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Recovery not fast enough? Notes on speeding up

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Abstract

Economy-wide losses occur due to sluggish factor adjustment: these notes focus on the role of training in economic restructuring, and provide a novel approach to assess the value of human resources management policies. As training raises mobility it speeds up reallocation, also with favourable distributional impacts; it is argued that these effects reveal the true value of training. Numerical exercises show that policies towards training incentives and preparedness can make a significant contribution towards faster economic growth and lower long term losses from sluggish adjustment. Also, the relevance of improving the too-frequent poor effectiveness of training programs is made apparent.

Key words: training, labour mobility, restructuring, development

JEL: J24, O15, F16, F17

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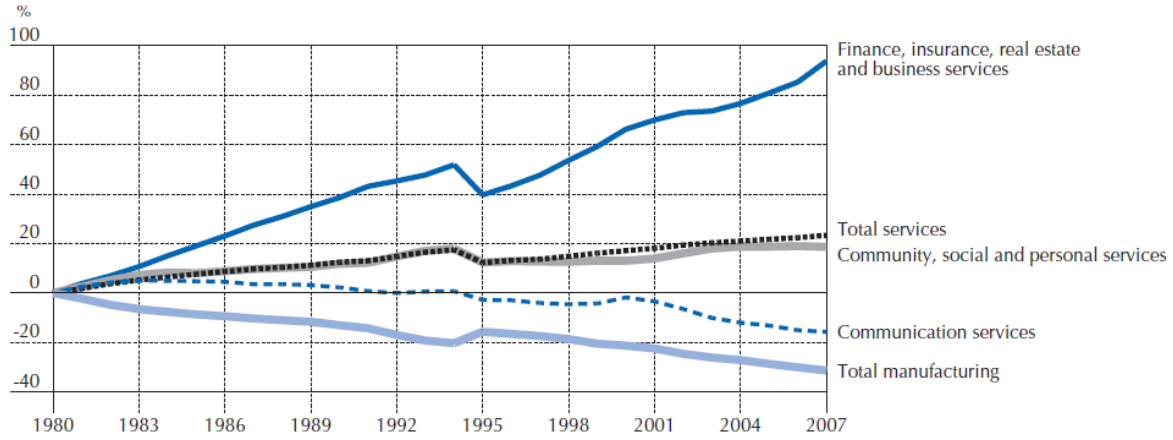
I. INTRODUCTION

Economic restructuring caused by changes in technology or shifting demand patterns, international prices, or innovation requires the ability of the economy to adjust fast to a changing environment, and this has caused indeed major changes in employment trends, as shown in Figure 1. The economic structure worldwide is shifting fast towards skill-intensive sectors and this poses important challenges to those countries where skills are not available in the right mix. Interactions between economic change, skills policy, unemployment and inequality are at the centre of the discussion in recent literature, such as Manning (2010), Kreickemeier (2009), Albrecht and Albrecht (2009), Lee and Wolpin (2006), Johanson (2004), among others.

Figure 1 Change in the share of employment by sector. Percentage change in share of employment relative to 1980, OECD average



Source: OECD (2013)

The demand for skills is growing very rapidly, putting the mechanisms of generation of skills under pressure. The skills policy is a key element in the economic policy; however the creation of lifelong skills shows several deficiencies both in developed and developing countries. On this, the International Labour Organization Report (2011) highlights that *"The cornerstones of a policy framework for developing a suitably skilled workforce are: broad availability of good-quality education as a foundation for future training; a close matching of skills supply to the needs of enterprises and labour markets; enabling workers and enterprises to adjust to changes in technology and markets; and anticipating and preparing for the skills needs of the future."* When this "*close matching*" is not present policy intervention is required, and policy design is crucial for its success. Current dynamism of the global economy requires an effort to establish a flexible and efficient mechanism to create and upgrade skills to quickly adjust to a fast changing environment. If not, what is really the cost of this lack of effectiveness? Training (or a lifelong learning strategy) has economy-wide effects beyond the direct effect on training participants as usually assessed, and this study aims to provide a methodological approach to assess the mid- and long-term effects of easing mobility or employability on growth and income distribution. It is also shown by means of numerical exercises that suitable human resources policies may ameliorate future economic losses by enhancing preparedness.

These notes are organised as follows. Section 2 describes the market adjustment with quasi-fixed labour. Section 3 provides a general equilibrium model and discusses some numerical exercises. Section 4 provides some concluding remarks.

