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**Education, Vocational Training and R&D: Towards New Forms of
Labor Market Regulation**

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Abstract

Labor market regulation and its relations with education and training have been performing an historical trajectory which closely intertwined with developments in economic thought. Under the form of human capital theories, neo-classical economics set the bridge between labor market equilibrium and education outputs for decades. The functionalist approach behind that lasting relationship was to be challenged by economic crises and globalization, which imposed the unquestionable supremacy of the demand for skilled work. Likewise, even if only that more strict perspective of education would prevail, which fortunately is not the case, time and hazard came to undertake its denigration on the grounds of a severe loss of regulatory efficiency as globalization was setting up.

In this paper we shed light on the increasing role which innovation is called to perform in labor market hetero regulation in the present phase of globalization. Depending on the institutional design throughout which R&D become embedded in nowadays societies, evidence clearly reveals how innovation strategies are to be found so asymmetrically implemented between developed and developing countries, thereby leading to the enlarging divide between the “new North” and “new South” globalization off springs.

Key Words: labor market regulation; education and training; innovation; knowledge; North-South divide; Portugal

JEL Classification: I24; J24

Introduction

In this paper we purpose to approach labor market regulation and its evolution through time up to the present challenges set by globalization. The whole trajectory has been marked by very diverse phases which mainly have to do with the corresponding evolution in the supportive theories and leading conceptions. As it normally happens with long lasting social processes, the transition for an ulterior phase doesn't preclude the survival of elements corresponding to previous stages therefore contributing to the global complexity.

Most of the above considerations apply to education as well. When trying to approach education and training as labor market regulators we have to analyze the leading phases which the educational processes have walked through in order to search for converging points between both domains' evolution.

Accordingly, in the first section we will briefly analyze the most important phases in the evolution of education and training since its contribution to the era of industrial capitalism up to the actual challenges induced by the usually called learning economy. The second section will address the evolution of labor market regulation, closely intertwined with the transition from neo-classical economics to alternative approaches. This transition enlightens the enlarging in scope of the conceptions of qualification and skills which defy the supremacy previously displayed by school to progressively encompass learning through work experience(s) and other forms of non formal and informal learning.

In section three we will analyze one of the leading forms of nowadays unequal change: the broad range displayed by the relative values of higher education in different regions, throughout gross wage premium, and the risk of globalization reinforcing the inequality by allocating higher funding for tertiary than to basic and primary education

The last two sections are dedicated to the justification of the need for new forms of regulation and to a reflection on the role played by R&D and innovation in the regulation of the labor markets.

As a general Conclusion, we stress that even if the functionalist approach in education would prevail, which fortunately is not the case, time and hazard came to undertake its denigration on the grounds of a severe loss of regulatory efficiency as globalization was setting up.

1. Education: the transition from industrial schooling to knowledge-based economies

Industrial capitalism exerted a severe impact on education policies as well as in the dominant conception of schooling. From then on, school and the labor market began developing a strong and sometimes critical relationship (Macdonald 2005).

Since the end of the eighteenth century, the scholastic paradigm had been subject to great criticism due mainly to its inability to provide the qualified workers required by the industrial revolution. And by the end of the nineteenth century, most European developed countries and the United States committed to school the ambitious role of promoting the basic skills for industrialization: being able to read, write and perform basic arithmetic operations; complying with discipline, social order and prescription from the hierarchies. Thereby a long lasting partnership between school and industrial development took place which imparted as well upon most models of school organization and management.

A strongly centralized model of schooling characterized by the time (and in most cases even nowadays...) the framework within which public authorities controlled and financed public school. And which led to compulsory school attendance with the increasing participation of women along with men in the labor market: in the middle twentieth century, with both parents out to work, state schooling would not only take care of children but also prepare them for the “world of work”.

This functionalist conception which perceived school as

...organizations of socialization which instill knowledge, attitudes, values and skills (...) to be rewarded in the labor market (Adnett & Davies 2002: 63)

shaped human capital theories, the core of the theoretical approach within mainstream Economics of Education. Here, the big concern has to do with enhancing productivity and school efficiency, both internal and in the articulation with the labor market. Internal and social rates of return have been elected as the key indicators of the performance of the schooling system, almost irrespectively of the other dimensions which should characterize a public service as equity and sustainability, among other.

The third quarter of the twentieth century brought to education two important critical impacts: the enlarged adoption of the technologies of information and communication (TIC) as well as the effects of the oil crisis in the economy and above all in critical thinking. The widespread use of TIC in education, as it also occurred in most activities, was supposed to overcome new inefficiency shortcomings. Nevertheless, pedagogic models and learning methodologies remained most of times unchanged, severely marked by individualism and fragmentary knowledge, still tailored for the economy of industrialization, now that service economy was progressively replacing the previous mode of production.

At the same time, and in parallel to the economic crisis, Economics of Education was developing an important epistemological debate. In this field several critical lines then developed, among other the one which addressed to credentialism and another to the functionalist approach. While the former critically revised the “production of diplomas” as the real target in education, the latter strongly criticized the conception under which education outputs should mostly (sometimes almost exclusively) serve labour market purposes. In fact, the running crisis proved that *laissez faire* in education had also failed from the point of view of insertion in the labour market. Nonetheless, other more demanding approaches were developing for which education processes should not neglect citizenship and human development as a whole (Ambrósio 2001; Cortesão & Stoer 1995; Crick 2008; Gandin 2007).

