Sweden and United Kingdom for the years 1985-95 and projects a similar trend for the next years, while for Portugal he reports the opposite results. Stuart and Dahm (1999) project a rise in jobs requiring a bachelor degree for USA in the period 1996-2006, while Campbell (2001) states that in UK occupations with higher skill levels are growing faster than those with lower ones. Finally, Adler (2004) argues that the expansion of professional and technician occupations indicates the skill upgrading of the labour process.

In our view, the monitoring of demand of certain occupations is a rather static way to interpret a highly dynamic phenomenon.² Occupations are profoundly affected by the changes in the labour process and the skillful worker of today is very likely to become the unskillful labourer of tomorrow (Tsaliki, 2008; Pavlidou *et al.*, 2011). Nowadays, the upgrading skill hypothesis of the early 90s is challenged by the 'skills polarization' thesis (Autor *et al.*, 2006; Goos and Manning, 2007; Goos *et al.*, 2009). The perplexity of the issue is further manifested in Fernández-Macías (2012) who argues that in EU at the same time coexist the trends for upgrading skills, the 'polarization' of skills and the expansion of 'medium skill' professions.

A third approach developed to test the upskilling thesis combines the skill-biased-technical-change hypothesis with the human capital theory and identifies an upskilling trend through the higher wage and employment rates of the more skillful part of the workforce. According to this approach, educated skillful workers complement technological innovations and since their productivity increases, so do their wages (Mincer, 1958; Grilliches, 1977). Contrary, unskillful workers fail to meet the needs of modern production process; thus they see their wages stagnate and usually find themselves among those included in the naturally unemployment, which are mostly individuals without the proper qualification to fill a job vacancy. In this fashion, mainstream microeconomic theory manages to deal, at the same time, with two

profound empirical outcomes, increasing wage differentials and persistent unemployment rates.

In our effort to test the link between education with advanced productive abilities, increased returns to schooling and rising remuneration gap, we calculated an economy wide skill-premium (s_p) as the additional wage received by the tertiary educated workers for 15 selected OECD countries for the years 2000-2012. This is an adequate long period of time to test our hypothesis provided that we selected a group of major OECD countries on the basis of data availability. The skill premium was estimated by decomposing the total wage bill (W) into the sum of the basic wage (w_b) times the respective employment (N_b) and the wage of skilled workers (w_s) times the respective employment (N_s) (Equation 1).

$$W = w_b N_b + w_s N_s \quad (1)$$

The wage of skilled workers is the sum of the basic wage plus the skill premium (s_p). Thus we have:

$$W = w_b N_b + (w_b + s_p) N_s = w_b (N_b + N_s) + s_p N_s = w_b N + s_p N_s \quad (2)$$

Dividing through by $N (= N_b + N_s)$ and solving for s_p we have:

$$W/N = w_b (N/N) + s_p (N_s/N)$$

$$w_a = w_b + s_p (N_s/N)$$

$$s_p = (w_a - w_b) (N/N_s) \quad (3)$$

Hence, the skill premium is given by the difference between the average ($w_a = W/N$) and the basic wage (w_b) times the inverse ratio of skillful to total employment (Equation 3). In order to calculate the skill premium for the selected countries (Table 1), we assume that the minimum wage sufficiently approximates the wage of unskillful workers, w_b , whereas the employment of tertiary educated labour (ISCED levels 5 and 6) is an accepted proxy to skillful labour employment, N_s .³ All wage-related data is from the OECD database, and employment data according to the educational level is from the UNESCO database.

We observe in Table 1 that the skill premium declines in all countries under investigation for the reference period, apart from Estonia where a 31.48% increase is observed. Skillful workers in Luxemburg and Poland lost more than half of their additional earnings between 2000 and 2012, while Luxemburg, France, Hungary and United Kingdom also exhibited sharp declines in skill premium. The difference between average and minimum wage increased in absolute terms in

almost all cases (except Portugal) from 1.05% in United Kingdom to an impressive 74.39% in Ireland. Though, this rise was overpassed in almost all cases by the higher rise in the relevant skillful employment which inevitably led to lower remuneration. It is interesting to note that the minimum wage declined only in Belgium (-1.75%), Greece (-14.21%), Ireland (-3.98%) and Netherlands (-1.33%) and increased in the rest. It is also worth noting that in eleven countries (Canada, Czech Republic, Estonia, France, Hungary, Luxemburg, Poland, Portugal, Slovak Republik. Spain and United Kingdom) minimum wage increased faster than average wage. Given that this increase cannot easily be attributed to unionization since trade union's bargaining power is generally assumed to have declined the last decades (Visser, 2002; Pontusson, 2013), this finding raises serious questions about whether technical change was actually skill-biased in 2000s.

