International Review of Business Research Papers
Volume 6. Number 2. July 2010 Pp. 299 – 307

Observations on an Index of Labour Market Flexibility

Philip E. T. Lewis and Greg Mahony*

The construction of an index of labour market flexibility offers the promise of encapsulating a range of complex factors into a single measure. The aim of this paper is to critically evaluate the construction of one such index and subject it to a preliminary empirical test by examining the rank order of just two countries, Singapore and Australia. Our empirical analysis of the evolution of the returns to skill in the two countries over a decade suggests that these rankings cannot be supported. We argue that it is only by subjecting the index to rigorous evaluation can the validity and utility of the index be assessed. The empirical results suggest that the methodology employed in the construction of this index is flawed and biased.

JEL Codes: J01, J31

1. Introduction: Indexes, Institutions and Markets

The construction of an index is, on the face of it, a practical empirical matter so it need not necessarily reflect a commitment to a theoretical position regarding the role and function of labour markets. Nor should an index be constructed with a rigid view regarding the desirability or otherwise of particular institutional arrangements or regulatory frameworks since an important function of an index is to test for or determine the effects of institutions and regulation.

Policy debate often revolves around a country's ranking in indexes, so the utility of an index must be accompanied by a good degree of validity and be as free as possible from theoretical or ideological bias or presuppositions. It should incorporate, as far as possible objective measures and where subjective measures are included the rationale and legitimacy of these should be argued for in a transparent manner. Unfortunately this is not always adhered to in the construction of indexes. While the World Competitiveness Index, for example, is widely used it is not without its critics. Sanjaya Lall (2001) suggests that the `WEF definitions are too broad, the approach biased, the methodology flawed and inconsistent, and many measures vague, redundant or wrongly calculated. Lall points out that the WEF uses subjective measures such as questionnaire data when reasonable objective measures are readily available.

Attempts to construct indexes of labour market flexibility can flounder on the complexity and degree of difference in institutions between countries This is compounded by the fact that recorded data are often not comparable. While (Lawson and Bierhanzal (2004) acknowledge the variation in institutions, regulations and practices that influence labour markets they argue that the main factors that generally affect labour markets are: unemployment insurance, unionization, minimum wages, marginal tax rates, hiring and dismissal cost; and active labour market programs. They suggest that the difficulties in quantifying and comparing

*Centre for Labour Market Research, University of Canberra, ACT 2601, Australia.
Ph 61 2 6201 5482, Fax 61 2 62015238, Corresponding author: Greg Mahony
Email Greg.Mahony@canberra.edu.au

these factors across countries and the diversity of opinion about their impacts point to the usefulness of an overall index. The index they construct relies heavily on subjective rather than objective data.

Lawson and Biehanzal (2004) call their approach the Labor Market Freedom (and at other times Flexibility) Index (LMFI). The LMFI attempts to `quantify the relationship between various institutional factors and measures of economic performance'. They draw on Gwartney and Lawson's (2002) attempt to build on the rather prosaically named Economic Freedom Index (EFW) but now drop most objective measures and employ survey data from the Global Competitiveness Report (GCR 2001). While the EFW report uses mainly quantitative data the subjective survey data are thought more able to capture the variation across countries so as to be able to rank countries according to their degree of labour market flexibility. The responses to the GCR questions are from `national leaders in the business community'. The responses that relate to labour markets include the impact of the minimum wage laws and their enforcement, hiring and firing practices, collective bargaining and unemployment benefits. Lawson and Biehanzl (2004) add to `the four survey components from the GCR, a rating based on the top marginal income tax rate and the threshold at which it applies...to account for the tax wedge facing workers' (p.121). All ratings are on a 0-10 scale and a simple average of scores of the five factors, four subjective GCR responses from CEOs and the tax score, are used in the construction of the LMFI.