The transition to the new century brought with it the reinforcement in globalization, with the increase in international exposure of the economies, in the competition from low wage as a consequence of deregulation and in the outsourcing across digital networks even (sometimes especially) of the high skilled work. Even before the present global crisis, unequal change for equally qualified work spread all over the world, as we can read, for instance, from the statistics on low wages.

At this critical point, in which price competition has proved to foster nothing but widespread inequity, the end of the principle “low wage – low skilled” should naturally impose despite its ability for resilience. The environment should be mature for a new mode of production in this post-industrial phase and a knowledge based economy – or a learning based one, as we prefer – should find not only its theoretical and ideological advocates but especially the political and operational enhancers mature enough to support the transition, what appears to be a most difficult task.

Anyhow, the transition for a “new economy” - in which knowledge plays the role

of the most important production factor, becomes the major responsible for a new model of economic development and above all the unique able to foster growth sustainability - will imply a severe challenge for education and models of learning. It is consensual that this new school has to develop learners' creativity, innovative skills and above all the ability and motivation for lifelong learning. Pupils as researchers appears as one of the leading mottos albeit its enforcement will depend a great deal upon new generations' sense of maturity and the conditions offered to youngsters in their transition to adulthood. Also vocational training, as well as all other forms of formal, non formal and informal learning, should deserve a most prominent role, because problem solving skills, learning by doing and interacting and all the sources able to promote the diversity of the required new skills are expected to constitute some of the main reference axes.

As to learning contents and their adequacy to the learning based economy, there are no unique solutions or models. Although it becomes difficult for schools and teachers to keep pace with technological and scientific innovation, especially in the more fast-moving areas, a technocratic approach for the "new school" states that innovative schools are the ones which prepare for borderline knowledge and to scientific innovation, throughout learning methodologies which would not comply with the mere acquisition of pre-existing skills and knowledge (Guile 2003). Nevertheless, from the alternative way of thinking criticism has been addressed to this innovative and technological deterministic approach, as a growing number of authors have been emphasizing the need to prepare learners as well for a critical study of economy and society:

(...) in a globalised, knowledge-based economy we need an informed workforce (...) a well-educated population is a first and large step toward a dynamic economy and a healthy society.

And reproducing other authors, as Williams (1965), Macdonald continues...

(...) We cannot in our kind of society call an education system adequate if it leaves any large number of people at a level of general knowledge and culture below that required by a participating democracy. (Williams 1965 In Macdonalds 2005: 46).

Being knowledge a non rival good (service) and the most valuable form of capital, the positive interaction it establishes with economic development becomes a virtuous self

reinforcing cycle able to foster sustainability, as the new growth theories explain to us. Anyhow, and quite paradoxically, this unique source of sustainable growth remains mostly a government's and public policies' preserve throughout the critical channels of public funding and curricula approval...

2. The long trend in labour market regulation

The current debate on labour market regulation oscillates between two poles – the neo-classical reappraisal and the pro-Keynesian temptation – in spite the policy mix which increasingly characterizes public action, *vide* flexicurity.

Despite the resilience revealed by labour market auto-regulation as a prototype, as a matter of fact the conceptions underlying the regulation of the labour market have gone through several critical phases, since the classical economists and their faith in *laissez-faire*.

Departing from the uselessness of any regulation at all, *mainstream* Economics came to consider the ability of the labour market for auto-regulation when the first capitalist crises developed. Then, freely acting price mechanisms were supposed to bring markets back to equilibrium (Gorz, 1998; Méda, 1995; Rifkin, 1995) and it was argued that the same should happen with the labour market: accepting a wage as low as required for the market to clear should be the unique condition for getting a job.

The thirty glorious years of the capitalistic development after the Second World War imposed an important turning point on the above conceptions. With the strong improvement in education and training required for the economic development, it became difficult to continue to consider the labour force in the same way as any other production factor, i.e. strictly in physical terms. After Gary Becker's and Jacob Mincer's seminal contributionsⁱ, workers' qualifications and more generally "human capital" started to play an important role in the new conceptions of the labour market. Moreover, the Economics of Development and notably Robert Solow began taking into consideration the important contribution played by labor qualification throughout education and work experienceⁱⁱ.

The first oil crisis and its impact upon the prevailing economic order made it difficult to go on accepting hypotheses like the "employment for life", the sovereignty

of the offer of qualified labor upon labor market opportunities and perfect job matching. It then became clear that new forms of regulation of the labor market were needed as it had proved unable to return to equilibrium by itself. Employment precariousness and the recurrence of unemployment spell even among some of the most qualified workers made education and training part of the new regulation tools.