II. QUASI-FIXED LABOUR AND REALLOCATION

In the multiperiod dynamic model labour is quasi-fixed, as defined by Oi (1962): labour units need to undergo training to acquire mobility or endure unemployment. Hence, the labour endowment is allocated as

$$L_{At} + L_{Bt} + L_t^{\,M} = \bar{L} \;\forall t \tag{1}$$

$$L_t^{\,M} = a/2\,(L_{ht} - L_{ht-1})^2 \;\; \forall t \;\; a > 0 \tag{2}$$

where the parameter a provides a measure of labour mobility, $\bar{L}$ is labour endowment, L_{ht} is labour used by each sector, sub-index $h = A, B$ represent economic sectors and t indicates time. The term $L_t^{\,M}$ is a training sector that enables labour to alternative allocations—this is an only-time input activity (as self re-training; it may also represent temporary unemployment). The quadratic functional form for $L_t^{\,M}$ is explained by the congestion in the labour/training market. Labour mobility costs have been extensively studied in the literature (e.g., Hammermesh and Pfann, 1996; Hammermesh, 1995, among others), but the emphasis here is on the economy-wide impact rather than that at the firm level. Although the assumed functional form introduces the dynamics in the process it is not essential for the argument except for the particular case of one-shot instant reallocation which is ruled out.

The parameter a is key in the process. If there is no friction ($a = 0$) labour units are perfect substitutes across sectors. However, when the labour units differing in allocation are imperfect substitutes there is friction to their movement; training may ease their move.

The intertemporal income maximisation program (discrete time) considering expressions (1) and (2) is

$$\underset{\{L_{At}\}t=0,\ldots,\infty}{Max} \sum_{0}^{\infty} \left[w_{At} L_{At} + w_{Bt} \left(\bar{L} - L_{At} - a/2\,(L_{At} - L_{At-1})^2 \right) \right] \Big/ (1+r)^t$$

$$st \;\; 0 \le L_{At} \le \bar{L}, \;\; initial \;\; allocation \;\; given$$

where w_{ht} is the wage that differs across sectors $\forall t \neq T$, and r is the interest rate. The first-order conditions take the following form:

$$w_{At} - w_{Bt}\left(1 + a\,(L_{At} - L_{At-1})\right) + w_{Bt+1}\, a/(1+r)(L_{At+1} - L_{At}) = 0 \qquad \forall t$$

For a *T* high enough, and a terminal condition assuming steady-state values for *T+1*, given the values for the initial allocation, prices, and interest rate, the problem is solved recursively. Considering $L_{AT+1} - L_{AT} = 0$, the following equilibrium condition along the optimal path is obtained:

$$w_{Bt}\, a\,(L_{At} - L_{At-1}) = \sum_{t}^{T} (w_{At} - w_{Bt}) 1/(1+r)^{t}$$

III. ASSESSING GENERAL EQUILIBRIUM IMPACT OF EASING MOBILITY

The imperfectly mobile labour market in a general equilibrium setup allows an economy-wide assessment of the value of training. Some scenarios are of special interest, particularly those related to expected changes in the economic environment or in policy. For instance: What is the incidence of imperfectly mobile labour in an external shock? Does it pay to get prepared for an expected future exogenous shock? The adjustment technology plays a crucial role in the overall assessment of economic impact of changes in the environment, this can easily be shown in the following exercises.

The main features of the general equilibrium model are: two final goods, two factors (capital and labour) where labour is quasi-fixed, constant returns to scale, fixed factor supplies, an open small price-taker economy and no assumption of distortions or trade barriers. It follows the standard Heckscher–Ohlin tradition introducing quasi-fixed labour; assuming Cobb-Douglas functions (production functions and consumers' utility) the full model is

$C_{ht} = \theta_h\, I_t / P_{ht}$ consumer demand of good h

$P_{ht}\, Z_{ht} = w_{ht}\, L_{ht} + r_t\, K_{ht}$ price equations

$C_{ht} = Z_{ht} \pm M_t \ or \ X_t$ goods market clearing conditions

$L_{ht} = Z_{ht} / A_h \left[r_t / w_{ht} \left(1-\alpha_h\right) / \alpha_h \right]^{\alpha_h}$ labour demand by sector h

$K_{ht} = Z_{ht} / A_h \left[w_{ht} / r_t\, \alpha_h / 1-\alpha_h \right]^{1-\alpha_h}$ capital demand by sector h

$I_t = \sum_i w_{ht}\, L_{ht} + r_t\ K_t$ household income

$P_{Yt} X_t = P_{Xt} M_t$ trade balance condition

$\sum_h K_{ht} = \overline{K}$ capital market clearing condition

$L_{At} + L_{Bt} + a/2\,(L_{At} - L_{At-1})^2 = \overline{L}$ labour market clearing condition

$w_{At} - w_{Bt}\left(1 + a(L_{At} - L_{At-1})\right) + w_{Bt+1}\, a/\left(1+r\right)(L_{At+1} - L_{At}) = 0$