The complexity and diversity of labour markets are no doubt wide ranging and should make one cautious of the use of inaccurate or unreliable objective measures. However, it is not clear that the subjective measures that Lawson and Biehanzal (2004) adopt are the solution to their `need to see the whole labour market, and (the manner in which) labour market policies react in complex ways'. The scaled responses give the impression of a quantitative exactitude that belies the less than reliable source of the data. How reliable might CEOs be as a barometer of conditions in the labour market? There are obvious issues here of lack of full information beyond their own industry or sector, limited appreciation of the institutional characteristics and norms of the country, potential bias of their managerial positions, and clearly the bias of responding to a questionnaire from an organisation known to favour deregulation and liberalisation. We are provided with little information as to how the sample of respondents is selected.

Against the approach of the LMFI should be weighed the loss of detail or attention to countries' institutional differences. It would be legitimate to argue that it is just these differences that should be the object of investigation and study along with their effects on labour market outcomes. While Lawson and Biehanzal (2004) claim their approach offers `a more comprehensive look at labor market regulation' it may obscure more than it reveals.

It is claimed that the LMFI's methodology offers the advantage of allowing currency to the index as it is easy to incorporate recent policy and institutional changes. However there are severe limitations to the approach that weaken the validity of the index for analysis and forecasting. The reliance on CEO perspectives from survey responses seems a less than satisfactory way to capture changes in and impacts of institutional arrangements such as regulations, bargaining arrangements and laws as well as social norms. It is argued that many institutional reforms may take as long as

ten years to take effect and this is used as justification for the reliance on subjective data such as the responses of CEOs. We suggest that, too often, the hysteresis effects or lags involved in institutional reforms are exaggerated but, even if we accept their position, an empirical methodology as employed in this paper offers the prospect of testing these claims. We argue that it is only when tested against outcomes in the labour market that the index may be judged as robust or not.

Since relative price adjustment is at the heart of neoclassical theory and the related support for labour market flexibility then an empirical method that tests this relationship most directly has much to recommend it. Such a method should capture the reciprocal adaptation of prices and quantities – in this case the supply and demand for labour. The methodology of comparing the evolution of the returns to skills over time offers a direct test of labour market flexibility. Our results for Singapore and Australia dispute the ranking provided by the LMFI and calls into question the methodology employed in index.

Table 1: Rankings of Labour Market Flexibility and GCI score & rank: Selected Countries

	Labour Market Freedom Index	Global Competitiveness Index Score 07-08	GCI rank of all countries
Hong Kong	7.7	5.37	12
Singapore	**7.3**	***5.45***	***7***
USA	6.6	5.57	1
Malaysia	6.2	5.1	21
UK	6.1	5.41	9
NZ	4.9	4.98	24
Australia	***4.2***	***5.17***	***19***
Belgium	3.4	5.1	20
France	3.4	5.8	18
Germany	2.7	5.51	5

Source: Lawson & Bierhanzl 2004; World Economic Forum. 2007, The Global Competitiveness Report 2007-2008,

Column two of Table 1 shows the relative scores and rankings for Australia and Singapore, two countries that are ranked highly and moderately in terms of labour market flexibility in the LMFI. (Columns three and four show the GCI scores and rank of selected countries). Both Australia and Singapore have aspired to become knowledge economies while promulgating polices of labour market deregulation. In the full table in the Appendix, of 73 countries Singapore has only one country higher than it while Australia has 60 (Lawson and Bierhanzl 2004).

2. Measuring Skills

Our direct measure of labour market flexibility can be explained in several stages. Data analysis that follows examines the extent of changes in skills mix and returns to skills in Australia and Singapore. First, it is necessary to define “skills”. The issue of skill measurement will confront any analysis of skills at an aggregate level. Typically in economic studies skill has been proxied by level of education and years of

experience (see, for example, Borland 1999).The obvious shortfalls of education and experience are that these measures do not necessarily capture the actual skill requirements of jobs – the rapid growth in educational attainment may have as much to do with credentialism as skill attainment (Attwell 1990). An alternative favoured by sociologists focuses on the skill attributes required of jobs, as defined in the US Department of Labor's Dictionary of Titles (DOT). Despite the limitations of using the DOT it provides a convenient basis for the analysis of skills independent of productivity measures and knowledge of individuals or workplaces and so is used for the following analyses. A brief overview of how skill scores are assigned to an occupation and industry follows. The full details can be found in Kelly and Lewis (2003).