As a matter of fact, the need to take into consideration the demand side of the labor market appeared as inevitable: given that being qualified would no longer guarantee access to and maintenance of a job, greater attention began to be paid to innovation's and technology's shorter cycles, to the specificities of the skills demanded by the organizations and most of all to the ability of workers to be flexible in order to become employable. That is why *lifelong learning*, in addition to *lifewide learning*, has been increasingly called upon to perform the role of a labor market regulator or, at least, to reinforce the action of other regulation mechanisms, such as labor law.

At the same time, there has been increasing pressure for schools to share their previous role as the unique source of knowledge with other learning institutions, notably firms and other organizations. In that light, for most of the reference authors during the eighties, the dynamics of individual learning processes could be depicted through models like the following (Willis 1986):

$$dK/dt = K_0 h \sum_{i,j} K_j - \delta \sum_{i,l} K_n$$

In other words, the accumulation of knowledge should be positively affected both by the initial school level (K_0) and by work experience (K_j) acquired during the jobs successively performed ($j = 1, \dots, n$); but labor market separations (K_n) lead to obsolescence, or human capital depreciation, the longer the separation spell and the higher the depreciation rate δ , unless some form of adequate training should be undertaken during those unemployment or inactivity periods. Allowing h to take different values for different i periods, the enlarged form of the equation displays differently valued job experiences.

Vocational training, as well as education, therefore acquires a prominent role in promoting (re)employability. And, as has always happened in face of the failure of market mechanisms, governments and public funding (as well as EC's, specially throughout ESF)

were called to support this new strategy. Labour market policies were then applied to the utmost, either under the form of active labour market policies (ALMP) or as unemployment subsidies and other public transfers (Heijke & Muysken 2000).

Education and vocational training are undoubtedly public (or semi-public) goods, but it is only when the market fails and ideological suspicion towards public intervention lessens that they acquire prominence, in this case as remediation strategies.

The functionalist approach towards education and training was emerging again... Actually, by not intervening to promote (re)employability and new skills throughout vocational training, governments would face an even larger pressure on the public budget in the form of passive labour market policies and, among all, unemployment subsidies.

Left to the uncertainties of the market and following no strategic alignment for long periods, training has been increasingly marked by severe vicious circles and strong bottlenecks: training markets are generally tailored for high dimension businesses, training activities are mostly attended by the already qualified and most mobile workers and the outcomes of training frequently fail to meet the organization's needs, especially with regard to improvements in competitiveness and work conditions (Chagas Lopes 2004; Chagas Lopes 2006; INE 2009). That is why great emphasis has been placed on other forms of ALMP since the nineties in most international *fora*, like the OECD; and the European Union's essay of integrated regulation has increasingly insisted on the need for "activation". This is especially so since the Lisbon Summit (Heintz 2006) and the Second Phase of the European Employment Strategy.

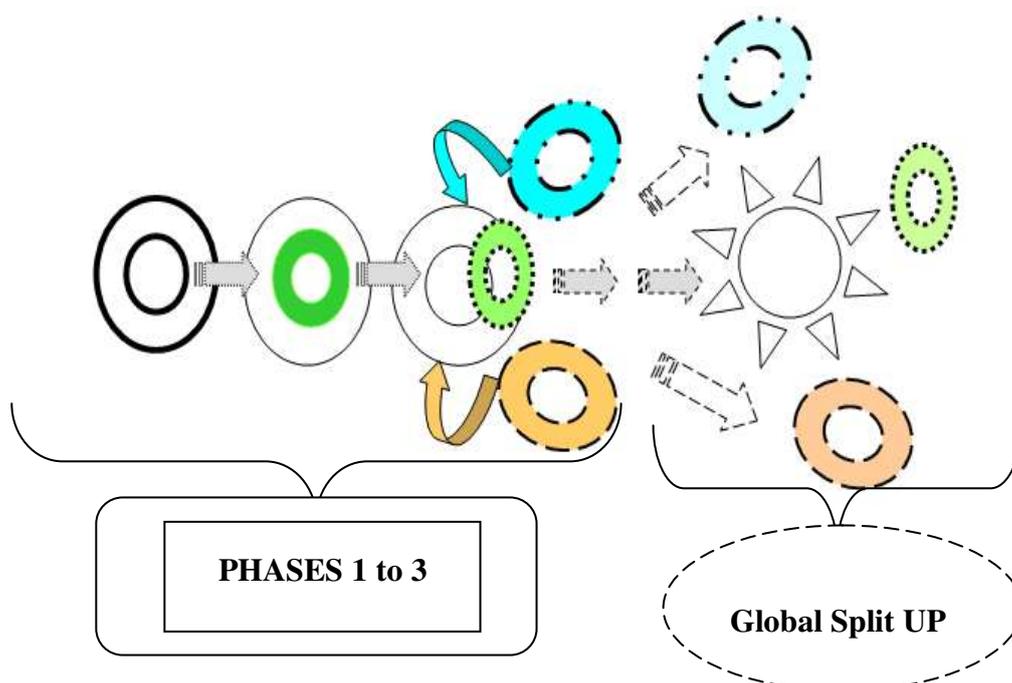
At the same time, the reinforcement of the economic and social crises in the beginning of the new millennium placed new pressure on public budgets with important restrictions to the funding of labour market policies. Education and training certainly retained their role as regulators of labour markets, but they proved to be increasingly inefficient even under the form of lifelong learning strategies. Once again the labour market had to seek new forms of hetero-regulation. Of these, flexicurity was among the most prominent, together with important alterations to labour market legislation, which led towards greater flexibility (Wilthagen 2008).