Table 1
The evolution of skill premium in 15 OECD countries, 2000-2012

<i>Country</i>	<i>Minimum Wage</i>	<i>Average Wage</i>	<i>Average Wage– Minimum Wage</i>	<i>Ns / N</i>	<i>Skill Premium</i>
Belgium	-1.75	4.65	10.06	24.24	-11.42
Canada	25.4	19.06	1.93	27.42	-9.55
Czech Republic	62.18	44.7	38.13	66.78	-17.18
Estonia	89.83	66.42	58.26	20.13	31.48
France	24.15	12.43	2.81	39.26	-36.54
Greece	-14.21	6.44	18.36	59.77	-25.92
Hungary	75.66	25.09	5.23	54.44	-31.86
Ireland	-3.98	28.54	74.39	85.64	-6.94
Luxemburg	17.9	9.63	8.14	99.81	-45.88
Netherlands	-1.33	8.01	15.69	35.03	-14.32
Poland	31.51	13.47	4.7	113.45	-50.95
Portugal	15.02	1.36	-5.95	63.39	-55.74
Slovak Republik.	46.48	36.53	31.34	72.98	-24.03
Spain	5.95	3.52	2.26	43.03	-28.5
United Kingdom	23.81	8.81	1.05	47.55	-31.52

Notes: All numbers show the overall percentage change in the variable; Wages are in constant 2013 prices in national currency.

Sources: Data on minimum and average wages were derived from OECD database at <http://stats.oecd.org/> and data on employment according to the level of education attainment were derived from UNESCO database at http://w3.unesco.org/pxweb/dialog/varval.asp?ma=006_GEWI_ISCED_ISCO_r&path=../database/STAT/30-GE/03-WorkAndeconomy/&lang=1&ti=Employment+by+level+of+education%2C+occupation+and+sex

As the results in Table 1 show, the evolution of the educational wage premium fails to justify for the rising wage differentials, since the sharp increase in the relevant skillful employment is not reflected to a proportional increase in the average wage, which would have been the case if the respective skill premium increased. In other words, technical change may be skills-biased and demand for skillful workers may rise resulting to higher employment of skillful workers, but all these are superseded by the strongest increase in skills supply which leads to a lower skill premium. Another way to keep pace with the empirical findings regarding the minimum wage and skill premium is to assume hetero-employment, a condition at which a skilled labourer is assigned to lower productivity and therefore to task requiring less skills. As a consequence, the increase in the employment of tertiary educated workers does not by itself signify an increase in the demand for skilful labour.

THE DESKILLING APPROACH AND THE DYNAMIC NATURE OF THE LABOUR PROCESS

The findings of the preceding section state that the conventional upskilling approach developed within the neoclassical tradition is not consistent with the contemporary trends in skills. More importantly, it cannot answer questions such as what will happen if all workers become skillful? Are they still going to be well-paid? And what is the meaning of skillfulness when it becomes massive?

To our view, the starting point of the analysis referring to labour process is the explicit recognition of its dynamic nature which surfaces when we focus on capital accumulation and the incessant need of capitalism for self-expansion. The search for higher profitability and the inevitable competition compel individual capitals for their survival to increase productivity and lower per unit cost. This systemic element of capitalism becomes feasible mainly through technological advancements which lead to the mechanization of the production process. In addition, the replacement of variable (workers) with fixed capital (machines) is proved more effective when the more expensive and 'rebel' skillful workers are replaced by cheap and more easily controlled unskillful labour. In this Bravermanian context, technological change is not exogenous but a conscious effort with specific scope: substitution of labour and especially the most skilful part of it, since it is the more expensive with greater bargaining power.