Measures of skill were constructed for occupations in Australia and Singapore, respectively, using data and information contained in the Australian Standard Classification of Occupation (ASCO) and the Singapore Standard Classification of Occupations (SSCO) using scales of skill complexity for four skill dimensions developed by the United States Department of Labor (USDOL 2000). The Dictionary of Occupational Titles (DOT), 4th edition, provides a schema for rating skills at the finest level of occupational detail, as shown in Table 2. In DOT jobs are classified as requiring workers to function to some degree in relation to data, people, and things. The scale for each skill dimension shown in Table 2 is in descending order.

Table 2: Scale of Complexity for Skill Categories

Data	People	Things
0 Synthesizing	0 Mentoring	0 Setting Up
1 Coordinating	1 Negotiating	1 Precision Working
2 Analyzing	2 Instructing	2 Operating-Controlling
3 Compiling	3 Supervising	3 Driving-Operating
4 Computing	4 Diverting	4 Manipulating
5 Copying	5 Persuading	5 Tending
6 Comparing	6 Speaking-Signaling	6 Feeding-Off bearing
	7 Serving	7 Handling
	8 Taking Instructions-Helping	

Source: USDOL (2000)

Those tasks that involve more complex responsibility and judgment are assigned lower numbers for each category and the less complicated have higher numbers. For example, for the data skill dimension (see Table 2) 'compiling' would be considered a more complex task than 'copying'. The same applies for the other dimensions. Each dimension is considered separately. The scale relates to an ordering of the complexity of tasks normally undertaken in an occupation, it does not signal anything about the intensity of use of those skills. At an industry level, this is determined by the hours of employment, or utilisation, of the skills embodied in an occupation. The occupation, in turn, tells us something about the tasks undertaken and how they relate to the scale of complexity shown in Table 2.

Three types of skill are analysed: motor skills, interactive skills and cognitive skills. The 'data' category in Table 2 provides a measure of cognitive skills, the 'people' category aligns with interactive skills and the 'things' category provides a good

indicator of motor skills. In addition the traditional measure of cognitive skills, education is also examined here. All measures were recalibrated such that least complex tasks were given the lowest score. The scale was converted to a common scale of 0 to 10. Finally, the scores were assigned to a given occupation for each skill dimension at the finest level of information on occupations, the six-digit level. The most complex task undertaken in an occupation for each skill dimension, as identified from ASCO and SSCO, provided the basis for applying the scores.

3. The Data

The Census of Population and Housing in Australia is a rich data source which is available to at a very detailed level of disaggregation. It therefore allows the distribution of people by occupations and industries to be determined at the six digit level and therefore allows for very detailed analysis of changes in occupational skills demand. Although the Census contains no data on wages, annual total income from all sources is available and, with care, can be used to estimate wages.

While the Census of Singapore in very comprehensive, held every 10 years and contains questions on occupations and earnings these are reported only at the highly aggregated one digit level. The Survey on Annual Wage Changes is published in the *Report on Wages in Singapore*, each year. The survey is conducted by the Manpower Research and Statistics Department of the Ministry of Manpower (and its predecessors) and covers only firms in the private sector. Full details can be found in the Ministry of Manpower (2009).

Here changes over a ten year period for both Australia and Singapore are chosen. For Australia the two Census years 1996 and 2006 are used while comparative years for Singapore are 1993 and 2003.

4. Changes in Skills Mix

Table 3 and Table 4 below show the changes in skills levels for each of the skills measures for Australia and Singapore respectively. Although direct comparisons cannot be made a clear picture nevertheless emerges. The two economies have had quite different experiences.