By clearly allowing for unemployment spells, even for the more qualified and trained workers, flexicurity induces an important divide between the employment relationship and the supply of skilled work that is in total opposition with the neo-

classical approach. In fact, new theoretical perspectives began to predominate, among which life cycle theories were considered one of the most important critical alternatives. Nonetheless, this does not mean that flexicurity deliberately proposed a break with the functionalist perspective, only that education and training were no longer powerful enough. Hence, they were to be supplemented by Social Security; the latter should intervene additionally during unemployment spells to ensure a minimum income and to help finance training and/or education to foster (re)employability.

Despite the specificities of Denmark and other Nordic countries where flexicurity was pioneered and where it proved to work for a while, that is, before the present global crisis, several European countries tried to adopt it as the new regulatory strategy. We will not pursue this subject but just emphasize its external nature relative to the labour markets which it was supposed to help regulate. In fact, labour market regulation performed an outward trajectory over time which was driven by theoretical revision and undoubtedly by the main impact of the employment and labour crises.

Figure 1. Trends in Labour Market Regulation- from *laissez faire* to globalised split



In the above Figure, Phases 1 to 3 represent, respectively, the absence of labour market regulation within the orthodox economy, the transition to labour market auto-regulation, and the need to supplement auto-regulation with external tools such as Education/training and Social Security, as in flexicurity strategies. The right hand side corresponds to the present globalised economy and the lack of sufficiently powerful global regulators, inducing the split up of labour market regulation mechanisms.

Actually, a more accurate analysis on the above regulators proves their inability to perform that role when we consider the globalized economy, as we develop in the next section.

3. Unequal change, take two: how valuable becomes an identical education degree in different labor markets?

Even before the present global crisis there was clear evidence that a same level of education didn't lead to equivalent rewarding in different labor markets. The concretization of this idea becomes easy to develop even in the framework of the leading theoretical approach in Economics of Education, the Human Capital Theories. On the basis of the Mincerian *standard* equation, we can compute a measure of the gross wage premium associated to the conclusion of an upper cycle of studies, generally Higher or Upper Secondary education, relatively to the precedent cycle. According to Strauss & Maisonneuve (2007), that wage premium assumed a very widespread range of values for a sub-sample of OECD countries, in 2001:

Table 1: Gross Wage Premium (GWP) on Tertiary Education (TE) for Men and Women, 2001 – Selected Countries

	GWP-TE: MEN	GWP-TE: WOMEN	DIF. MEN-WOMEN
BELGIUM	40,2	36,3	3,9
DENMARK	47,6	42,5	5,0
FINLAND	52,6	43,1	9,5
FRANCE	58,8	57,2	1,6
GREECE	35,3	47,2	-11,9
IRELAND	54,3	68,4	-14,4
ITALY	50,9	38,8	12,1
PORTUGAL	65,8	91,8	-26,0
SPAIN	26,9	36,5	-9,5
SWEDEN	29,6	23,7	5,9

Source: Strauss & Maisonneuve (2007)

From the above table some main results deserve reflection. The main conclusion appears to be that no systematic association can be derived between the size of the Gross Wage Premium (GWP) associated to Higher (or Tertiary) Education and the geographical and socio-cultural area to which the countries belong. As a matter of fact, either in the Northern countries, as in Finland, or in the Southern ones, like in Portugal, we can observe very high GWP values. Some “peripheral” countries, from the EU integration perspective, exhibit very high values, namely Portugal and Ireland; but at the same time, Greece and Spain display the lowest ones. One (almost...) common trait among the latter group seems to be the higher GWP values displayed by women relatively to men’s; Italy nevertheless represents an exception to this latter trend...

Some of the main facts behind this so heterogeneous pattern have to do with the momentum in which Higher Education reforms took place in some of the countries, with Portugal and Finland being by the time in the latecomer group, an issue which clearly lies outside the scope of the present paper. Accordingly, the graduation rate in Higher Education in those two countries, but especially in Portugal, was then

meaningfully lower than the average and the shortage of graduates led to an important upward move in the corresponding hourly wage.

We should also notice that the reference baseline for the computation of GWP is the average hourly wage corresponding to the precedent schooling cycle, e.g. Upper Secondary's when we consider Higher Education wage premium. For cases in which average hourly wage corresponding to Upper Secondary is low, in relative terms, premium becomes therefore proportionally higher. This reasoning applies namely to the GWP for women in countries where their hourly average wage associated to Upper Secondary Education is especially low and meaningfully lower than men's equivalent, as in Greece, Ireland and above all Portugal.

That is to say, almost irrespectively of theoretical equivalent productivity levels for the same school cycle and identical productivity increases associated to the transition from Upper Secondary to Higher Education, countries reward quite differently those individual productivity gains because of the specificities of their hourly wage structures. In other words, the golden transition rule which in Human Capital theories connects education, productivity and individual wages is no longer proving.