Once a new technology is introduced in the production process, it transforms the labour process itself by replacing certain tasks formerly

executed by workers and by demanding other skills for its proper and effective implementation. The view that the introduction of a new technology substitutes only routine tasks formerly performed by unskilful workers in effect underestimates what a new technology can really do. In addition, the rapid diffusion of a new technology across sectors is usually accompanied by the acquisition of new skills needed for the operation of new technologies; however, the new skills are quickly devaluated through their mass diffusion. For instance, when personal computers were newly introduced in production, they required the upgraded skill of the very few who knew how to use them. In a very short period of time, these skills became prerequisites for almost every profession and the formerly skillful employees soon were demoted to unskillful workers. The failure to recognize this dynamic nature of the labour process is the reason why recent empirical attempts cannot justify the upskilling argument.

It is important to realize that the unskillful worker of today is very different from the one some decades ago; he/she is literate, knows how to use computers, speaks foreign languages, *etc.* All these do not make him/her skillful and do not ensure high earnings. The reason is that the massive acquisition of skills by the people transforms them eventually into basic-skill labour force, since the concept of skills is meaningful when they are scarce (Tsaliki, 2008). From the moment that the majority of workers acquire the same, previously advanced expertise almost instantaneously they lose that privilege since now the majority of the working force is equipped with the same skills. The above statement is clarified and easy to comprehend when the concept of socially necessary abstract labour time is introduced. According to Marx, a set of specific historical and social conditions define the socially necessary abstract labour time needed for the production of a product, which is mirrored into its price. More importantly, this socially necessary labour time has the tendency to fall over the years due to rising productivity caused by the inevitable mass production mode forced on the units of capitals. Within this context, workers' remuneration is determined by the socially necessary abstract labour time embedded in the commodities needed for the reproduction of the labour power. The observed fall in the skill premium, that is the price of skillful labour power, signifies a decrease in the time needed to produce a unit of skilled labour. Thus, the skill premium and skills move to the same falling direction indicating that the labour process in capitalism continuously leads to the debasement of labour skills.

CONCLUSIONS

Our theoretical and empirical investigation supports that the mainstream upskilling approach is too static to capture a rather dynamic phenomenon, where any skill upgrading due to technological change is, sooner or later, followed by the devaluation of these formerly upgraded skills, mainly through their massive acquisition. This argument is manifested by the increasing basic skills demanded by every job candidate (such as advanced language, computer and social skills). Moreover, the increasing ratio of tertiary educated workers in the total workforce is not accompanied by a proportional increase in wage differences, since this excessive supply drives down the respective wage premium. This process coexists with a traditional deskilling process through the replacement of tasks formerly performed by skillful workers with tasks performed by machines. The overall outcome leads a constant deterioration to the way working class is integrated in the capitalist production process, regardless of the worker's level of skillfulness.

What becomes apparent is that labour process debate has not reached to a consensus yet and its reassessment becomes imperative, since most of the policy agendas regarding employment and labour market reforms are based on the nature of technological change and its impact on labour market. The analysis of the labour process in a dynamic framework requires being aware of the coexistence of deskilling and upskilling processes under the dominance of the deskilling trend. Future research should focus in exploring all these developments regarding the trends in basic wage and skill premium, as well as relevant employment by bringing into the analysis the classical theory of value.

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Notes

1. However, Armstrong (1988), Meiksins (1994) and Spencer (2000) argue that many of the critics addressed to Braverman's work originate from a misreading of his writings.
2. We leave aside the issue of heterogeneity that exists even in a detailed classification of professions (*i.e.*, the code 34 of ISCO 08 (Legal, social, cultural and related associate professionals) includes lawyers and judges (3411), social workers (3412), priests (3413), athletes (3421), trainers (3422), *etc.*).

3. Data on minimum (w_b) and average wages (w_a) were derived directly from OECD database, while data regarding total employment (N) and employment of tertiary educated workers (N_s) were directly derived from UNESCO database. The calculation of the skill premium was based on Equation 3.