$P_{ht} = PW_{ht}\, E$ price taker country

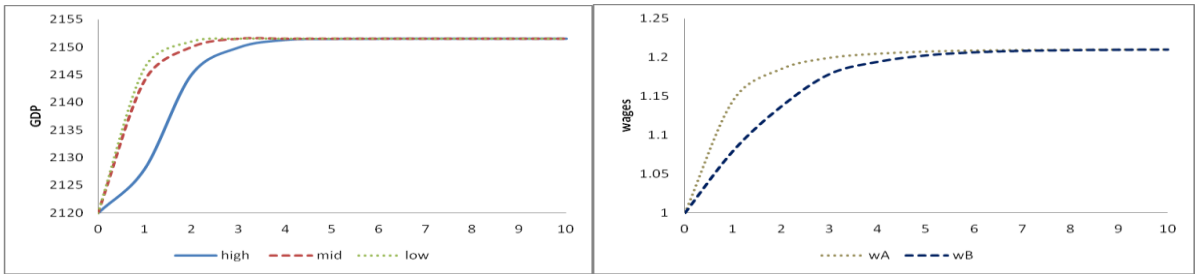
where the endogenous variables are C_{ht} consumption of good h, Z_{ht} production of good h, P_{ht} price of good h, L_{ht} use of labour by sector h, K_{ht} use of capital by sector h, w_{ht} wage sector h (differ during transition), r_t capital rental, I_t household income, X_t exports, M_t imports, E exchange rate; exogenous variables are PW_{hr} international good prices, $\overline{K}$,

$\bar{L}$ capital and labour endowments. Sub-indexes $i = K, L$, $h = A, B$ and t indicates time. In the exercises the interest rate r is set at 3% and T=10.

It has proved hard to find relatively standards ways to compute adjustment costs levels: while some authors have estimated them to be relatively high others have found lower ones (for instance, Cooper and Willis, 2003; Hall, 2004), a complete discussion on sources of variations can be found for instance in the study by Hammermesh and Pfann (1996). The following numerical exercises attempt to shed light on the economy-wide impact of the mobility issue without relying on specific values of parameter a (a wide range of low and high values will avoid this); a permanent rise in the international price of good A is simulated for alternative mobility levels.

An initial picture of the impact of the shock is displayed in Figure 2. The reallocation induced by a shock causes a "temporary deviation" of labour units towards re-training; as some labour units are not used for productive purposes during re-training there is a temporal contraction of the production possibilities frontier with implications on distribution and welfare, depending on the level of the adjustment costs. After an external shock the presence of adjustment costs gives rise to gradualism, with speed inversely related to the cost level (parameter a), Figure 2 illustrates this point. The figure shows that for a small a, the transitory period is short, for higher costs the contraction takes longer to recede. As the production possibility frontier for each period depends on the adjustment cost level, the present value of the differences between the output level with and without adjustment costs provides a measure of the economic value of easing mobility.

Figure 2 Growth and wage gap



Source: Own elaboration

Imperfect mobility also generates a wage gap across the sectors during the adjustment process. The right panel of Figure 2 illustrates this: the costlier the adjustment, the longer the period needed for wage convergence. Therefore, the fate of owners of labour units relies heavily on the mobility cost during transition; consequently, the efficiency in the adjustment technology has distributional effects.

These two effects during transition, the present value of the economic loss and the distributional impact, reveal the true value of easing mobility, i.e. training or lifelong learning. Variations of this exercise can shed further light to the issue: the shock is simulated for alternative mobility levels and policies, leading to the following set of cases,

Case 1 Perfect labour mobility: The shock takes place at t=0, immediate reallocation takes place.

Case 2 Immediate shock with low adjustment costs: The shock takes place at t=0, gradual reallocation takes place afterwards.

Case 3 Future shock anticipated with low adjustment costs: The shock takes place at t=3, but this is anticipated and gradual reallocation takes place immediately.

Case 4 Future shock not anticipated with low adjustment costs: The shock takes place at t=3, this is not anticipated thus gradual reallocation takes place afterwards.

Case 5 Immediate shock with high adjustment costs: idem Case 2

Case 6 Future shock anticipated with high adjustment costs: idem Case 3

Case 7 Future shock not anticipated with high adjustment costs: idem Case 4

The present value (PV) of GDP for the 10 years period is computed for all cases. Taking as reference Case 1 the percentage of long term loss is also computed for the rest of the cases. The results are presented in Table 1. Several facts are worth highlighting. In the long term imperfect mobility could lead to significant output losses, which could be avoiding at least partially easing mobility: as shown in Table 1 losses could be reduced from -1.80 to -0.71 by improving technology, i.e. reducing a. Also preparedness is a key in determining the actual gains and losses. Indeed, as can be seen in Table 1 when there is an expected future event it pays to start getting prepared immediately rather than to wait until the future event actually takes place. Then, the value of '*anticipating and preparing for the skills needs of the future'* (in workds of the ILO) could be precisely estimated.