With globalization and the crisis upsurge, the "unequal change" between education and the labor market gets reinforced also on account of another set of reasons.

The first question to address is how far do governments alter the structure of education financing on account of globalization? Some authors conclude that in most countries globalization led governments to reinforce spending in Higher Education relatively to Basic Schooling. This is the case of the study by Baskaran & Hessami for 121 OECD countries in which the authors utilize a rather broad index of globalization (KOF index) to model against average hourly wage by skill level, global tax revenue and marginal tax rate and emigration (Baskaran & Hessami 2010). Considering the period from 1992 to 2006, they observe the following trend in the decomposition of public funding:

Table 2: Evolution of Public Funding by Education Level and Development Status (1992-2006)

Public Expenditure in Education	Basic Education	Higher Education
OECD countries	-0,135	0,112
Less Developed Countries	-0,141	0,106

Source: Baskaran & Hessami (2010)

For the authors, this trend implies the reinforcement in social inequity as for underprivileged students there is a much lower probability to access to Higher Education than for the wealthier. But it also means enlarging the divide between developed and developing countries: for the latter and opposite to developed countries, the social rate of return of education is higher for Basic than for Higher Education and therefore a budgeting more generous for the latter would be inefficient. Nevertheless, investing in Higher Education becomes vital to foster technological progress and high skilling.

Under globalization not only capital but also skilled labor becomes more and more mobile. In face of eventually large imbalances between the structures of the demand and the offer of skills in national labor markets – a topic we will address more deeply in the next section – brain drain constitutes the more obvious and frequent way out.

When trying to formalize the probabilistic decision to emigrate by the high skilled workers, Baskaran & Hessami propose the following model:

$$\pi(l, w_i, x) = F(\epsilon \geq (1 - l^F)w_i^F - [(1 - l)w_i - x])$$

where l , w_i , l^F and w_i^F represent internal and (F)oreign fiscal incidence and average hourly wage by skill level, respectively, and x emigration costs (Baskaran & Hessami 2010).

How should then governments intervene in order to safeguard the investment made in public Higher Education? As some authors argue, public intervention may try to impede the high skilled to leave the country by smoothing the corresponding tax revenue. But by allowing a tax relief for the more wealthy, governments reinforce inequity as the probability of completing tertiary education (and therefore probably performing better paid jobs...) is uneven distributed across the population and is generally conditional upon individual's and family's income, among other things. On the other way, this kind of fiscal intervention would be inefficient from the point of view of the public budget: one of the main income components of the social rate of return to Higher Education – tax revenue - would therefore become much shorter.

Therefore, the net effect exerted by globalization and the present crisis upon investment in (Higher) Education and the corresponding rewarding becomes mostly inconclusive. But the point is that neither education nor vocational training by themselves are now powerful enough to regulate labor markets as they are so exposed to globalization determinants.

4. The present need for (new forms of) labour market regulation

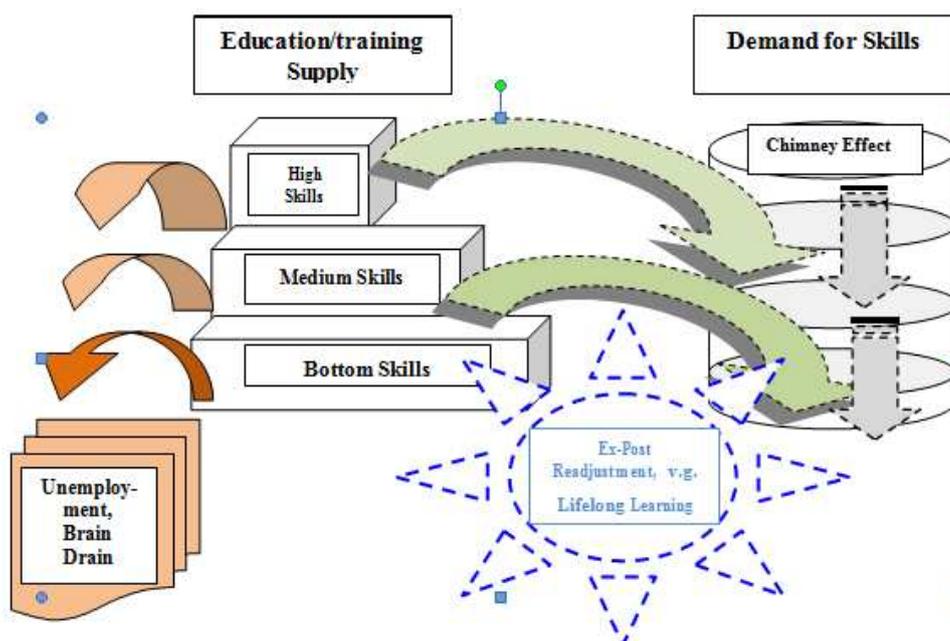
As a matter of fact, with globalization, labour markets have met with new forms of disequilibria which originate either within each country's labour market or as an outcome of the global interaction.