References

- Acemoglu, D. (1998), 'Why Do New Technologies Complement Skills? Directed Technical Change and Wage Inequality', *The Quarterly Journal of Economics* 113, pp. 1055-1089.
- Adler, P.S. (2004), 'Skill Trends Under Capitalism and the Socialisation of production', (ed.) *The Skills That Matter*, Macmillan Palgrave, Houndmills, pp. 242-260.
- Armstrong, P. (1988), 'Labour and Monopoly Capital', in: Hyman, R. and Streeck, R. (ed.) *New Technology and Industrial Relations*, Oxford: Basil Blackwell.
- Aronowitz, S. (1973), *False Promises*, New York: McGraw-Hill.
- Autor, D., Katz, L. and Krueger, A. (1998), 'Computing Inequality: Have Computer Changed the Labor Market?', *The Quarterly Journal of Economics* 113, pp. 1169-1213.
- Autor, D., Levy, F. and Murnane, J. (2003), 'The Skill Content of Recent Technological Change: An Empirical Exploration', *Quarterly Journal of Economics* 118, pp. 1279-1333.
- Autor, D., Katz, L. and Kearney, M. (2006), 'The Polarization of the U.S. Labor Market', *The American Economic Review* 96, pp. 189-194.
- Baccini, A., Cioni, M. (2010), 'Is Technological Change Really Skill Biased? Evidence from the Introduction of ICT on the Italian Textile Industry (1980-2000)', *New Technology, Work and Employment* 25, pp. 80-93.
- Bell, D. (1973), *The Coming of Post-Industrial Society: A Venture in Social Forecasting*, Harmondsworth: Penguin.
- Berman, E., Bound, J. and Griliches, Z. (1994), 'Changes in the Demand for Skilled Labour within US Manufacturing: Evidence from the Annual Survey of Manufactures', *The Quarterly Journal of Economics* 109, pp. 367-397.
- Berman, E., Somanathan, R. and Tan, H.W. (2005), 'Is Skill-Biased Technical Change Here Yet? Evidence from the Indian Manufacturing in the 1990s', *Annales d'Economie et de Statistique* 79/80, pp. 299-321.
- Braverman, H. (1974), *Labor and Monopoly Capital: The Degradation of Work in the 20th Century, 25th Anniversary edition*, New York: Monthly Review Press [1998].
- Campbell, M. (2001), 'Skills in England 2001: Key messages', Project Report, Leeds Metropolitan University, Policy Research Institute. <http://dera.ioe.ac.uk/5059/1/skills-in-england-2001-key-messages.pdf>
- Carey, M. (2007), 'White-Collar Proletariat? Braverman, the Deskilling/Up-skilling of Social Work and the Paradoxical Life of the Agency Care Manager', *Journal of Social Work* 7, pp. 93-114.

- Castells, M. (1996), *The Rise of the Network Society*, Massachusetts: Blackwell Publishing.
- Dunne, T. and Troske, K.R. (2004), 'Technology Adoption and Workforce Skill in US Manufacturing Plants', IZA Discussion Paper Series, Paper No 1427.
- Durkheim, E. (1893), *Division of Labor in Society*, New York: Free Press [1964].
- Fernández-Macías, E. (2012), 'Job Polarization in Europe? Changes in the Employment Structure and Job Quality, 1995-2007', *Work and Occupations* 39, pp. 157-182.
- Form (1987), 'On the Degradation of Skills', *Annual Review of Sociology*, 13, pp. 29-47.
- Goos, M. and Manning, A. (2007), 'Lousy and Lovely Jobs: The Rising Polarization of Work in Britain', *The Review of Economics Statistics* 89, pp.118-133.
- Goos, M, Manning, A. and Salomons, A. (2009), 'Job polarization in Europe', *The American Economic Review* 99, pp. 58-63.
- Griliches, Z. (1969), 'Capital-skill complementarity', *The Review of Economics and Statistics*, pp. 465-468.
- Griliches, Z. (1977), 'Estimating the Returns to Schooling: Some Econometric Problems', *Econometrica* 45, pp. 1-22.
- Haskel, J. and Heden, Y. (1999), 'Computers and the Demand for Skilled Labour: Industry and Establishment Level Panel Evidence for the UK', *The Economic Journal* 109, pp. 68-79.
- Hugues, K.D. (1989), 'Office Automation: A Review of the Literature', *Relations industrielles/Industrial Relations* 44, pp. 654-679.
- Kaiser, U. (2000), 'New Technologies and the Demand for Heterogeneous Labour: Firm-level Evidence for the German Business-related Service Sector', *Economics of Innovation and New Technology* 9, pp. 465-84.
- Machin, S. (1990), 'Changes in the Relative Demand for Skills' in Booth, A.L. and Snower, D.J. (ed.) *Acquiring Skills: Market Failures, their Symptoms and Policy Response*, Cambridge: Cambridge University Press.
- Marx, K. (1867), *Capital*, Vol. I, New York: International Publishers [1967].
- Meiksins, P. (1994), 'Labor and Monopoly Capital for the 1990s: A Review and Critique of the Labor Process Debate', *Monthly Review* 46, pp. 45-59.
- Mill, J.S. (1848), 'Principles of Political Economy with some of their Applications to Social Philosophy'. <http://econlib.org/library/Mill/mlP.html>
- Mincer J. (1958), 'Investment in Human Capital and Personal Income Distribution', *The Journal of Political Economy* 66(4), pp. 281-302.
- O' Mahony, M., Robinson, C. and Vecchi, M. (2008), 'The Impact of ICT on the Demand for Skilled Labour: a Cross-country Comparison'. *Labour Economics* 15, pp. 1435-1450.
- Ottersten, E.K. (1998), 'New Job Skill Needs and the Low Skilled: A summary', in Guggenheim, E.F. (ed.) *AGORA-IV: The Low-skilled on the European Labour Market, Prospects and Policy Options: Towards a Minimum Learning Platform*, 29-30 October 1998, Thessaloniki.