Table 3: Change in Average Skill Levels, Australia, 1996-2006, per cent

	Motor	Interactive	Cognitive	Education
Full-time	-5.1	5.1	1.2	2.9
Part-time	-7.4	6.6	1.4	0.8
Total	-6.0	5.3	1.0	2.1

For Australia the mean skill levels for full-time workers for interactive, cognitive and education skills increased by about 5.3, 1.2 and 2.9 per cent respectively between 1996 and 2006. The most striking result is that motor skills per hour employed for full-time workers declined by 5.1 per cent. The decline in motor skills for part-time workers was 7.4 per cent. The changes for part-time workers in interactive and cognitive skills were similar to full-time workers. Overall the increase in mean skills was highest for interactive and relatively modest for cognitive skills and educational attainment. In summary, the Australian labour market experienced considerable

change in skills mix over the period with the changes accommodating the move to the New Economy.

Table 4: Change in Average Skill Levels, Singapore, 1993-2003, per cent

	Motor	Interactive	Cognitive	Education
Males	-31.9	17.2	-9.4	-7.9
Females	-19.8	53.1	9.6	14.1
Persons	-27.3	32.2	-1.1	1.4

The results for Singapore show that there has been a dramatic fall in the average level of motor skills per workers, down about 27 per cent for all workers, but particularly large, 32 per cent, for males. This is as would be expected if Singapore is moving towards a New service-based Economy. Perhaps of concern is the decline in cognitive skills and education among males. It is important to note that this does not necessarily mean that the workforce had less cognitive skills or became less educated over the period in question, but rather, that the cognitive and educational level required (as represented by the numbers employed) was less intensive. This is of some concern since it implies that despite the huge increase in human capital investment by government, and more so individuals, the change in the distribution of jobs has not matched this. The biggest rise in skills was for interactive skills, particularly for women, over 53 per cent) which is consistent with a shift to more service sector or client focussed jobs.

5. Returns to Skills

In a market economy for efficient human capital formation it is necessary for returns to skill formation to be reflect changes in demand for skills. As a country becomes integrated into the New Economy some skills, most notably those associated with the generation and use of knowledge, will be in greater demand. Rises in wages in occupations which are intensive in those skills, act as signals to invest in education in the attainment of these skills. Similarly relative wages in occupations which use intensively skills which are in decline, such as manual dexterity and strength, should decline.

In the exercise here wages are related to skills levels by the following simple model:

$$w_i = \alpha + \beta_j \sum X_{ij} + \gamma_j \sum X_{ij}\, X_{ij} + \varepsilon_i$$

where:

w_i is log of the median wage in occupation i β_j is a vector of parameters for j skills

α, β_j , γ_j are constants, j=1..3

X_{ij} is a matrix of j skill variables for i occupations

$X_{ij}\, X_{ij}$ $i \neq j$ are included to account for interaction between the three skills

ε_i is the error term.

The extent to which the βs change over time can be interpreted as changes to the returns to particular skills.

The model was estimated using ordinary least squares. The model satisfied the usual diagnostics. The estimated coefficients for the skills variables are given below. A full set of results is available from the authors by request.

Table 5: Returns to Skills in Australia, 1996 and 2006

Males

Year	Motor	Interactive	Cognitive
1996	-0.004	0.022	0.023
2006	-0.004	0.051	0.035

Females

Year	Motor	Interactive	Cognitive
1996	-0.009	0.029	0.023
2006	-0.009	0.042	0.031

Looking first at the Australian results for males, the motor skills coefficients are very small (in some cases not significantly different from zero) and negative. This indicates that as the economy has changed and reduced demand for motor skills investment in these skills has become less profitable, as expected in a flexible labour market. On the other hand, the returns to interactive and cognitive skills – those associated with the New Economy – are strongly positive and have risen.

By comparison with males the results for females show that motor skills are not important (coefficients not significant) or negative with respect to earnings. This is as expected given the labour market segmentation with respect to gender whereby women are not prevalent in manual jobs. The coefficients suggest that returns to interactive skills are large and have increased for women at a rate similar to that for men, again as would be expected in a flexible labour market adjusting to technological and structural change.