Struggle for competitiveness leads resourceful countries to permanently push the technological innovation frontier onwards. Hence, technology cycles become even shorter and maturity peaks are reached at a faster pace as if in some sort of perpetual movement, until a crisis like the present one hits this wealthier part of the world. For technology dependent countries, that circular auto-feeding movement means the reinforcement of dependence in which they got caught by trying to keep a position in the global trade to survive. Actually, besides their increasing losses in competitiveness, they also face severe distortions in the labour markets: the qualification systems remain intrinsically national in terms of the values and skills they promote and they rarely adjust easily to innovation especially when it comes from abroad. Likewise, in these countries an increasing divide between the organizations' demand for skills and the supply of qualifications takes place, and the corresponding vicious circles and caveats become difficult to eradicate as time goes by.

More developed and less dependent countries also face distortion and disequilibria, albeit of a different kind. For most of them, precariousness stemming from external labor market flexibility has increased along with the struggle for competitiveness and alleviation in the labour laws. As a result, they face a rising mismatch between the duration of labour contracts – which tend to follow the shorter productivity patterns – and the need to improve qualifications throughout labour market experience. Lower rates of return for investment in human (occupational) capital and increased free-riding flows then appear as obvious consequences, with further qualification and training efforts proving to be inefficient to overcome those bottlenecks (Chagas Lopes 2006).

Distortions like the latter often become powered by the rigidity of the structure of the demand for labour: despite suffering from very low productivity levels, the economic structure proves unable to absorb the medium and high-level skills it so urgently requires. As we shall see in the next section, lack or misuse of innovation policies is usually the main cause behind this outcome. This paradoxical behaviour has sometimes been called the „chimney effect” and it induces severe underutilization of skills and competencies, as depicted by the following Figure:

Figure 2. Skill’s underutilization and the *chimney effect*



Source: Adapted from Chagas Lopes (2008)

From the above Figure, three main traits are clear:

- the incapacity of the demand for labour to absorb higher skills, which leads to their unemployment and/or to a brain drain, an important feature which characterizes the Portuguese labour market today;
- the occupational downward trend, which results in a meaningful share among the higher skilled being offered only poorly qualified jobs;
- the eviction effect, or pushing the less skilled workers to the very bottom or even to unemployment, thereby reinforcing the probability that the *outsiders* will remain excluded for longer periods.

These sorts of vicious circles tend to be reinforced whenever the economic strategy and education and training policies are kept separate, thus precluding articulation of the corresponding decision making.

In light of the discussion so far, it appears that the need for regulation in the labour markets is consensual nowadays. Nevertheless, we can distinguish among several regulation approaches, in particular the one which the European Union has been trying to adopt, and the OECD's perspective, which we shall briefly review.

Being aware of the modest ability of the "European model" to raise employment as well as the need to foster competitiveness, the European Commission seems to overlook the kaleidoscopic nature of the European Union most of times. Actually most European official documents stress the need for *a (global and unique...) regulation model*, which should be able to foster "(...) *fair and decent working conditions and labour standards to all workers in EU and protect workers against overexposure to the whims of the market (...)*" (European Parliament 2007). It would seem that at least the neo-classical pro-free market *penchant* has been overcome, although perhaps not for good.

As a matter of fact European labour markets behave quite differently even when the economic conjuncture is stable. These differences have been persistent over time and are deeply rooted in structural reasons, leading us to systematically distinguish the Nordic countries from the Southern-Mediterranean, the central European and the Anglo- Saxon ones in so far as long-run labour market trends are concerned.

Reflecting on the new forms of labour market regulation, the OECD's approach mostly emphasises the role of "(...) *good domestic policies ... supported by well designed employment protection legislation (...)*" (OECD 2007: 3) in order to foster re-employment opportunities. It stresses the crucial role which labour market regulation should play in shifting jobs from declining to expanding occupations, in "making work pay" namely for the workers at the bottom, and in promoting skill development opportunities for the less educated in order to limit low pay traps (OECD 2007). Unlike EU, OECD does not have to deal with integrated decision making and perhaps for that political reason it does not neglect the role that national (and in fact quite diverse) decision making should play in labour market regulation, an approach which seems to us to be much more reasonable.

Accordingly, we argue that country specific R&D and Innovation policies must play a leading role in today's hetero-regulation of the labour markets. In doing so, they complement education, training and other policies' regulatory capacity. Now, despite the inevitable split up due to lack of a global regulation model, in each country's labour market R&D policies should be called to intervene and upgrade the demand for skills in order to minimize the underutilization of the qualifications supplied. Of course we do not uphold isolationist policies for countries belonging to economically integrated areas, such as the EU. But EU centrally decided Innovation and R&D policies risk glossing over each country's specificities and as a result they may contribute little to reinforcing the EU's ability to absorb higher qualifications.

In the next section we shall explore the intervention of R&D and Innovation as labour market regulators in more depth. For this purpose we shall consider the Portuguese situation in the context of the European Union.