- Pavlidou, N. E., Tsaliki, P. V. and Vardalachakis, I. N. (2011), 'Technical Change, Unemployment and Labor Skills', *International Journal of Social Economics* 38, pp. 595-606.
- Perez, C. (1983), 'Structural Change and the Assimilation of New Technologies in the Economic and Social Systems', *Futures* 15, pp. 357-375.
- Pontusson, J. (2013), 'Unionization, Inequality and Redistribution', *British Journal of Industrial Relations* 51, pp. 797-825.
- Piva, M., Santarelli, E. and Vivarelli, M. (2005), 'The Skill Bias Effect of Technological and Organisational Change: Evidence and Policy Implications', *Research Policy* 34, pp. 141-157.
- Ricardo, D. (1817), 'The Principles of Political Economy and Taxation', New York: Prometheus Books [1996].
- Smith, A. (1776), 'The Wealth of Nations, vol. 2', London: Edwin Cannan [1970].
- Spencer, D. (2000), 'Braverman and the Contribution of Labour Process Analysis to the Critique of Capitalist Production-Twenty-Five Years on', *Work, Employment & Society* 14, pp. 223-243.
- Spitz-Oener, A. (2006), 'Technical Change, Job Tasks and Rising Educational Demands: Looking Outside the Wage Structure', *Journal of Labour Economics* 24, pp. 235-270.
- Stasz, C. (2001), 'Assessing Skills for Work: Two Perspectives', *Oxford Economic Papers* 53, pp. 385-405.
- Stuart, L. and Dahm, E. (1999), '21st century skills for 21st century jobs', Federal Publications, Key Workplace Documents, No 151.
- Touraine, A. (1971), *The Post-Industrial Society. Tomorrow's Social History: Classes, Conflicts and Culture in the Programmed Society*, New York: Random House.
- Tsaliki, P. V. (2008), 'Economic Development, Human Capital and Technical Change: The Question of Machinery Revisited', *International Review of Economics* 55, pp. 363-371.
- Visser, J. (2002), 'Why Fewer Workers Join Unions in Europe: A social Custom Explanation of Membership Trends', *British Journal of Industrial Relations* 40, pp. 403-430.
- Walker, C.R. and Guest, R.H. (1952), *The Man on the Assembly Line*, Cambridge, Massachusetts: Harvard University Press.
- Welsch, F. (1970), 'Education in Production', *Journal of Political Economy* 78, pp. 35-59.
- West, E. G. (1970), 'The political economy of alienation, Karl Marx and Adam Smith', *Oxford Economic Papers* 21, pp. 1-23.