Table 6: Returns to Skills in Singapore, 1993 and 2003

Males

Year	Motor	Interactive	Cognitive
1993	0.049	0.090	0.147
2003	0.031	0.078	0.128

Females

Year	Motor	Interactive	Cognitive
1993	-0.255	0.128	0.115
2003	-0.009	0.103	0.118

Looking first at the Singaporean results for males, the most striking observation is that the magnitudes of the skills coefficients have hardly changed over time. If anything the returns to all three types of skills has declined slightly. Certainly there is no evidence that returns to interactive and cognitive skills – those associated with the New Economy – have risen.

By comparison with males the results for females show that motor skills are relatively unimportant (coefficients not significant). This is as expected given the labour market segmentation with respect to gender whereby women are not prevalent in manual jobs. The coefficients suggest that returns to interactive skills are greater for women than for males, again perhaps indicative of labour market segmentation whereby women are more highly represented in service industries and occupations. Importantly, for females, as for males again there is little change in returns to skills over time.

6. Discussion and Conclusion

The results for Australia are consistent with an economy moving in accordance with New Economy developments. Demand for skills has changed in exactly the way one would expect with declining demand for motor skills and rises in the other skills. Also despite the huge rise in educational attainment rewards to skills have increased. The results for Singapore are less convincing. Although demand for motor skills has fallen there has not been the expected growth in demand for knowledge-based skills, at least for males. Also, there has been no increase in the returns to the skills which would be in demand in the New Economy

This suggests that that the Australian labour market is very flexible but that there is less flexibility in the labour market in Singapore than would be required and which policy has aimed for since 1985. This is in contrast to the findings of Lawson and Bierhanzl (2004) whose study was based on an index of Labor Market Flexibility. Their ranking of countries in terms of labour market flexibility has Singapore ranked highly and Australia much lower, in the moderate range.

Theory suggests that in a well functioning labour market (not necessarily analogous to a fully deregulated one) incomes are expected to show increased dispersion over time especially in a period of technological change to a knowledge economy. Here is where Singapore and Australia are useful comparators. The data suggest that the Singapore experience has been quite different to that of other major industrialised countries such as the US and Australia where the New Economy developments have significantly widened the earnings distributions (Kelly and Lewis 2003).

Our test is quite rigorous since our measure of the returns to skill does not depend on direct assessments of any particular regulation or institution of the labour market or any other dimension of the economy (e.g. top marginal tax rate). Our results show the Lawson and Bierhanzal index of labour market flexibility to be problematic in its rankings. We suggest that their methodology is flawed due to excessive reliance on subjective measures in their index. These measures are subject to ignorance on the part of CEOs of the actual state of the labour market, are biased due to the small sample size, and are self serving or incomplete.

References

Borland, J., ‘Earnings Inequality in Australia: Changes, Causes and Consequences’, *Economic Record*, vol 75, no 229, pp 177-202.

Gwartney, J. and Lawson, E. 2002 Economic Freedom of the World: 2002 Annual Report. Vancover: Fraser Institute.

Lall, S. 2001, "Comparing National Competitive Performance: An Economic Analysis of World Economic Forum's Competitiveness Index", *World Development* Vol. 29, No.9 pp. 1501-1525.

Lawson, R.A. and Bierhanzl, E. 2004 "Labor Market Flexibility: An Index Approach to Cross Country Comparisons", *Journal of Labor Research*, Vol XXV, no. 1. Winter 2004, pp. 117-126.

Ministry of Manpower, Singapore, 2009, *Report on Wages in Singapore*, Manpower Research and Statistics Department.

Kelly, R. and Lewis, P.E.T. 2003, "The New Economy and Demand for Skills", *Australian Journal of Labour Economics*, Vol. 6, No. 1, pp 135 – 152.

World Economic Forum, 2007 Global Competitiveness Report: 2006-07. Oxford, Oxford University Press.

United States Department of Labor, USDOL 2000, "Dictionary of Occupational Titles (4th Ed.) - Appendix B", 2000, (accessed online 19 September, 2000: http://www.oalj.dol.gov/public/dot/refrnc/dotappb.htm,).