5. R&D and Innovation in the regulation of labour markets

In most analyses there is a trend to illustrate the ability each country has to foster R&D and innovation by means of education indicators such as the share of individuals in a given cohort having completed higher education or advanced studies (MSc. and PhD). Sometimes these indicators are broken down by scientific domain and consider especially the proportion of graduates and post-graduates

in the specific fields of Engineering and Science. Notwithstanding, this kind of information is quite limited as it gives us no sign of the capacity of the economic structure to absorb the high and medium-high qualifications upon which it so much depends to enhance productivity. Furthermore, with such indicators we have no information on the rate of “human capital” underutilization, a feature which is often connected with the bottlenecks and other disequilibria in labour markets like those we considered in the previous section.

Research on learning methodologies has come a long way and contributions like Kolb’s (1984) experiential learning theory mark a fundamental turning point. This author defines learning as *“the process whereby knowledge is created through the transformation of experience”* (Kolb 1984: 23). Therefore we cannot disregard occupational experience – and likewise employment status – when trying to assess the influence that “human capital” exerts upon the broad process of skill and competency development. In this line most authors in human resources management, such as Beckman & Barry (2007), insist on the importance of action-oriented learning for the process of innovation in work and the labour market; the robustness of the initial education, the kind of professional career and the competency requirements of the current jobs and tasks all play a leading role in fostering innovation (Barry & Beckman 2007). It becomes clear that differences in individual learning styles – especially throughout the unequal distribution of job opportunities – strongly affect the ability to participate in and foster innovation. As the above authors state *“(…) Innovation for sustainability requires taking a systems view (...) [It] involves those who will pay for the output of the innovation process and those who will use it ...”* (Beckman & Barry 2007: 26). They also stress the importance of the context for which innovation is designed, stating that to neglect that context, inner aspirations and decisions will lead to misunderstanding and misrepresentation of the innovation processes.

Therefore, it is clear that in the present globalised world, innovation and knowledge are quite unequally distributed and they strongly depend upon access to labour market opportunities and working conditions.

In order to assess how far R&D and innovation are **indeed** contributing to the regulation of labour markets and to the alleviation of bottlenecks which we have been describing we need other kinds of indicators that are complementary to the ones relative to outputs in Higher Education and advanced studies. The breakdown of researchers by institutional sector (Business Enterprise Sector, BES, Government, GOV and Higher Education, HE) allows us to go a step further. When we consider EU-27 and Portugal in this light, we observe that for 2008 while in EU-27 some 46,0% of total researchers were absorbed by BES, 40,0% by HE and only 13,0% by GOV, in Portugal HE absorbed more than half (56,0%) of those high skills whilst BES only employed some 26,0% and GOV 16,5% (EU 2009).

The relative capacity of absorption of high skilled workers is confirmed when we look into employment indicators more deeply. In 2006 the percentage of people working in Science and Technology (S&T) within total employment amounted to 29,6% in EU-27, while in that same year Portugal exhibited the lowest value for the whole Community, 17,9% (EU 2009). Of course those results have to do with the different robustness of the economic structures with regard to technological sophistication and skill requirements. According to the same source, in 2006 Portuguese high and medium-high- technology manufacturing absorbed no more than 3,3% of the global employment, exactly one half of the corresponding EU-27 figure (6,6%). Even knowledge intensive services (KIS) where larger gains in productivity have been obtained in today's economies reveal Portugal's inability to absorb high skilled employment: only 23,1%, in 2006, the third worst result after Bulgaria and Romania, against 32,8% in EU-27. Yet, gross expenditure in R&D relative to GDP would not lead us to expect such a bad result for Portugal. This certainly points to inefficiency in the allocation of R&D resources, but it also seems to indicate that there are important difficulties in transforming R&D into effective innovation.

Some of the caveats we have been referring to have to do with the country's industrial structure, which in Portugal is by and large made up of small and medium enterprises (SME). In addition, organizational models, managers' competencies and skills, entrepreneurial values and inherited culture exert an influence on the ability to innovate.

Actually they severely affect knowledge and technology diffusion and demand as well as organizational innovation. For the EU, two important instruments display information on most of those innovation indicators: the Community Innovation Survey (CIS) and the European Innovation Scoreboard (EIS). From the releases CIS 2004 and EIS 2006 (Parvan, 2007) and considering only SME¹¹ we obtained some indicators that help us characterize the Portuguese situation: more than 40,0% of the Portuguese SME introduced in house (intra mural) product or process innovation in 2004, a very noble result when compared to the corresponding figures for France, Italy, Netherlands or Spain, for instance. Nevertheless, that result is not essentially the outcome of a meaningful cooperative strategy as less than 10,0% of the innovative SME in Portugal cooperate with other enterprises of the kind, an “isolationist” behavior which in eight other European countries (such as Italy and Spain, among others) becomes even more exaggerated¹². These results alert us to the importance of the context and to the impact that national specificities exert upon innovation processes. But most of all they shed light on the strong articulation existing between the employment structure and labour market opportunities and R&D and innovation efforts. In fact, education and training will no longer be able by themselves to regulate labour market disequilibria. On the contrary, they may operate towards the reinforcement of bottlenecks if innovation in the economic structure does not take place. In a sense, striving for competitiveness and valorizing human capital can go hand to hand: it just requires that adequate R&D policies translate into innovation which will lead enterprises to steadily and increasingly absorb the medium and high skilled workers they absolutely need to raise competitiveness. By so doing, R&D policies will enhance skilled and sustainable employment, as well as contribute to foster inclusion and citizenship when reforms and measures are taken to develop a renewed and humanized work centered society, breaking with the neo-liberal policy framework.