Table 1 Long term shock impact, several labour mobility cases

		LOW			HIGH		
	(1) Perfect labour mobility	(2) Immediate shock	(3) Future shock Anticipated	(4) Future shock not anticipated	(5) Immediate shock	(6) Future shock anticipated	(7) Future shock not anticipated
0	2120.0	2120.0	2120.0	2120.0	2120.0	2120.0	2120.0
1	2151.5	2087.4	2102.0	2120.0	2016.2	2032.6	2120.0
2	2151.5	2104.7	2106.9	2120.0	2029.7	2037.2	2120.0
3	2151.5	2115.1	2103.1	2089.2	2038.1	2025.9	2032.6
4	2151.5	2148.6	2147.6	2105.1	2146.0	2145.4	2037.2
5	2151.5	2149.7	2149.0	2114.5	2147.1	2146.6	2025.9
6	2151.5	2150.3	2149.9	2148.5	2148.0	2147.5	2145.4
7	2151.5	2150.8	2150.4	2149.6	2148.6	2148.2	2146.6
8	2151.5	2151.0	2150.8	2150.3	2149.0	2148.6	2147.5
9	2151.5	2151.1	2151.0	2150.7	2149.2	2148.9	2148.2
10	2151.5	2151.5	2151.5	2151.0	2151.5	2151.5	2148.6
PV	20473	20327	20329	20276	20105	20115	20077
	% Loss	-0.71	-0.70	-0.96	-1.80	-1.75	-1.93

Source: Own elaboration

Considering that both easing mobility and preparedness are policy matter, there is much room to seek output gains in the long term by acting today. In Table 1, a -1.93% loss of present value of output could be avoided or significantly reduced by the abatement of a and a carefully planned policy that takes into account the future economic challenges.

IV. CONCLUDING REMARKS

A recent World Development Report 2013 by the World Bank, states: *"Skills, especially cognitive abilities, are strongly related to productivity growth, more so than school attendance rates. They also are closely associated with structural transformation, especially for low- and lower-middle-income countries where they create opportunities for people outside of agriculture.... But around the world, available skills are not fitting well with the demands of the economy. Skills mismatches are arguably growing rather than shrinking".* Too often skill policies to correct/avoid this have not been effective, for instance, the empirical evidence on effectiveness of training programs is inconclusive (see for instance, Cansino and Sanchez, 2011; Arellano, 2010; Rosholm and Skipper, 2009; Heckman et al., 1999; Green et al, 2000); this fact may be revealing that training programmes are not being paid attention according to its real value, probably because in the sphere of public affairs these schemes have been historically thought mainly as remedial programs to dislocated workers for particular microeconomic- or macroeconomic-rooted reasons (see for instance, Jacobson et al., 2005). However, the dynamism of the global economy is challenging this view of the public policy and requires an effort to establish efficient mechanisms to generate the suitable skills.

These notes show that training may improve the efficiency of the restructuring process with direct impact on output growth and distribution. It is argued that these two effects reveal the true value of training, contrary to the conventional literature on evaluation of training programs; this methodological approach is one contribution of these notes. Indeed, adequate human resources policies can significantly speed up resources reallocation and reduce economic losses, as shown in the numerical exercises. The exercises highlight the losses of sluggish factor movements, showing that policies towards training incentives and preparedness can make a significant difference towards faster economic growth and lower long term losses. These results may provide useful guidelines to policymakers, which is a second contribution of these notes.

Incidentally, these policy recommendations might not be necessary for some emerging economies such as China where fast growth and economic restructuring is being accompanied by heavy investments in human capital: China hosts one of the largest workforces in R&D, and currently the government is seeking to reach 12 years of education for every child by 2020 (OECD, 2013). However, it might be not obvious in other cases whether policymakers would agree with these recommendations: in the United States the years of schooling attained by the population grew by a mere 0.27 fraction of a year in the last decade (2000-2010, last available data, Barro and Lee, 2013), and the pace of R&D spending is slowing down in comparison with China (2000-2009, last available data World Bank, 2013). A worrying report by OECD (2013) shows that in many developed countries newer generations struggle with basics skills required in the third millennium labour market, moreover, in England youngsters are lagging behind their parents' generation. There is also a question raised by Unesco (2013) as they project shortage of teachers in many countries by 2030. All in all, many opportunities to get ready not to be missed, or otherwise pay a hefty price.

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