¹¹ As S-V. Parvan emphasizes, to consider not only SME but all countries’ enterprises would lead to severe biases which would strongly affect international comparisons.

¹² From the point of view of organizational innovation, the country does not rank as modestly as might be expected: with regard to SMEs, more than 42,0% introduced that kind of innovation.

Conclusions

The historical evolution of labor market regulation inscribes into the evolutionary trends and resilient attempts performed by neo-classical economic theories. As a matter of fact, most of the more deep rooted hypotheses - like the one of automatic regulation and subsequent rejection of public intervention – are still attracting a great deal of supporters, along with the high ability for recovery that characterizes the *mainstream economics*.

Nevertheless employment and labor crises became more and more severe and recurrent and the successive approaches of the labor market dynamics came to consider the need for external help, or hetero-regulation, namely after the third quarter of the twentieth century.

Also economics of education, as a scientific field, developed in close interaction with the neo-classical approaches. The human capital theories (hct), one of the major neo-classical conceptual apparatuses, performed the role of axial reference either in labor economics or in economics of education. Actually, hct served as a natural bridge between the two scientific fields and strongly resisted to criticism and alternative proposals even when the evolution of “the real economics” put at stake the inadequacy of its hypotheses.

Acting as a propulsion mechanism, hct condemned for long education to a mere role of provider for qualifications and knowledge to be used in the labor market. This functionalist approach, which is still attracting a large number of followers, has been severely criticized by the alternative and broader approaches which give priority to the conceptions of the education as a leading vehicle for personal and social development, enhancing social inclusion, humanization and democracy.

Nevertheless, that instrumental perspective lead education, and training, to be attributed the general role of labor market regulators for decades. In this paper we purposed to shed light on the inadequacy of such a role mostly because of the new restrictive conditions imposed by globalization to economic equilibrium.

With the pressure imposed by growing unemployment and discontinuities of the individual labor relation along life cycle, education and training reinforced their role as labor market regulators, now under the form of lifelong learning. The latter perspective encountered large support in the life cycle theories and their implicit hypothesis that such kind of learning would constitute the best (re) employability enhancer. The transition to the end of the last century was made under the flag of this new kind of policies, a great

deal of institutional documents, policy decisions and academic outputs being developed under this approach. We must notice that “second chance” education (or training) were then attributed the role of ex post regulators, a feature which clearly sheds light on the insufficiency of initial education and training to provide now for good job matches. This is especially true whenever education and economic policies are kept as separate parts within the countries’ global strategy.

Recurrence of labor market separations and demographic pressure, along with globalization, contributed to reinforce the conviction that new forms of labour market regulators were needed. At a first instance, social security has been called to perform the third axis of the triangle besides recurrent unemployment and lifelong learning: labour market separations would then need an income support able to provide not only for basic needs but also for new schooling or training attendance, the ultimate goal being employability. That was the time for the widespread of flexicurity strategies in several European countries which purposed to follow the Danish model, even though in most cases - as the Portuguese one – such strategies did not get to be implemented.

Open competitiveness and deregulation in the globalized economies lead developed countries to invest even more in frontier technologies in order to keep previous market shares as far as possible. For developing and technology dependent countries this kind of speed increased innovation contributes to reinforce two kinds of disequilibria: the first one, between imported technology (and rising external debt), its implicit values and norms, and nationally acquired skills and qualifications, which are mainly an output of national education systems and inner idiosyncrasies. A second one which expresses throughout an increasing mismatch between the offer and demand for skills, leading to severe distortions in the structure of occupations, as with the *chimney effect*, skilled unemployment and brain drain.

Likewise, even if only the more strict perspective of economics of education – the functionalist one – would prevail, which fortunately is not the case, time and hazard came to undertake its denigration on the grounds of a severe loss of regulatory efficiency as globalization was setting up.

Anyhow, the preponderance of the demand side of the economy, and in particular of the labor market, became unquestionable. As it became more and more evident, as well, the need for systematic upskilling measures directed towards the economic activities which prove unable to absorb high and medium-high skilled labor, on which they absolutely depend to foster productivity gains and competitiveness. The leading role was

then on the side of innovation.

How far are then R&D policies adequately designed and implemented in order to enhance innovation? A brief analysis of the leading indicators clearly shows the large divide between countries relatively to this matter. With globalization, not only is there a trend for governments in less developed countries to over invest in higher education against basic and secondary levels, as there is also a severe problem of innovation embeddedness in most productive activities. Therefore knowledge, the leading productive factor in nowadays economies, becomes quite unevenly allocated among countries, thereby contributing to enlarge and reproduce the divide between the “new North” and “new South” societies, the more obvious off springs of globalization.

ⁱ We refer to Gary Becker’s (1964) and Jacob Mincer’s (1972).

ⁱⁱ Which seminal contribute is R. Solow (1956), A Contribution to the Theory of Economic Growth, *Quarterly Journal of Economics*, MIT Press 70 (1), (65-94).

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